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# Chemical and mechanical stimulation of the subchondral bone induces microcomputed tomography and histological changes of bone and cartilage in an ovine model

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ABSTRACTS

# World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (WCO-IOF-ESCEO 2019): Posters Abstracts

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## P101
## EFFECT OF ERAS ASSISTED MIPPO IN THE TREATMENT OF PROXIMAL HUMERAL FRACTURE

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**Objective:** To investigate the effect of ERAS combined with MIPPO in the treatment of proximal humerus fracture.
**Method:** 32 patients with proximal humerus fractures were randomly divided into ERAS combined with MIPPO group and simple MIPPO group that have 16 cases each. These two kinds of groups have same operation, while the treatment before and after operation were very different. The VAS score, the incidence of complications, the average hospitalization days and cost, the time of beginning to walk postoperatively and functional exercise were compared between these two groups.
**Results:** Compared with MIPPO group, the VAS score of ERAS combined with MIPPO group was lower than that of MIPPO group. The incidence of nausea and vomiting was 12.5% *vs.* 43.75%. The average hospitalization day was 5.7±1.3 d *vs.* 8.2 ±1.4 d, the average hospitalization cost was 3.1±0.8 w *vs.* 3.9±0.6 w. The time of beginning to walk postoperatively was 6.2±0.8 h *vs.* 24.2±2.7 h while the time of beginning functional exercise after operation was 2.1±0.4 d *vs.* 7.2±1.2 d ($P<0.05$).
**Conclusion:** ERAS combined with MIPPO can alleviate postoperative pain, reduce postoperative complications, shorten average hospitalization days and cost, bring forward days of walking and functional exercise, which is better for patients' recovery and is worthy for clinical application.

## P102
## CLASSIFICATION ALGORITHMS FOR PREDICTING THE RISK OF OSTEOPOROTIC FRACTURE

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Information technology may provide alternative approaches to osteoporosis disease diagnosis. This systematic review was performed to compare the diagnostic accuracy of vertebral fracture assessment. In this study, we examined the potential use of classification techniques on a massive volume of healthcare data, particularly in prediction of patients that may have osteoporosis through its risk factors. For this purpose, we proposed to develop a new solution approach based on random forest decision tree to identify the osteoporosis cases. There has been no research in using the aforementioned algorithm for osteoporosis patient prediction. The reduction of the attributes consisted to enumerate dynamically the optimal subsets of the reduced attributes of high interest by reducing the degree of complexity. A computer-aided system was developed for this purpose. The performance of the proposed model in this study was analyzed and evaluated based on set of benchmark techniques applied in this classification problem.

## P103
## L3 VERTEBRAL BODY COMPRESSION FRACTURE IN A PATIENT WITH TYPE 2 DIABETES MELLITUS AND VITAMIN B12 DEFICIENCY – RISK FACTORS ASSESSMENT AND THE ROLE OF DENOSUMAB IN ITS CONTROL: CLINICAL CASE PRESENTATION

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**Objectives:** Vertebral compression fractures are very common especially in older adults and are usually caused by osteoporosis where mineral bone density became low. This kind of fractures is a growing public health problem with important socioeconomic effects in the western countries. Osteoporotic fractures are those occurring from a fall from a standing height or less, without major trauma. They often occur at the midthoracic (T7-T8) spine and the thoracolumbar junction (T12-L1). Fractures may result in significant back pain, leading to inability to perform activities of daily living. and can lead to loss of independence, depression, and chronic pain. Osteoporotic fracture is an important risk factor for subsequent fracture. While the diagnosis can be suspected from history and physical examination, plain radiography, as well as occasional CT or MRI,

are often helpful in accurate diagnosis and prognosis. Following the progressively ageing population the prevalence of osteoporosis is increasing and as a consequence, the incidence of spinal compression fractures. Denosumab. a specific inhibitor of RANKL, is a novel antiresorptive therapy for postmenopausal osteoporosis and effectively and quickly reduces the risk of important fractures related to osteoporosis, and that fracture protection persists as long as treatment is given.

**Methods:** We present a case of a 65-year-old patient with type 2 diabetes mellitus with poor glycemic control (HbA1c ≥7%), hypertension, and osteoporosis, following a spinal trauma secondary to a casual fall from a standing height. However the first radiological examinations did not show any changes an intense worsening pain of the lumbar spine and a restriction of motion lead to extended investigation. After 14 d from the traumatism, the patient returned to her first care doctor with worsening pain. The radiographs and CT scan showed collapse of the L3 vertebral body. Laboratory studies showed normal complete blood count and biochemistry confirmed *poor diabetic control with HbA1c* value of 8.5% and vitamin B12 deficiency suggesting pernicious anemia. The patient was diagnosed osteoporosis on the basis of both his medical history and radiological and histological findings was diagnosed of L3 osteoporotic fracture and was treated with paracetamol and NSAIDs for the last 20 d.

**Results:** The patient was referred to the Traumatology consultation where conservative treatment were decided, including bracing with thoracolumbosacral orthosis (TLSO), pain medications (paracetamol, NSAIDs and opioids) and starts treatment with denosumab and B12 supplements with a great response and favorable evolution desestimating surgical treatment. During 2 y of follow-up the patient reestablished painless and full lumbar motion, did not presented new compression fractures and the laboratory test shown HbA1c 5.8% and the deficiency of B12 was not detected.

**Conclusion:** It is necessary to keep all risk factors for osteoporotic fractures under control in order to prevent new events. Diabetes mellitus and B12 loss are being considered among the most important factors responsible for the increase of the risk of fracture especially in osteoporotic bones. New treatments like denosumab not only acts protecting bone from degradation but also seems to improve glycemic control in diabetic patients. It is also very important for the physicians to have a complete knowledge of the clinical, pathological and radiological characteristics osteoporotic fractures and its risk factors, as to follow a correct diagnostic course enabling to prepare the most suitable therapy.

## P104

## LOW BACK PAIN IN A 19-YEAR- OLD TEENAGER REVEALING CHONDROBLASTIC OSTEOSARCOMA: CLINICAL CASE REPORT

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The purpose is to report a case of chondroblastic osteosarcoma in the region of the pelvis with 3 months of evolution. The term osteosarcoma refers to a heterogeneous group of malignancies with bone formation or mesenchymal tissue with histopathological evidence of osteogenic differentiation. The pattern of chondroblastic osteosarcoma represents 1/4 part of all reported cases of this neoplasm. Its histopathological diagnosis is based on the predominance of a chondroid matrix formed in the midst of neoplastic cells.

Case: A 19-year old male patient, presented in several occasions to his first care doctor and to the emergency room complaining of a dull ache in the lower back and thighs. No relevant clinical history. Plain X-ray was normal. The CT analysis exhibited a radiolucent pelvic mass with dispersed areas of radiopacity, with poorly defined and indistinct peripheral edges. The patient was subjected to incisional biopsy and histopathological examination showed the presence of a malignant neoplasm of mesenchymal origin characterized by the presence of irregular bone trabeculae dispersed among mildly atypical chondroblastic cells. The conventional or classical osteosarcoma is the most frequent variant, which develops within the medullary bone. This report illustrates the rapid evolution of one of the histological variants of osteosarcoma. The patient is referred to Oncology Department and resectional surgery is valorated and once rejected chemotherapy is used leaving the patient stable for months.

## P105

## ACCURACY OF DIGITAL TEMPLATING IN TOTAL HIP ARTHROPLASTY

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**Objective:** Preoperative planning is an essential part of total hip arthroplasty (THA). It facilitates the surgical procedure, helps to provide the correct implant size and aims at restoring biomechanical conditions. In recent times, surgeons rely increasingly on digital templating techniques. Although there are many positive effects associated with digital templating, problems remain that have to be taken into consideration. The core objective was to evaluate the impact of the planner´s experience on the accuracy of predicting component size by digital preoperative templating. In addition the influence of overweight and obesity (according to WHO criteria), patient´s sex and component design on the accuracy of preoperative planning have been analyzed.

**Methods:** This retrospective study included 632 patients who had primary THA. THAs were all planned with syngo – EndoMap® digital planning software (Siemens Medical Solutions AG). The accuracy of predicting component size has been evaluated by comparing preoperative planned sizes

with definitely implanted sizes as documented by the surgeons. The planner´s experience was tested by comparing the reliability of preoperative planning done by senior surgeons or residents. The influence of BMI on predicting component size has been tested by comparing the accuracy of digital templating between different groups of BMI according to WHO criteria. The same has been done for evaluating the impact of patient´s sex and component design. Mann-Whitney U test and Kruskal-Wallis test have been used for statistical analysis.

**Results:** The implant size was predicted exactly in 42% for the femoral and in 37% for the acetabular component. 87% of the femoral components and 78% of the acetabular cups were accurate within one size. Digital templating of femoral implant size was significantly more reliable when done by a senior physician. No difference was found for the acetabular component sizes. The BMI also had an impact on estimating the correct femoral implant size. Overweight individuals were significantly harder to plan than normal weight people. Templating obese patients was not that accurate either but showed no significance. Again, the acetabular components were not affected. Furthermore, the design of the prostheses and the patient´s sex had no influence on predicting component size.

**Conclusion:** Experience and overweight correlate with the accuracy of preoperative templating in femoral components. Acetabular components however seem to be independent of these factors.

## P106

## COMPLICATED TIBIAL PLATEAU FRACTURES IN YOUNG PATIENTS: FUNCTIONAL OUTCOME WITH DUAL PLATING VIA 2-INCISION TECHNIQUE EXPERIENCE OF TWO PUBLIC SECTOR HOSPITALS OF KARACHI, PAKISTAN

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**Objective:** This prospective study was designed to evaluate the functional outcomes of dual plating via a 2-incisions technique for the fixation of tibial plateau fractures.

**Method:** This prospective study included 94 cases of type V and VI tibial plateau fractures of young patients age range from 15-45 y, operated between Jan 2014 and Dec 2016. Exclusion criteria include patients with multiple fracture on same side or same bone, age >45 y, open contaminated fracture, and patients with head injuries.

**Results:** Total 94 patients (45 single and 49 dual plating) were operated during the study period of 2 y. 38 (77%) patients in a double plating group regained full flexion (135°) and extension (0°) with a good alignment compared to single plating group, seen in 30 (66%) patients at follow-up.

**Conclusion:** Dual plating by 2-incision method resulted in better functional outcome in young patients.

## P107

## ROLE OF ALENDRONATE/TERIPARATIDE IN STEROID INDUCED OSTEOPOROSIS IN DEVELOPING COUNTRIES

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**Objective:** Bisphosphonate therapy is the standard of care for the prevention and treatment of steroid-induced osteoporosis. Studies of anabolic therapy in patients who are taking long-term steroids and are at high risk for fracture are lacking.

**Methods:** This is double-blinded randomized controlled trial that was conducted in Civil Hospital Karachi from January 2015 to June 2017. In this study comparison of alendronate with teriparatide in 214 women and men with osteoporosis (ages, 22-65 y) who had received glucocorticoids for at least 3 months (prednisone equivalent, 5 mg daily or more). A total of 107 patients received 20 μg of teriparatide once daily, and 107 received 10 mg of alendronate once daily. The primary result was the change in BMD at the lumbar region. Secondary outcomes included changes in BMD at the total hip and in markers of bone turnover, the time to changes in BMD, the incidence of fractures, and safety.

**Results:** The mean (±SE) BMD at the lumbar spine had increased more in the teriparatide group than in the alendronate group (3.2±0.5% vs. 6.9±0.6%, P<0.001). A significant difference between the groups was reached by 6 months (P<0.001). At 12 months, BMD at the total hip had increased more in the teriparatide group. Fewer new vertebral fractures occurred in the teriparatide group than in the alendronate group (6.0% vs. 0.4%, P=0.004); the incidence of nonvertebral fractures was similar in the two groups (3.5% vs. 5.4%, P=0.36). Significantly more patients in the teriparatide group had at least one elevated measure of serum calcium.

**Conclusion:** Patients with osteoporosis who were at high risk for fracture, BMD increased more in patients receiving teriparatide than in those receiving alendronate.

## P108

## EARLY AND MIDTERM SURVIVALS OF UNCEMENTED BIPOLAR HEMIARTHROPLASTY IN ELDERLY OSTEOPOROTIC PATIENTS IN KARACHI, PAKISTAN

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**Objective:** Treatment of unstable intertrochanteric fracture in elderly patients remains challenging. The purpose of this prospective study is to determine clinical and radiological results of cement less bipolar hemiarthroplasty using a fully porous-coated stem in osteoporotic elderly patients with unstable intertrochanteric fractures with follow-up over 1 y.

**Methods:** This retrospective study is conducted in 22 patients at Dept. of Orthopaedic Surgery Civil Hospital, DUHS Karachi.

Exclusion criteria were the patients with age <40 y, with polytrauma and head injury. The patients with isolated neck of femur fractures either traumatic or osteoporotic having age >40 y were included in this study. The study duration is of 1 y from August 2017 to August 2018. All the patients were evaluated clinically as well as radiologically. The mean follow-up duration was 9 months.

**Results:** 13 cases (60%) showed no decrease in ambulation capacity postoperatively. Radiologically, there were 12 cases (57%) of fixation by bone ingrowth and 10 cases (43%) of stable fibrous fixation. There were no cases of osteolysis. 11 cases (27.5%) of new bone formation were found around the stem. All stems were stable without significant changes in alignment or progressive subsidence.

**Conclusion:** Cement less bipolar hemiarthroplasty using a fully porous-coated stem is a useful surgical treatment option for unstable intertrochanteric fracture in elderly patients with osteoporosis.

## P109
## GENDER, SKIN TYPE AND LIFESTYLE AND THE ELIGIBILITY FOR VITAMIN D SCREENING

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**Background:** It is becoming well known world-wise that low levels of vitamin D are associated with an elevated risk of chronic disorders including malignancies and metabolic disorders. Hypovitaminosis D is also common among the diverse population of the UAE despite the ample year-round sunshine. Many people however, tend to stay indoors avoiding the excessive heat during the day time while others lead a predominantly an indoor life style because of their social status or the nature of occupation. Several studies in the past have attempted to identify the factors behind the vitamin inadequacy touching upon potential issues for the problem. None however, has addressed the issue of eligibility for vitamin D screening in certain groups of population at risk of deficiency and who will benefit the most from vitamin D correction. This work intends to pave the way for the above purpose and before a nation- wide task force can be initiated.

**Methods:** Over a period of 6 months , a cohort of 104 adult patients attended the clinic of (Internal Medicine & Rheumatology) for various medical reasons. They themselves requested the estimation of the level of vitamin D. None ,in this group was on vitamin supplementation nor indicated history of chronic renal or liver failure or malabsorption syndrome. Information of demographic characteristics , social and occupational history , daily activity whether (predominantly indoors or outdoor or of both ), skin scale type based on ( Fitzpatrick scale) and the dressing style of females (fully concealing clothing ; as subgroup 1, concealing clothing but with face and hands exposed : as subgroup 2,and others with western clothing style ; as subgroup 3), in addition to results of 25(OH) D assay were sought here.

**Results:** 91 (87.5%) had level of 25 (OH) D3 less than 30 ng/ml in G1 and 13 expressed normal values ( >30ng/ml) in G2, P=0.0001. 65 (71.5%) & 10 (77%) were females in the two groups respectively, P=0.0001.Their age was from (15-72 years) and approximate mean of (41.4+/-12.4 and 44.5+/-13.7 yrs, P=0.47). 25(OH)D3 was significantly higher in G1 (mean of 18.8+/-5.72 vs. 40.8+/-ng/ml in G2) ,p=0.0001. In those with hypovitaminosis D ,the mean of 25(OH)D3 in both genders was equal though ( 18.6+/- 5.74 in females vs.19.1 +/- 5.76 ng/ml in males, p=0.75). Only 5 patients, (( 4 females(6%) & 1 male (4%)) had deficiency levels of < 10 ng /ml (5%). 64 Arab nationals expressed mean of 19.5+/-5.83 vs . a mean of 17.7+/- 5.64 ng/ml in 22 Asian patients , P=0.22. In dress style perspectives, the majority of females 44 (68%) belonged to subgroups 1 & 2 (( 8( 12.5%) ,& 36 (55.5%)) respectively, vs. 21 as subgroup 3 (2%), p=0.0001. Surprisingly, the mean of 25(OH) D was not different between the three subgroups of dressing style , as all p values were non significant. The distribution of all patients based on Fitzpatrick skin scale is shown in Table 1.

Table 1

| Patients with low 25 (OH)D (91) :Scale (%) | | Patient with normal 25(OH)D (13):scale (%) | P |
|---|---|---|---|
| 1 | 1 (1%) | 1 (7.5%) | |
| 2 | 16 (17.5%) | 2 (15%) | 1.000 |
| 3 | 52 (57%) | 7 (54%) | 1.000 |
| 4 | 16 (17.5%) | 2 (15%) | 1.000 |
| 5 | 5 (5.5%) | 1 (7.5%) | 0.56 |
| 6 | 1 (1%) | 0 | |

The comparison between the mean of 25(OH)D (19.0 +/- in patients with skin scale 2 ( the lightest) and each of that in patients with scale 3,4 and 5 did not reveal any statistical significance, P values (NS). The vast majority ((97 , (95.5%)) indicated a predominantly indoor daily activity and the remaining 4 patients (4.5%) indicated both of indoor and outdoor daily activity . The gross social & occupational categorization is shown in Table 2.

Table 2

| Category | Number (%) |
|---|---|
| 1. House wives & house maids 38 +2 | 40 (44%) |
| 2. Various office work personnel including teachers | 33 (36%) |
| 3. Skillful (including medical professionals , engineers & technicians | 10(11%) |
| 4. Students | 6 (6.5%) |
| 5. Police force | 2 (2%) |

**Discussion and Conclusion:** Hypovitaminosis D appeared significantly common in this random group of patients who were interested in the estimation their 25(OH)D levels and the females appeared more concerned about that than the males. Nonetheless, the mean values o the 25(OH)D with regard to

gender, skin scale type and dressing style in females were not discriminatory. Home or office-based individuals with minimal access to sun exposure formed the bulk in this group hence they may represent the population with highest risk for vitamin D deficiency. These findings should be taken into consideration in future studies aiming at the eligibility for vitamin D screening.

## P110
## MULTIFOCAL BONE MARROW NECROSIS IN NEWLY DIAGNOSED ACUTE LYMPHOBLASTIC LEUKEMIA: A CASE REPORT

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Bone marrow necrosis (BMN) in acute leukemia is a rare histopathological entity at the time of initial diagnosis. However, it represents an important diagnostic and prognostic challenge. It is an uncommon, but not rare cytological and histological entity in both acute myeloid leukemia and acute lymphoblastic leukemia (ALL). The clinical symptoms could be very severe with fatigue, bone pains, fever and alterations as anemia, thrombocytopenia, leucopenia or leukocytosis, coagulopathy, high LDH level, and/or hypercalcemia. The diagnosis is made by bone marrow biopsy. The treatment is based on the associated pathology. The prognosis is generally poor, depending on age, patient clinical history and severity of the initial pathology. The incidence of BMN seen across a wide range of malignant and non-malignant hematological disorders. We present a case of 15-year-old boy diagnosed of ALL in February 2018 after presenting severe anemia, progressive fatigue and excessive sweating, hemoglobin concentration was 5.5 g/dl and the differential count indicated lymphocytosis and severe neutropenia. Under a treatment for pain control and chemotherapy ALL SEHOP - PETHEMA 2013 RI with acceptable control in the follow-up. BMN in ALL is a rare phenomenon, but the disease course and its underlying processes are of basis and clinical interest.

## P111
## METASTATIC MELANOMA IN THE FEMORAL NECK – A PATHOLOGIC FRACTURE IN A 53-YEAR-OLD MALE: A CASE REPORT WITH LITERATURE REVIEW

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Malignant melanoma is a neoplasm with malignant proliferation of melanocytes mainly in the skin, but also can occur in other organs like the esophagus, mucosas, the eyes and the meninges. Even though it represents only 3-5% of primary cutaneous malignancies, malignant melanoma remains the most aggressive one. The incidence of this type of cancer has increased a lot over the last decades. Nowadays, malignant melanoma is responsible for 50% of deaths from skin cancer. Metastatic melanoma or clinical stage 4 melanoma is described when the malignant melanocytes spread from the primary site to the regional or distant lymph nodes and to other organs. The metastatic behavior of malignant melanoma is uncommon because the sites of metastases are widespread compared to other tumors. Even if, in theory, any organ can be invaded by malignant cells, melanoma commonly spreads in certain organs more than in others. It will metastasise mainly in the following organs: skin (other areas), subcutaneous tissue and lymph nodes (50-75%), lungs and area between the lungs (70-87%), liver (54-77%), brain (36-54%), bone (23-49%), gastrointestinal tract (26-58%), heart (40-45%) adrenal glands (36-54%), kidneys (35-48%), spleen (30%), and others. The aim of this case report was to evaluate the histopathological characteristics on a patient with metastases in the femur from malignant melanoma. A review from the literature is also mentioned.

We present a case of metastatic malignant melanoma in the femur with known primary tumour in a 53-year-old male who presents in the Emergency Room complaining of severe pain and functional impotence in the right hip. Some pains in the left thigh and gluteal region were present for about a months, but at a lower intensity. Physical examination, during active and passive mobilisation attempts, reveals major pain in the hip and functional impotence were highlighted. The patient had been admitted with a diagnosis of proximal third right femur fracture on pathological bone, for specialised investigations and treatment. The wholebody scintigraphy examination realised on the third day of hospitalisation revealed a retention area with high intensity and heterogeneous character in the proximal third of the left femur (trochanteric and shaft region). On SPECT/CT examination detected small areas of retention and heterogeneous character; it is also described the fracture trajectory marked on CT. Diagnosis was confirmed by histopathology. The patient undergoes a surgery with partial replacement of the left hip. In a follow-up presents correct recuperation from the surgery.

Malignant melanoma is a cancer that may metastasise in the skeleton. However most of bone metastases are found in the axial skeleton and they rarely involve the femur, as in our case. Only a few case reports are published in the literature. Clinicians must be aware of the varied clinical manifestations of disseminated malignant melanoma.

## P112
## ANALYSIS OF THE RISK OF BONE FRACTURES IN ELDERLY WOMEN THROUGH FRAX TOOL

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**Objective:** Evaluate the bone quality of women over 60 y of age through the application of the FRAX Tool.

**Method:** This is a descriptive, observational and cross-sectional study with quantitative approach and sampling of elderly individuals, consecutively included women, developed in a general gynecological clinic, which provides care to women from all regions of the Distrito Federal, in which a sociodemographic questionnaire and the FRAX tool were applied.
**Results:** A low risk of fractures in 10 y was observed in 93.2%. The risk of medium/high fractures of 6.8% was similar to other studies. In patients up to 79 y of age, the risk of medium/high fractures through FRAX is 3.7%, and in patients above 80 y, it rises to 45.5%. Another finding of this work is also about the low osteopenia/osteoporosis diagnosis of the study patients.
**Conclusion:** When comparing the elderly up to 79 years old with the elderly over 80 y, there is a greater variation in the percentage of risk of medium/high fractures, through FRAX. A high rate of falls is still observed in the patients.

## P113
## PERIPROSTHETIC BONE REMODELING AFTER IMPLANTATION A NEW ANATOMIC CEMENTLESS STEM: ONE YEAR DENSITOMETRIC FOLLOW-UP

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**Objective:** In order to establish the pattern of bone remodeling caused by a cementless, anatomic implant, we intend to evaluate the changes in BMD observed after surgery in the Gruen zones.
**Method:** A controlled, prospective study was carried out, in which a group of 37 patients suffering from primary coxarthrosis were densitometrically analyzed over the 1-y period following the implant of an Anato® stem (Stryker). The patient's healthy hip was taken as the control. Any differences in the remodeling pattern were compared according to age, BMI and implant size.
**Results:** Decreases in BMD were observed after 3 months in all of the zones studied. However, this BMD loss was recovered in all zones by the end of the study, except in zone 7 where a decrease of 7.2% in bone mass was observed. In zones 2 and 6, where more loads are transmitted, bone mass preservation, in accordance with Wolff's law, can be seen. No differences were found in the remodeling pattern in relation to age and BMI. Neither were there any differences related to stem size except in zones 1 and 7.
**Conclusions:** The Anato® stem achieves an efficient transmission of loads between the stem and the proximal femur, providing enough mechanical loads for bone preservation. It is only in zone 7 where significant bone atrophy can be observed, attributable to the damage that this area suffers during the surgical process and the subsequent stress-shielding caused by the implant design.

## P114
## MINIMALLY INVASIVE SURGICAL TREATMENT IN OSTEOPOROTIC VERTEBRAL FRACTURES

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The increase in life expectancy involves the raise of the incidence of osteoporosis. Likewise, the incidence of osteoporotic fractures also increases. Especially the vertebral fractures in osteoporotic postmenopausal women. This forces us to re-examine this subject once more. In some patients with painful vertebral compression fractures it is possible to obtain an analgesic effect by percutaneous vertebroplasty or by kyphoplasty.
In this area, we report the case of a 61-year-old postmenopausal woman with multiple osteoporotic vertebral fractures. Four months after suffering vertebral fractures of T10, T11 and T12, the patient did not show improvement of the dorsal pain, so it was decided to perform kyphoplasty of T10 and T12. At the postsurgical month it was reviewed in consultations, presenting an important pain improvement.
We consider kyphoplasty and vertebroplasty a good option for minimally invasive treatment for our osteoporotic patients with vertebral fractures and poor pain control.

## P115
## TAKING THE PLUNGE – BUILDING A CASE FOR A FRACTURE LIAISON SERVICE: EXPERIENCE OF A TERTIARY HEALTHCARE INSTITUTION IN SINGAPORE

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**Objective:** To identify (i) the potential gap in osteoporosis treatment post-hip fracture, and (ii) compliance and persistence rate to therapy for justification of resources to set up a fracture liaison service.
**Methods:** A retrospective study of patients aged >50 admitted for surgical fixation of hip fractures from January 2014 to December 2016 at National University Hospital, Singapore was conducted. Of 532 patients enrolled, 347 had data sufficient for analysis. Key data collected were initiation of osteoporosis treatment (namely bisphosphonates, denosumab, teriparatide), calcium and/or vitamin D supplement, and

compliance/persistence rate to therapy. Good compliance was defined as proportion of days covered (PDC) ≥0.8. Persistence was defined as continuous treatment with <30-d permissible gap. Chi-square test, Mann-Whitney test and logistic regression were used, with significance level set at $p<0.05$.

**Results:** Only 40.3% of patients were prescribed osteoporosis treatment within 1 year post-hip fracture. Independent treatment determinants include being female ($p=0.020$), screening of DXA scan ($p<0.001$) and screening vitamin D levels ($p<0.027$). In addition, only half of the patients (49.7%) were compliant with prescribed treatment. Elderly aged 70-79 ($p=0.026$) were shown to have poorer compliance. The mean PDC of oral bisphosphonates (0.66) was significantly lower than that of denosumab (0.83) ($p=0.032$). Persistence with therapy was also suboptimal (39.3%) especially among elderly aged 70-79 ($p=0.002$) and males ($p=0.017$).

**Conclusion:** Osteoporosis continues to be a suboptimally managed problem even in high risk patients with hip fracture. This study serves as a call to action for increasing awareness of osteoporosis and consideration of a fracture liaison service to improve treatment compliance especially among high risk individuals.

## P116
## DIAGNOSIS OF OSTEOPOROTIC CONDITIONS IN PATIENTS WITH COMBINED COURSE OF CHRONIC PANCREATITIS AND HYPERTENSIVE DISEASE BY DETERMINATION OF TARTRATE-RESISTANT ACID PHOSPHATASE

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**Objective:** Disorders of calcium-phosphorus metabolism, which determines the composition and condition of bone tissue, lead not only to quantitative, but also qualitative changes. Population aging increase in patients with calcium-dependent diseases, their comorbidity, create conditions for the development of secondary osteoporosis. Among such diseases consider chronic pancreatitis (CP) and hypertensive disease (HD). Our aim was determination of the content of tartrate-resistant acid phosphatase (TRACP) in the blood serum of patients with combined course of CP and HD, as a bone resorption marker.

**Methods:** 110 patients were examined - 70 persons with CP and HD (main group) and a comparison group of 40 patients with isolated CP. The groups of those surveyed matched by age (39.4±5.2 and 38.2±4.1) and gender (men predominated - 53.4% and 54.3%). The duration of the history of HD was in the range of 2-10 y, CP 3-8 y. Diagnosis of structural and functional disorders of bone tissue was carried out by method of densitometry. In the study of TRACP used sets DAC - SpectroMed (Moldova) were used. Control results were obtained by examining 78 almost healthy people.

**Results:** A densitometric study showed that of 40 patients with isolated CP, changes in BMD were recorded in 16 cases (40%). When combined CP with HD - in 32 out of 70 (45.7%). At the same time, in the group with CP, the signs of osteopenia were confirmed in 9 persons (22.5% out of 40 examined), and osteoporosis in 6 (15%). In the group of CP and HD, 19 (27.1% of 70 individuals) and 13 (18.6%), respectively. When studying the TRACP, it was established that the mean increase in the group with isolated CP was 2.72±0.2 units, at the control 0.9±0.15 units. In patients with CP and HD, the level of TRACP was 3.14±0.2 units. At the same time, among patients with osteoporotic changes, in the groups the value of TRACP exceeded 3.12±0.3 units and 3.32±0.2 units, respectively. The level of TRACP tended to increase with an increase in the duration of the anamnesis of the combined pathology, and also slightly higher in female subjects.

**Conclusion:** The combined course of CP and HD can be the cause of the osteoporotic conditions formation. Anamnesis of the combined course, exceeding 5 y, is the basis for conducting research to identify changes in the structural and functional state of bone tissue.

## P117
## CORRELATES OF HAND ABNORMALITIES AND MEASURES OF HAND PAIN AND FUNCTION IN OLDER ADULTS

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**Objective:** To describe associations of abnormal features seen on ultrasound (US) and clinical joint examination and hand osteoarthritis (HOA) reported symptoms.

**Methods:** Hand joints US and clinical features were assessed in a cohort of community-dwelling older adults (n=519). Hand pain, function, and stiffness were assessed using visual analogue scale (VAS) and Australian/Canadian hand osteoarthritis index (AUSCAN). Grip strength was assessed using dynamometer. Data was analysed using hurdle and linear models, adjusted for age, sex, BMI, and other clinical or US features.

**Results:** Participants with pain were more female and had more clinical and US features of HOA meet the ACR HOA criteria, had weaker grip strength than participants without pain. Osteophytes (OP) and grey-scale (GS) synovitis were ubiquitous, while power Doppler imaging (PDI) synovitis was common (33%). Number of tender joints was associated with greater pain (VAS, β=1.57 (95%CI; 1.11, 2.03); AUSCAN pain, β=10.57 (4.00, 17.13)) and AUSCAN function (β=4.07 (1.28, 6.86)) and poorer grip strength

(β=-0.07psi (-0.14, -0.005)); associations with functions were partially mediated by pain. PDI synovitis was associated with greater pain (VAS, β=2.61 (1.03, 4.19); AUSCAN pain, β=13.07 (3.82, 22.32)) but not function and stiffness. Joint deformity was associated with poorer function (AUSCAN function, β=4.51 (1.75, 7.26); grip strength, β=-0.13 (-0.23, -0.04)) but not pain and stiffness, whereas GS synovitis was independently associated with poorer grip strength (β=-0.22 (-0.41, -0.04)) but not pain. Nodules (β=0.27 (0.08, 0.46)) and OP (β=0.51 (0.03, 0.99)) were independently associated with stiffness. Further adjustment of US features for clinical features (and vice versa) did not change the associations, except for a significant reduction in the effect between nodules and stiffness when adjustments were made for OP.

**Conclusion:** Tender, deformed, nodulous joints and US-assessed PDI synovitis and GS synovitis were independently associated with hand pain, function or grip strength cross-sectionally. Associations with poor physical function were predominantly mediated through pain; however, tenderness and deformity affected function even after pain adjustment. Therefore, treating synovitis may improve hand pain, but preventing deformity as well as pain may be necessary for improving poor hand function.

## P118

## THE EFFECT OF COGNITIVE BEHAVIORAL THERAPY ON THE CIRCULATING PROINFLAMMATORY CYTOKINES OF FIBROMYALGIA PATIENTS: A CONTROLLED CLINICAL TRIAL

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**Objective:** There is no consensus regarding the effect of cognitive behavioral therapy (CBT) in the treatment of fibromyalgia (FM). This study aims to evaluate the effect of CBT on FM patients through the assessment of circulating proinflammatory cytokines.

**Methods:** A controlled, single-blind, parallel clinical trial was performed with 21 FM patients in each group. Sixteen FM patients in the intervention group (CBT) and 17 FM patients in the control group (waiting list) completed the study. For the intervention group, traditional face-to-face CBT was performed for groups of 10 and 11 patients in 20 sessions. Fibromyalgia impact questionnaire (FIQ), widespread pain index (WPI), circulating IL-6, IL-8, and TNF-α level were evaluated before and after the intervention, using enzyme-linked immunosorbent assay.

**Results:** Baseline measures were not significantly different between the two study groups. At the final evaluation, the mean FIQ, WPI, serum IL-6 level, and serum IL-8 level were significantly lower in the intervention group (p=0.05, p=0.002, p=0.05, p=0.036, respectively). The mean serum TNF-α level was not significantly different between the two study groups at the end of the study (p=0.69). No significant correlation was observed between FIQ and serum cytokine concentrations. A positive correlation was found between serum IL-8 level and WPI (r=0.447, p=0.009).

**Conclusion:** The circulating levels of IL-6 and IL-8 decreased following the CBT intervention, as well as FIQ and WPI. These results highlight the value of CBT as a safe and efficacious treatment for FM that improves both laboratory and subjective surrogates of FM patients.

## P119

## A MULTICENTER PROSPECTIVE STUDY ON THE EFFICACY AND SAFETY OF DENOSUMAB IN GASTROINTESTINAL CANCER PATIENTS RECEIVING SHORT-TERM PERIODIC STEROID PREMEDICATION FOR PREVENTION OF CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING (ESPRESSO-02/HGCSG1602)

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**Objective:** We previously reported that short-term periodic premedication of glucocorticoids (GCs) used with chemotherapy for gastrointestinal cancer (GIC) caused the reduction of BMD (ESPRESSO-01 study; Oncologist 2017). Surprisingly, it seems that the BMD decreasing levels due to only the 16-week GC usage in GIC chemotherapy were comparable to that of the 12-month adjuvant aromatase inhibitor therapy for early stage breast cancer patients2 or the 12-month androgen deprivation therapy for nonmetastatic prostate cancer patients3. We conducted this study to evaluate the efficacy and safety of denosumab for prevention of chemotherapy-induced BMD decrease.

**Methods:** The eligibility criteria were as the follows: 1) Histologically confirmed GIC, including esophageal, gastric, pancreatic, and biliary cancer; 2) a schedule of periodical intravenous steroid administration as premedication that was weekly, biweekly, or triweekly, and in which >4-week steroid-free intervals were not allowed; 3) high-risk patient with steroid-induced secondary osteoporosis; 4) no prior treatment for osteoporosis. The dose of denosumab is 60 mg administered as a

single subcutaneous injection within a week before the induction of chemotherapy. All participants should receive adequate calcium and vitamin D supplementation. The primary endpoint was to investigate the BMD change on lumbar spine between baseline and 16 weeks after induction of chemotherapy.
**Results:** From April 2017 to Feb 2018, 49 cases were enrolled. Two patients did not meet the inclusion criteria. One patient died before treatment and one patient refused just after enrollment. One case was not measured for BMD at baseline and four cases were not measured for BMD at 16 weeks, due to patient refusal, discontinuation of treatment, and death (42 cases were the full analysis set). In 30 cases (71.4% of FAS), the levels of BMD at 16w were significantly increased compared with baseline and the average percent change of BMD of lumbar spine was +2.772% (n=42, 95%CI: 1.350% to 4.195%, p<0.0001). The lower limit of 95%CI of BMD variation rate was +1.350 and the primary endpoint was met. No one suffered any bone fracture in FAS population.
**Conclusions:** We found that denosumab administration could prevent the reduction of BMD and bone fracture.

## P120
## CIRCULATING ADIPOKINES IN POSTMENOPAUSAL WOMEN WITH AND WITHOUT HIP FRACTURES: BONE-FAT RELATIONSHIP

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**Objective**: Circulating adipokines, such as leptin and adiponectin have been considered as having a major role in the bone-fat relationship. The present study was designed to determine the possible impact of adiponectin, leptin and LAR on hip fracture prediction in postmenopausal women hospitalized for fragility fracture.
**Method:** This monocentric, prospective study consisted of 104 postmenopausal women divided into two groups: Group 1 consisted of 49 subjects hospitalized due to the diagnosis of nontraumatic hip fracture and Group 2 contained 55 postmenopausal women without history of hip fracture.
**Results**: Circulating adiponectin and leptin levels were significantly higher in Group 1 than in Group 2 (p=0.005 and p=0.044, respectively). LAR was significantly lower in postmenopausal women with hip fracture than women without fracture (2.1±2.2 vs. 4.0±4.5, p=0.011). In general linear model, there was no between-group difference in circulating leptin as well as adiponectin. Nevertheless, significant by-group differences in terms of LAR persisted even after adjustment (p=0.016).
**Conclusions**: We found that the LAR is an independent predictor of hip fracture in postmenopausal women. Our fidings propose LAR as a preferential marker of hip fracture prediction compared to leptin and adiponectin alone. The present study emphasizes the potential role of adipokines in bone remodeling and justifies future studies to elucidate the clinical, genetic and molecular levels of adipokine-bone relationship.

## P121
## HERACLES STRAIGHT BLADE: A NEW CONCEPT FOR TROCHANTERIC FRACTURES

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**Objective:** Trochanteric hip fractures are common and devastating injuries especially for the elderly. Surgical treatment is the optimal strategy for managing this kind of fractures as it allows early rehabilitation and functional recovery. Using cephalic blades instead of screws has shown a higher bone stock in femoral head and neck, but still there are complications as cut-out or femoral head displacement. Heracles straight blade has demonstrated a lower cut-out rate and femoral head displacement in comparison with other devices like spiral blades.
**Methods:** 38 patients with trochanteric fractures (31A1 and 31A2 AO fracture classification) were treated with Heracles proximal femoral nail using cephalic Heracles straight blade. In a follow-up between 3 and 6 months, no avascular necrosis or cut-out were noticed. Also none of them needed revision surgery; most of them recovering the independence level they had before trauma.
**Results:** Patients treated with Heracles straight blade show good recovery and none of the most frequent complications of trochanteric fracture surgery.
**Conclusion:** Although further studies are required, this cephalic devise appears as a good option of treatment with low complication level.

## P122
## QUALITY OF LIFE AFTER BILATERAL ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTIONS

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**Objective:** To analyze the influence of bilateral anterior cruciate ligament reconstructions on life quality of patients and their return to sports activities.
**Methods**: 32 operated patients took part in this survey during the period of 10 y. There were 5 women and 27 men, their average age being 30.46 y (19-55). The participants answered a modified Knee Injury and Osteoarthritis Outcome Score questionnaire set and gave data about preoperative and postoperative periods.
**Results:** The participants' age and parameters of Lysol scale did not correlate significantly with the subjective level of physical activity after the second knee surgery. After the first anterior cruciate ligament reconstruction, 4 participants (12.5%) did not return to trainings, while 28 did (87.5%); 8 patients (25%) did not return to competitions and 24 of them (75%) achieved the competition level of sports activities. After the anterior cruciate ligament reconstruction of contralateral knee, 6 (18.8%) did not

return to trainings, while 26 (81.3%) did; 15 patients (46.9%) did not return to competitions, while 17 (53.1%) continued to compete without restrictions. The average values of questionnaire scores were between 95.1-98.2 points.
**Conclusion:** Resuming the same or higher level of sports activities after the first reconstruction is one of the preconditions for the same injury of another knee. An athlete looses >2.5 y of competitions on average. Operations of additional meniscus ruptures do not play a crucial role in restitution of sports activities. Although we achieved good operative results, only every second athlete with bilateral injury has returned to sports activities without restrictions after the bilateral anterior cruciate reconstructions.

## P123
## IRISIN IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM: AN INTERPLAY BETWEEN IRISIN AND PTH

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**Objective**: Irisin is a myokine able to ameliorate bone status, muscle atrophy and it influences also glucose and energy homeostasis. PTH is hormone able to exert several metabolic effects that may interact with irisin's ones. No studies have investigated the biological relation between Irisin and PTH. Our aim was to test the hypothesis that irisin and PTH mutually affect their biological action, we evaluated the FNDC5 mRNA expression in myotubes treated with PTH (1-34) and PTH-R mRNA expression in osteoblast treated with recombinant irisin. To confirm the *in vivo* impact of PTH on irisin, we evaluated irisin serum concentration in postmenopausal women with primary hyperparathyroidism (PHPT) compared to age, sex and BMI matched control subjects with no impairment of calcium/phosphate metabolism.
**Methods**: C2C12 myotubes were treated with 100 nM of teriparatide for 3 and 8 h or with 100 nM of teriparatide for 6 d, refreshing medium every 48 h. MC3T3-E1 osteoblasts were treated with 100 ng/ml r-irisin for 8 h. Teriparatide-treated myotubes, irisin-treated osteoblasts and untreated controls were subjected to RNA extraction and qPCR analysis. In a cross-sectional, open-label trial, we enrolled 26 PHPT postmenopausal women and 31 age/BMI-matched control subjects with no impairment of calcium/phosphate metabolism.
**Results:** Both short (p=0.036) and continuous (p=0.006) teriparatide treatment on myotubes significantly decreased FNDC5 mRNA expression respect to untreated control. R-irisin led to a 50% downregulation of PTH-R mRNA expression compared to untreated cell (p=0.029). Irisin was significantly lower in PHPT group compared to age/BMI-matched controls (4.5±1.1 vs. 12±5.2 μg/mL, p<0.001). No significant correlation between irisin and BMD or PTH was recorded in PHPT group.
**Conclusion**: For the first time, our preclinical findings suggest the existence of interplay between PTH and irisin metabolism that seems to be confirmed by the significant reduction of irisin concentration in postmenopausal women with PHPT.

## P124
## BONE MINERAL DENSITY CHANGES WITH LEVONORGESTREL-RELEASING INTRAUTERINE SYSTEM USAGES

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**Objective:** To evaluate changes in BMD in patients using a levonorgestrel-releasing intrauterine system (LNG-IUS) or a TCu380A intrauterine device (IUD) after 2 y.
**Methods:** The medical records of all patients who underwent LNG-IUS or TCu380A IUD insertion were reviewed. The patients were 40-45 years old at the time of insertion, had undergone a BMD examination of the femur and lumbar spine before the loop insertion, and had also received a follow-up BMD examination 2 y later. Patients were excluded if risk factors known to affect BMD were noted in their medical records. The 2 groups of patients were compared with regard to age, parity, BMI, and levels of osteocalcin and pyridinoline. Changes in BMI, osteocalcin, and pyridinoline after 2 y were also compared.
**Results:** The LNG-IUS and TCu380A IUD groups showed no differences in mean age, mean parity, mean BMI, preinsertion or postinsertion BMD values of the femur or lumbar spine, changes after 2 y in the BMD of the femur or lumbar spine, or changes after 2 y in osteocalcin or pyridinoline level (P>0.05).
**Conclusions:** Women using the LNG-IUS for 2 y have changes in BMD and osteocalcin and pyridinoline levels similar to those of TCu380A IUD users. The use of the LNG-IUS for 2 y may have no adverse effect on BMD.

## P125
## PSORIATIC ARTHRITIS IN A PATIENT WITH EHLER-DANLOS SYNDROME

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**Objective:** Psoriatic arthritis (PsA) is a chronic disease which involves the inflammation of synovial tissue, entheses and skin. Ehlers-Danlos syndrome is a heritable connective tissue

disorder characterized by skin hyperextensibility, fragile and soft skin, delayed wound healing with formation of atrophic scars, easy bruising, and generalized joint hypermobility. We report a case of a 39-year old woman with Ehlers-Danlos syndrome who developed PsA.

**Results:** Diagnosis of Ehlers-Danlos syndrome was made in early childhood of the patient. The onset of psoriasis occurred soon after that. During the year 2006, she developed joint symptoms and soon the diagnosis of PsA was made. for 3 y the patient was using salazopirin and pronison and then, on her own hand, stopped with the therapy. She felt good for a few years but then again experienced problems with her hand joints. Inflammatory markers were normal and she was anti-citrullinated protein antibody and rheumatoid factor negative. X-ray images of the hand have shown dysplastic changes on the skeleton (probably connected with Ehlers-Danlos syndrome) and signs of chronic arthritis of both carpal regions. The ultrasound examination revealed the tenosynovitis of some extensor tendons in the right wrist region. The treatment with glucocorticoids and methotrexate was started and she responded very well on this therapy.

**Conclusion:** In the patient with Ehlers-Danlos syndrome, the development of PsA occurred. The most prominent problems, arthritis of both wrists and tenosynovitis of the right wrist, were completely withdrawn soon after the start of the treatment with glucocorticoids and methotrexate.

## P126

## PHARMACOKINETICS OF A NEW PHARMACEUTICAL FORM OF A VITAMIN D3 100 000 IU IN SOFT CAPSULE

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**Objective:** The bioequivalence, single-dose, open-label, parallel-group, randomized study compared a new developed vitamin D3 100 000 IU soft capsule (Group 1) and the reference drug vitamin D3 100 000 IU oral solution in ampoule (Group 2) in 53 healthy adults (mean age 26.9 y).

**Methods:** This pharmacokinetic study was conducted in the north of France between February to June 2014. There was no difference between groups for all baseline parameters. Before the treatment, a low serum 25-hydroxyvitamin D (25(OH)D) levels were observed in both groups (10.6 ng/ml in Group 1 and 9.0 ng/ml in Group 2.

**Results:** As the primary endpoint, the area under the curve (AUC) of serum 25(OH)D concentrations was 2499.4±463.8 nmol/ml (7.8±0.2 for LogAUC) for Group 1 and 2152.3 ±479.8 nmol/ml (7.6±0.2 for LogAUC) for Group 2 at Day 112. The bioequivalence of both treatments was not demonstrated. A superiority test concluded to a superiority of the soft capsule vs. ampoule using a nonparametric Wilcoxon test, with p=0.029 for AUC and p=0.03 for LogAUC. Serum 25(OH)D concentration in Group 1 was higher than in Group 2 at all time points (significant at Day 1, Day 3, Day 7, Day 14, Day 90). Mean serum 25(OH)D concentration in Group 1 were between 20-30 ng/ml during the 4 months after administration, while they were under 20 ng/ml during all the study in Group 2, except at Day 112 (21.3 ng/ml). Mean $C_{max}$ for Group 1 (28.5±5.0 ng/ml) was significantly higher (p=0.002) than mean $C_{max}$ for Group 2 (23.9±4.3 ng/ml). Only 14 d were needed to reach $T_{max}$ by more than half of subjects who received vitamin D3 100,000 IU soft capsule whereas 45 d were needed to reach $T_{max}$ in Group 2. However $T_{max}$ value distribution was not statistically different in the two groups (p=0.338). Both treatments were well tolerated, with no severe or related adverse event reported throughout the study.

**Conclusion:** The pharmacokinetic profile of the new formulation of the soft capsule was superior to the solution in ampoule.

## P127

## CHILDHOOD OBESITY AND FRACTURE RISK: A REGION-WIDE LONGITUDINAL COHORT STUDY OF 466,000 CHILDREN AND UP TO 11 YEARS OF FOLLOW-UP

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**Objectives:** As childhood obesity increases, there is growing interest in the impact of BMI upon bone health. This study investigated if there is an association between childhood BMI and fracture risk.

**Methods:** A prospective cohort of children with a valid primary care BMI measurement in Catalonia, Spain at age 4 y (±6 months) between 1/1/2001 and 31/12/2013 were identified in SIDIAP database, and followed up until they turned 15, migrated, died, or until 31/12/2016. Fractures were defined using validated ICD10 codes recorded in primary care. Childhood cumulative incidence (age 4-15 y) was calculated by anatomical location and stratified by BMI category (WHO 2007 growth reference). Cox models were used to estimate hazard ratios (HR) according to BMI.

**Results:** Of 466,997 children, 9250 (2.0%) had obese range BMIs, 26526 (5.7%) overweight, and 540 (0.1%) underweight range BMIs. We identified 20878 incident fractures. The cumulative incidence of upper limb fracture for children with obese range BMIs was 76.1 per 10,000 (95%CI 58.4-81.1), compared to 62.1 (59.8-63.4) for normal BMI. Lower limb fracture cumulative incidence was 28.7 per 10,000 (18.0-34.1) in those with obese range BMIs and 15.1(13.9-15.7) in children with normal range BMI. Using BMI as a continuous

variable, adjusted HR (95%CI)) were 1.05 (1.03-1.06) per 1 SD increase for forearm fractures, 1.08 (1.05-1.12) for hand fractures, 1.14 (1.09-1.20) for ankle fractures and 1.15 (1.10-1.19) for foot fractures. Divided by WHO categories, compared to those with normal range BMI, children with obese range BMIs had an adjusted HR (95%CI) of 1.14 (1.0-1.29) for forearm fractures, 1.37 (1.14-1.66) for hand fractures, 1.66 (1.32-2.10) for foot fractures and 1.81 (1.37-2.37) for ankle fractures. Further adjustment for birthweight (available for 310,751 children) did not affects these estimates.

**Conclusions:** Childhood obesity is associated with a significantly increased risk of forearm, hand, ankle, and foot fractures. The effect of increased BMI upon fracture risk in adults appears to extend to the paediatric population

## P128

## TWO-YEAR PERSISTENCE WITH TERIPARATIDE IMPROVES SIGNIFICANTLY AFTER EXTENSION OF AN EDUCATIONAL AND MOTIVATIONAL SUPPORT PROGRAM

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**Objective:** To determine whether an educational and motivational support program (EMSP) increases treatment persistence with teriparatide (TPTD).

**Methods:** In the Netherlands, one central pharmacy provides TPTD, enabling us to study persistence in all patients who were prescribed TPTD. TPTD was dispensed as a prefilled pen, intended to be used as daily subcutaneous injection of 20 μg TPTD for 28 consecutive days. From January 2013 - February 2014, patients were instructed and followed according to a basic support program (BSP) consisting of an intake, TPTD home delivery, educational home visit and phone calls by a trained nurse (1, 2.5 and 8 weeks after treatment initiation). Since May 2015, the BSP was extended with a medication adherence questionnaire, additional phone call (at 12 months) and motivational letters (at 9 and 14 months), the so called EMSP. The questionnaire was aimed at identifying potential nonpersistent patients and providing them an additional phone call or home visit to emphasize the importance of treatment completion. Patients with treatment initiation between March 2014 – April 2015, received the BSP including the motivational letters (BSP+letters). Patients were classified as persistent if 24-26 pens were delivered. The potential 24-month treatment course was evaluated using age and sex adjusted Cox proportional hazard analyses.

**Results:** TPTD treatment was initiated in 1573 patients: 649 patients received the BSP, 530 the BSP+letters, and 394 received the EMSP (88% vs. 89% vs. 85% women, mean age 72 y). Two-year persistence was 72% in BSP, 74% in BSP+letters and 78% in EMSP. Reasons for treatment discontinuation were comparable between groups, except for discontinuation due to side effects, which was lower in the EMSP (8% vs. 15% BSP vs. 12% BSP+letters). Adjusted analyses showed a reduction of 28% for being nonpersistent for patients instructed and followed according to the EMSP compared to the BSP (HR:0.72; 95%CI:0.55-0.93).

**Conclusion:** Persistence with TPTD improved significantly if patients were instructed and followed by the EMSP including the medication adherence questionnaire. The adherence questionnaire was able to identify patients at risk of treatment discontinuation and allowed targeted interventions by a trained nurse resulting in a reduction of non-persistence during the 24-month treatment course.

## P129

## FAT MASS DOES NOT INCREASE THE PRECISION ERROR OF TRABECULAR BONE SCORE MEASUREMENTS

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**Objective:** Trabecular bone score (TBS) is a textural parameter that provides indirect information on trabecular microarchitecture, derived from lumbar spine DXA. Previous phantom study on TBS precision error showed no influence after increasing soft tissue thickness. We investigated the effect of progressive increase of BMI and waist circumference on TBS precision error on patients, in comparison to BMD.

**Methods:** We distributed a population of postmenopausal Caucasian women in 3 different BMI (normal, overweight, class I obesity), plus 2 further groups based on waist circumference diameter (≤88 cm and >88 cm, respectively). In vivo precision error was calculated on 30 consecutive subjects that were scanned two times, with patient repositioning, using the Hologic QDR-Discovery W densitometer. The last available version of TBS (v 2.1) at the time of the study was used. Coefficient of variation, percent least significant change (LSC%) and reproducibility were calculated according to the ISCD guidelines.

**Results:** Ninety-five women aged 66±10 (mean±SD) were included. No significant differences were found both for BMD and TBS precision errors, respectively, when comparing BMI groups and waist circumference groups. BMD reproducibility ranged from 95.9% (BMI >30 kg/m$^2$) to 97.5% (BMI <25 kg/m$^2$). TBS reproducibility ranged between 95.8% (BMI=25-29.9 kg/m$^2$, waist circumference >88 cm) and 96.6% (BMI <25 kg/m$^2$). With the exception of obese group, a significant difference was found between BMD and TBS reproducibility, being that of TBS slightly lower than BMD. A significant decrease of TBS values was found between normal and obese subjects, as well as between waist circumference groups; BMD variations between groups were not statistically significant.

**Conclusions:** TBS precision error is not affected by BMI and waist circumference differences. TBS reproducibility showed to be slightly lower than that of BMD, but this difference was mitigated in obese patients. A statistically significant negative association was found between the amount of fat mass and TBS mean values.

**Disclosures:** CM: travel grant from Abiogen, Sandoz and Bracco. LMS: travel grant from Abiogen, Fidia, Bracco.

## P130
## TOPICAL ATORVASTATIN AS A POTENTIAL CHONDROPROTECTIVE AGENT IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objective**: Osteoarthritis (OA) is considered the leading cause of musculoskeletal disability in the elderly population worldwide. Several studies have shown a potential role of statins as an alternative treatment option for OA, beyond their cholesterol-lowering properties. Topical application of Atorvastatin had proved to induce more anti-inflammatory and hypocholestrolemic effect in rats with OA as compared to other used anti-inflammatory drugs such as Diclofenac. Therefore, Atorvastatin was prepared in a topical gel form to be compatible for human use.

**Methods**: The study was held at the Rheumatology and Rehabilitation Department in Mansoura University Hospitals in association with the Clinical Pharmacology Department. 60 patients with chronic knee OA were involved in a randomized controlled trial for a period of 12 months. Each patient underwent full history taking, full clinical examination, necessary laboratory investigations, and radiological investigations. The patients were divided equally into 3 groups of each receiving different drug regimen as follows: Group 1 was the control group receiving the ordinary regimen provided by the department staff members (piascledine 300 mg tablet once/d + diclofenac sodium 75 mg tablet twice/d). Group 2 (Atorvastatin gel 5% + Diclofenac). Group 3 (Atorvastatin gel + Diclofenac + Glucosamine).

**Results**: All patients underwent a clinical assessment via WOMAC index twice during the whole period of study; pretreatment and 12 months post treatment. The collected data were coded, processed and analyzed using SPSS program. P values <0.05 were considered statistically significant. Group 1 showed a minimal stiffness reduction with an average score of 0.9 pretreatment down to 0.79 post treatment. Whereas Group 2 showed a significant reduction in the WOMAC index from 0.92 pretreatment to 0.44 post treatment. However, adding Glucosamine to Group 3 did not prove to improve the patients' scores as expected compared to results obtained from Group 2 with a reduction from 0.86 to only 0.53, which contributed to about 38.3% of stiffness reduction as compared to basal level. Whereas Group 2 showed a major improvement in the patients' WOMAC index in the form of approximately 52.1% stiffness reduction along the 12 months period of supervised drug regimen.

**Conclusion**: The results obtained by the use of topical Atorvastatin showed to super pass some commercially widely used chondroprotective agents. Topical Atorvastatin may be used safely and effectively for patients with knee OA.

## P131
## KNEE OSTEOARTHRITIS: INITIAL RADIOLOGICAL RESULTS IN TOTAL KNEE ARTHROPLASTY – COMPARISON BETWEEN CONVENTIONAL TECHNIQUE AND COMPUTER-ASSISTED SURGERY

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**Objectives:** Many authors support the greater precision of computer-assisted surgery (CAS). The aim of this study is to analyse the differences in the femorotibial mechanical axis measured in telemetric radiographs when implanting a total knee arthroplasty comparing conventional surgery and CAS.

**Methods:** Retrospective observational study to evaluate the preoperative radiological results and at 3 months of follow-up of the patients treated with Optetrak Logic® total knee arthroplasty between February 2016 and November 2017. We also analysed age, sex, operated knee, Ahlbäck classification, duration of the intervention and complications.

**Results:** There were 54 cases registered. Of the 28 patients operated by conventional surgery, 23 (82.1%) had a varus alignment, 3 (10.7%) normal alignment and 2 (7.1%) valgus alignment. Of the 26 patients operated on by CAS technique, 13 (50%) had a varus alignment, 6 (23.1%) normal alignment and 7 (26.9%) valgus alignment, with significant differences (p=0.039). The results for conventional surgery are 23 patients (82.1%) within±3° of varus/valgus and 5 patients (17.9%) out of range. All 26 patients (100%) treated by CAS were found within±3° of varus/valgus. These results were statistically significant (p=0.024). No differences were found between the different techniques and surgical time (p=0.98).
**Conclusions:** Numerous studies have shown that misalignment can lead to premature failure. They also seem to suggest that an alignment within±3° of the femorotibial angle in the frontal plane reduces this risk. Our results show that 100% of patients operated on by CAS were within the range of±3° of varus/valgus. In our environment, the CAS has proved to be a useful tool to improve the alignment without increasing the surgical time, which has made it currently our preferred technique.

## P132
## KNEE OSTEOARTHRITIS: ASSESSMENT OF SHORT-TERM FUNCTIONAL RESULTS AFTER UNICOMPARTMENTAL KNEE ARTHROPLASTY

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**Objectives:** Numerous studies indicate the advantages that the unicompartmental knee arthroplasty can provide reduction of postoperative morbidity, reduction of length of stay in hospitals, reduction of rehabilitation time and good cost-benefit ratio with a good long-term result. The aim of this study is to analyse the short-term functional results of the patients undergoing surgery through unicompartmental knee arthroplasty.
**Methods:** A retrospective observational study to evaluate the short-term functional results of patients undergoing Oxford® unicompartmental knee prosthesis between January 2012 and December 2017. Among the variables included: time to sitting and walking, length of stay, postsurgical flexion-extension, final flexion-extension and complications.
**Results:** 8 patients were included, with a mean age of 58.25 y (SD 10, 67). The average time until walking was 2, 12 d (SD 0.35). The hospital stay was of 3.38 d on average (SD 0.52). The patients received 9.38 sessions of physiotherapy average (SD 5.45), for a period of 47.88 d on average (SD 38). The average final flexion was 109, 38° with 1 SD (SD 7.76) and the mean final extension was -1.25 (SD 2.31). The mean total gain was 25, 63° of flexion (SD 6.23) and of 6.25° of extension (SD 6.4).
**Conclusions:** In general, these patients are discharged early and require less physical therapy, all associated with high survival rates. In our study we found an early sitting and ambulation, with a short hospital stay. As for the joint balance, the average total gain was 25, 63° of flexion (SD 6.23) and of 6.25° of extension (SD 6.4). We can conclude that this technique is satisfactory in the short term in our environment from the functional point of view, provided that strict inclusion criteria are followed.

## P133
## TERIPARATIDE AS COADJUVANT TREATMENT IN SEVERE OSTEOPENIA AFTER FAILURE OF MULTIPLE SURGERIES DUE TO FRACTURE OF THE DISTAL FEMUR

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**Objective:** To analyze the usefulness of teriparatide to increase bone formation and osseous consolidation in the specific case of a young patient with severe osteopenia who has undergone four surgical operations in four months due to their failure after a femur supracondylar fracture after a large fall.
**Methods:** We analyzed the radiographs and the clinical and functional evolution of our 54 years old patient who suffered a supracondylar fracture of the femur after a long fall. In the first moment damage control surgery was performed with an external fixator, two weeks later we performed closed reduction and internal fixation with a plate and screws, three months later this surgery failed and the fracture lost adequate reduction, factors that favored this failure are the great destruction of the distal femur, the loss of bone stock and the poor quality of it, which hindered the adequate consolidation. The fracture was immobilized provisionally with a new external fixator and later it was fixed by intramedullary nailing with a femur retrograde nail. The patient after leaving the hospital began the treatment with teriparatide (20 ng/24 h) in order to accelerate the consolidation of his fracture and increase the bone stock.
**Results:** In the control radiographs five months after the last surgery, a clear increase in bone density and formation of new bone was observed, and the patient is currently completing his rehabilitation satisfactorily. The consolidation of the fracture is satisfactory and the patient is clinically and functionally well.
**Conclusion:** In cases of severe fracture with a large loss of bone stock and poor bone quality, teriparatide can be an advantageous treatment to improve bone stock and accelerate the healing of a fracture during recovery even in nonelderly patients.

## P134
## USE OF TERIPARATIDE AS A COADJUVANT THERAPY IN THE TREATMENT OF SEVERE OSTEOPENIA AFTER THE FAILURE OF MULTIPLE INTERVENTIONS IN FRACTURE-LUXATION OF PROXIMAL HUMERUS

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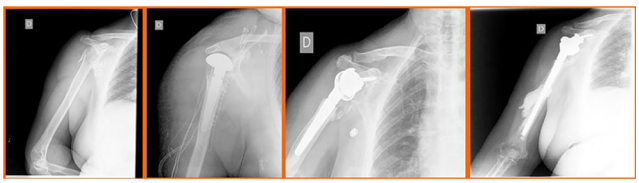
**Objective:** Osteoporosis and fracture of the proximal humerus in postmenopausal women is closely related. It is a challenge for the orthopedic surgeon that implies a decrease in the quality of life of the patient and the frequent need for numerous surgical interventions. All this entails an increased risk of complications and health costs.
**Methods:** A 66-year-old woman with a medical history of high blood pressure and dyslipidemia. Surgical intervention: amidactomy. In usual treatment with Indapamide 2.5 mg and Paroxetine 20 mg. After falling down stairs of his home, he presents fracture-dislocation of the right proximal humerus (13-09-14). During 2 y, 4 surgical procedures were performed. First intervention: failure of osteosynthesis attempt due to anesthetic problem (13-09-14). Second intervention: anatomical hemiarthroplasty (16-09-14). Third intervention: inverted shoulder prosthesis (07-22-16). Fourth intervention: Replace PIH + paresia radial nerve pro cement extravasation (19-12-16). One month after the last intervention, treatment begins with rehabilitation and treatment is started with teriparatide at a dose of 20 ng/d (after ruling out analytical alteration of the levels of calcemia, hepatic or renal alterations).
**Results:** In subsequent radiological controls an increase in bone density and formation of new bone is observed. In October of 2017, Rehabilitation consultations with dependency for basic activities of daily life are registered. Slight limitation 4/5 of the Daniels scale, abduction of first finger and extension of fourth and fifth fingers. In September 2018, he was discharged from Traumatology clinics for clinical improvement and without radiological changes.



**Conclusion:** After the surgical failure on 4 occasions, it was decided to associate the peptide derived from the PTH subcutaneously, to increase the qualitative and quantitative properties of the bone tissue. (Dec.16 / Dec.18). Its anabolic effect is due to the stimulation of osteoblasts, which causes an increase in both cancellous and cortical bone, thus increasing bone strength.

## P135
## THREE SPINE OSTEOPOROTIC FRACTURES FOR 6 MONTHS IN AN ELDERLY MAN

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The aging of the population, with a higher prevalence of osteoporosis, conditions an increase in the fragility and loss of resistance in the bone, which favors the appearance of fractures after minor traumatisms. Osteoporotic spine fracture is one of the most prevalent osteoporotic fracture. It constitutes an epidemy that increases yearly. Osteoporosis is considered an elderly women disease but with increasing prevalence of osteoporosis we see fragility fractures in men.
We present the case of an octogenarian patient who, in <6 months, suffered three fractures without a traumatic history. The first one affected to L5. It was treated a kyphoplasty of the same. Two months later, the second fracture affected L4 causing lumbar pain and acute stenosis of the canal that required posterolateral lumbar arthrodesis and decompression. In the immediate postoperative period, he suffered a third thoracolumbar fracture treated with kyphoplasty of the fracture and prophylaxis vertebroplasty of the adjacent vertebra because of the high risk of a new fracture. Currently the patient is under treatment for osteoporosis with calcium and vitamin D and teriparatide. The risk of suffering a vertebral fracture due to osteoporosis increases after the appearance of the first fracture. Kyphoplasty allows rapid clinical improvement and functional recovery of the patient.

## P136
## PANTERA PLATE IN THE TREATMENT OF OSTEOPOROTIC PROXIMAL HUMERUS FRACTURE

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**Objective:** The "Pantera plate" is an alternative for the treatment of osteoporotic proximal humerus fractures. Proximal humerus fracture, is the third most common osteoporotic fracture in our area. 70% of cases affect women with osteoporosis. The aim of this study was to evaluate clinical and radiographic short-medium term results of the pantera plate in the treatment of osteoporotic proximal humerus fracture in 3 and 4 fragments.
**Methods:** A retrospective study was performed in our hospital, on 44 patients undergoing pantera plate from 2010-2012. The indications for surgical intervention were osteoporotic proximal humerus fracture in 3 and 4 fragments. Patient-oriented outcomes were obtained using the Constant score postoperatively at 3, 6, 12, 24 months. In addition, functional ranges of motion were measured in forward elevation and internal and external rotation. Preoperative and postoperative visual analog scale were recorded.
**Results:** The mean patient age was 78.6 y (range, 51-85 y). The mean follow-up was 4.3 y (range, 6 months - 6 y). 85% of the patients were women. 59% were right shoulders and 41% left shoulders. The average preoperative pain score was 7, with a range from 5-9. Preoperative constant score averaged 21,9, with a range from 16-29. Postoperatively, all scores improved with a mean pain score noted at 1, range 0-6; mean constant 40.5, with a range 23-55; mean abduction was 70, forward elevation was 80°, external rotation of 41°, internal rotation 43°. 25 patients

were satisfied with the functional results of surgery while 13 were somewhat dissatisfied and 6 were dissatisfied. The overall incidence of complications was 12 cases, 2 cases of infection, 4 cases of avascular necrosis, 6 cases of nonunion.

**Conclusions:** Pantera plate is a therapeutic option for the treatment of proximal humerus fracture, providing good pain relief, but their long-term functional results are not entirely satisfactory than expected, design improvements are necessary in order to achieve better results.

## P137

## THE IMPACT OF PSORIATIC ARTHRITIS VS. PSORIASIS ON INCOME, EMPLOYMENT, HOUSING STATUS, RELATIONSHIPS, AND SOCIAL ACTIVITIES: AN OBSERVATIONAL STUDY

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**Objective:** Investigate if psoriatic arthritis (PsA) affected patients' ability to lead a 'normal' life compared to patients with psoriasis affecting the skin/nails only (PsO).

**Methods:** An observational study was undertaken at Royal Free Hospital, London, U.K. Adults attending rheumatology or dermatology outpatients were recruited using convenience sampling. In total, 94 (male=56; 60%) PsA patients and 34 (male=27; 79%) PsO patients consented.

**Results:** A greater proportion of PsA patients were not working (PsA: 39.4% vs. PsO: 14.7%; *P*=0.009), were more likely to describe themselves as "permanently sick or disabled" (PsA: 13.8% vs. PsO: 0%; *P*=0.040), and were more likely to be receiving state benefits (PsA: 28.7% vs. PsO: 2.9%; *P*=0.002). Of those in work, the median weekly hours worked was lower for PsA patients (PsA: 37.8 h vs. PsO: 40 h; *P*=0.038). A greater proportion of PsA patients lived in social housing (PsA: 26.6% vs. PsO: 8.8%; *P*=0.002), and reported that their physical health had at least moderately interfered with their normal social activities in the previous 4 weeks (PsA: 57.4% vs. PsO: 23.5%, *P*=0.000). There was no significant difference in median salary (PsA: £35,000/year vs. PsO: £40,000/year; *P*=0.168) between PsA and PsO patients. PsA patients did not report significantly greater difficulty in forming relationships as a result of their disease compared to PsO patients (*P*=0.379), or in the quality of their relationships as a result of their disease (*P*=0.681), nor was there a significant difference between the groups in the proportion of patients who were married or in civil partnerships (*P*=0.927).

**Conclusion:** PsA patients' ability to lead a 'normal' life is impaired compared to patients with PsO.

**Acknowledgments:** Dr Sandy McBride, Consultant Dermatologist, Royal Free Hospital; Dr Philip Sedgwick, Reader in Medical Statistics and Medical Education, St George's, University of London

## P138

## HEREDITARY MULTIPLE EXOSTOSES MISDIAGNOSED AS RHEUMATOID ARTHRITIS

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Making a diagnosis of rheumatoid arthritis (RA) is often tricky. With no single test that confirms or eliminates the disease, the diagnosis of RA is based on a physical exam, patient history, laboratory tests and often imaging. However, symptoms of RA, such as pain, swelling and fatigue, are not exclusive to the disease. And correct diagnosis is important in choosing an appropriate treatment plan. A number of diseases, such as lupus, fibromyalgia or Sjögren's syndrome, may easily be confused with RA, or coexist in a patient. Arthritis symptoms might develop following certain infections, such as Lyme disease, tuberculosis, gastrointestinal infection or sexually transmitted diseases. Patients with certain cancers, such as large granular lymphocyte leukemia, have an increased incidence of RA, an acute leukemia in children may even be misdiagnosed as idiopathic juvenile arthritis. In this case report a 25 years old male patient presented with arthralgia, fatigue, swelling of swelling of all MCPs, PIPs both wrists and knees, tender shoulders, Limited range of motion of right elbow, limitation of ROM of knees, severe cervical muscle spasm, was misdiagnosed as rheumatoid arthritis with 2ry Sjogren's syndrome with no response to treatment; imaging revealed multiple exostoses at distal end of Rt radius, ulna and distal femoral and tibial end.

## P139

## TOTAL KNEE ARTHROPLASTY IS A SAFETY PROCEDURE FOR OCTOGENARIAN PATIENTS

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**Objective**: Nowadays, higher activity is demanded by octogenarian people as they preserve better quality of life than formerly. Therefore, the number of total knee arthroplasty (TKA) in these patients has been increased. Despite of this, its indication is still controversial as they are also supposed to present a higher risk of complications. Our aim was to determine if age is really a contraindication of performing TKA.

**Methods**: A retrospective study with 120 patients, operated on TKA in our hospital during 2010 and 2012, has been performed. It has been compared comorbidities, mortality, complications in-hospital and after the hospital discharge between group A (60 octogenarian patients) and group B (60 patients younger than 80).

**Results:** No statistical differences due to comorbidities, mortality, in-hospital stay or before hospital discharge complications or rehabilitation have been found. However, hospital stay and the need of transfusion have been greater for group A (octogenarians), with a relative risk (RR)=1,88 (IC 95% 1,1-3,1 p>0,05) for the last one.

**Conclusion:** Therefore, we can affirm that age is not a contraindication of TKA. However, we should try to decrease the need of transfusion and consider that more social resources may be needed after the hospital discharge in octogenarian patients.

## P140
## ASSESSMENT OF NUTRITIONAL STATUS AND BOWEL HABITS IN OSTEOPOROSIS: A CROSS-SECTIONAL, MULTICENTER STUDY OF TURKISH ELDERLY FEMALE POPULATION

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**Objective:** To investigate the differences in nutritional status and bowel habits between osteoporotic and nonosteoporotic elderly females

**Methods:** Design: A multicenter cross-sectional study. Setting: 12 different provinces of Turkey. Subjects: A total of 1224 elderly free-living postmenopausal Caucasian women (age>65). This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the University of Usak Human Research Ethics Committee (HREC) approval number HREC/2018/11. The study was conducted in outpatient clinic of 15 different physical medicine and rehabilitation clinics from 12 different provinces. Participants were informed that the study aimed to determine the differences in nutritional status and bowel habits between osteoporotic and nonosteoporotic elderly females. Written informed consent was obtained from all participants. Inclusion criteria: elderly women (>65) who were performed DXA scans (lumbar spine and hip scan) within 1 month, volunteers for the study who had not received previous treatment for osteoporosis. Exclusion criteria: Chronic glucocorticoid use, malignancy, metabolic bone disease, neurogenic bladder, neurogenic bowel, other malnutrition diseases, use of drugs causing malabsorption, use of drugs causing constipation, nonambulatory status renal failure, and rheumatologic disease. Evaluated variables; Nutritional status as determined by the Mini-Nutritional Assessment (MNA). Bowel habits as assessed by gastrointestinal symptom rating scale (GSRS) and Bristol Stool Form Scale (BSFS). Measurements of BMD of the lumbar spine and left hip using DXA. BMD: DXA measurements were evaluated with the criteria of WHO. T-score between -1.0 and -2.5 accepted as osteopenia and -2.5 and below T-scores accepted as osteoporosis. The patients were divided into the nonosteoporotic group (NOP), osteopenic (OPN) and osteoporotic (OPR) groups. Statistical analysis: The SPSS for Windows 12.0 software package was used for the statistical evaluation of the data. All data were analyzed separately for women and men. Descriptive statistics were analyzed and reported as mean (with standard deviation), or as percentiles as appropriate. One-way ANOVA (analysis of variance) for comparing for three groups on each variable.

**Results:**

| | NOP 586 (47.9%) | OPN 369 (30.1%) | OPR 269 (21.9%) | p |
|---|---|---|---|---|
| Age (years) | 69.8± 5.5 | 71.4±6.3 | 74.4±7.8 | < 0.05 |
| BMI (kg/cm²) | 28.7±4.7 | 28.4±4.1 | 27.6±4.9 | > 0.05 |
| Vitamin D | 14.47±7.9 | 15.78±8.8 | 10.32±8.8 | < 0.05 |
| Mid-arm C (cm) | 29.1±4.6 | 28.8±4.1 | 27.4±4.6 | > 0.05 |
| Hemoglobin | 12.75±2.36 | 11.95±2.48 | 11.24±1.97 | > 0.05 |
| Vitamin B12 | 345.48±87.15 | 359.51±101.4 | 284.97±115.78 | > 0.05 |
| IoL (glass/day) | 10.2±6.8 | 9.8±7.4 | 8.7±7.1 | < 0.05 |
| MNA | 25.4±4.2 | 24.2±4.1 | 23.1±5.3 | < 0.05 |
| BSFS | 2.62±1.54 | 2.44±1.50 | 1.75±1.11 | < 0.05 |
| GSRS | | | | |
| Reflux | 3.86±1.12 | 3.80±1.18 | 3.88±1.23 | > 0.05 |
| Abdominal pain | 3.0±1.45 | 3.16±1.53 | 3.26±1.69 | > 0.05 |
| Indigestion | 3.34±1.14 | 3.31±1.26 | 3.59±1.73 | > 0.05 |
| Diarrhoea | 1.85±0.45 | 1.16±0.29 | 0.98±0.18 | > 0.05 |
| Constipation | 2.96±0.89 | 3.05±1.12 | 3.54±1.48 | < 0.05 |

NOP: non-osteoporotic group, OPN: osteopenic group, OPR: osteoporotic group, MNA, Mini Nutritional Assessment Bristol Stool Form Scale (BSFS), GSRS: Gastrcintestinal-symptom rating scale, Mid-arm C: Mid-arm circumference (cm), IoL: Intake of liquids (glass/day)

**Conclusion:** In general, the nutritional status was good in our study population. However, we found poorer status in nutrition and bowel habits in osteoporotic patients. While some similar results detected in four symptom clusters of GSRS (reflux, abdominal pain, indigestion, diarrhea), constipation was significantly more often in osteoporotic patients according to both GSRS and BSFS results. Healthcare professional should be careful to add the right amount of fiber to osteoporotic diets.

## P141
## MYOSTATIN AND INSULIN GROWTH FACTOR-1 ARE BIOMARKERS OF MUSCLE STRENGTH, MUSCLE MASS AND MORTALITY IN HEMODIALYSIS PATIENTS

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**Objective:** Muscle strength is frequently altered in hemodialysis patients. In the present work, five potential muscle biomarkers have been studied in their ability to assess muscular strength, muscular mass and to predict mortality of hemodialysis patients: activin-A, procollagen III N-terminal peptide, follistatin, myostatin and insulin-like growth factor-1 (IGF-1).
**Methods:** In the current observational prospective study, three independent cohorts of prevalent hemodialysis patients (2 from Liège, Belgium and 1 from Marseille, France) were considered. The biomarkers were first measured in the Liege1 cohort. Two of them, myostatin and IGF-1, were then assessed in the whole population of patients (Liege1, Liege2 and Marseille). Muscle strength was assessed with handgrip strength (HGS) and muscle mass with bioimpedance analysis. One-year mortality predictive value of biomarkers was also studied in the Liège1 and Marseille cohorts.
**Results:** In the Liège1 cohort (n=67), HGS was only associated with concentrations of myostatin and IGF-1. These associations were confirmed in the whole population of 204 patients ($r=0.37$, $p<0.001$ and $r=0.46$, $p<0.001$, respectively) and remained significant ($p<0.05$) in multivariable models. The association between muscle mass and concentrations of myostatin and IGF-1were also significant. The ability of myostatin, IGF-1 and serum creatinine to detect a low HGS compared by Receiver Operating Characteristic curves analysis were not significantly different. Both myostatin and IGF-1 had a significant and comparable area under the curve to predict one-year mortality: 0.73 (95%CI: 0.64 to 0.83) and 0.72 (95%CI: 0.61 to 0.82), respectively.
**Conclusion:** Our results suggest that myostatin and IGF-1 are two biomarkers of interest to assess muscle status of dialysis patients. Both biomarkers are associated with HGS, muscular mass, and one-year mortality.

## P142
## HIGH FORCE SHORT DURATION COMPRESSION FORCES ON BONE RESULTS IN SIGNIFICANT OSTEOBLASTIC ACTIVITY

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**Objective:** he relationship between bone geometry and mechanical influences on bone and suggests that when significant forces are applied to bone, the compression will stimulate an adaptive response, commonly known as Wolff's Law. While the American College of Sports Medicine recommends exercise as a treatment for those diagnosed with osteoporosis, traditional exercise has not been able to create the forces needed to stimulate bone growth in a safe and effective manner. A three year study conducted in multiple clinical locations with a novel apparatus allowed for significant compressive force to the level required to have an effect on the osteoblastic function offering high force production within a short duration, i.e. osteogenic loading (OL) was utilized. OL has been suggested as a non-pharmaceutical option to improve bone health. The purpose of this study was to examine if OL was 1) safe when generating forces required for osteoblastic function and 2) effective for individuals dealing with osteoporosis.
**Methods:** Twenty-six women ranging in age from 41-87 y from three independent clinical locations with a diagnosis of osteoporosis were selected to participate in a one-year study using an exercise device that allows the individual to create significant forces on the bone with four unique exercise movements. Since the study was conducted over a three year period, a subset of the 26 subjects (9 individuals) were followed for one additional year after the conclusion of the 48 sessions to determine if additional benefits could be obtained with additional exposure to higher forces on bone. All three centers had the same equipment, settings and protocol. Subjects completed a minimum of 48 sessions once a week over the year, each session lasting approximately 15 min. DXA scans were conducted at the same testing location for both pre-and post-assessments. Subjects self-reported their body weight, weekly minutes of traditional exercise, diet and prescription medications.
**Results:** Of the 26 subjects, 16 individuals demonstrated a significant reduction (improvement in bone) in their mean DXA score, 6 had no significant change and 4 individuals

showed a further degradation in their bone density. Within the 4 movements (chest press, leg press, abdominal crunch and vertical lift), forces generated were 2x - 10x body weight with no injuries reported with any subject.

**Conclusion:** These data suggest that a nonpharmacologic exercise solution is available to individuals diagnosed with osteoporosis. Further study is required with larger sample sizes and more diverse demographics. Additional research is needed to validate OL as a viable and safe strategy for bone reformation.

## P143
## 3-LEVEL DEGENERATIVE SPONDYLOLISTHESIS WITH SPINAL CANAL STENOSIS

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Lumbar degenerative spondylolisthesis is a major cause of impaired quality of life and diminished functional capacity in the elderly. Degenerative spondylolisthesis often involves only one or two level and tend to present with one or two level spinal canal stenosis.

The authors describe an unusual case of degenerative spondylolisthesis involving 3 levels of the lumbar spine from L2 to L5. The patient was a 58-year-old woman who suffered chronic back pain and neurogenic claudication. Plain radiography revealed grade I degenerative spondylolisthesis at L2-L3, L3-L4 and L4-L5. Elevated pedicle-facet joint angles and W-type facet joints at the lumbar spine was observed. MRI showed L2- S1 spinal cord compression at the lumbar spine. Patient underwent L2-S1 decompression laminectomy and posterior lateral fusion of L2-S1 with posterior instrumentation and bone grafting. Symptoms improved significantly at 4 months follow-up.

Thorough evaluation for multilevel segmental involvement in degenerative spondylolisthesis is important because of the frequency of severe symptomatic spinal stenosis or foraminal encroachment. Good surgical outcome can be expected from decompression and stabilisation. The pathogenesis of multilevel lumbar degenerative spondylolisthesis can be complex and heterogeneous.

## P144
## CORONARY VASOSPASM IN INTRACTABLE AUTONOMIC DYSREFLEXIA

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Coronary vasospasm is a transient sudden vasoconstriction of one of the coronary arteries that can lead to myocardial ischaemia, myocardial infarction, fatal arrhythmia and sudden death. Most patients with coronary spasm have underlying cardiac pathology. This paper presents a rare case of intractable autonomic dysreflexia in a 36-year-old patient with chronic C5 paraplegia with silent myocardial ischaemia secondary to coronary vasospasm in the absence of underlying cardiac pathology. The MRI perfusion study revealed normal left ventricular contractility and no evidence of coronary artery occlusion.

This case highlights the cardiac complications associated with paroxysmal heightened sympathetic nervous system and proposes that autonomic dsyreflexia can predisposes to coronary vasospasm via uncontrolled sympathetic nervous system. The disruption of sensory input from the myocardium to the brain in patient with SCI predisposes them to asymptomatic myocardial ischaemia. The challenges in the diagnosis and management of coronary vasospasm associated with autonomic dysreflexia are described.

## P145
## SIMILAR RADIOLOGICAL RESULTS WITH ACCELEROMETER-BASED NAVIGATION VS. CONVENTIONAL TECHNIQUE IN TOTAL KNEE ARTHROPLASTY

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**Objective:** The Zimmer iASSIST system is an accelerometer-based, portable navigation device for total knee arthroplasty that does not require the use of a large console for alignment feedback as required in computer-assisted surgery. The purpose of this study was to determine the accuracy of the accelerometer-based system in component positioning and overall mechanical alignment.

**Methods**: Two groups of 30 patients each with primary osteoarthritis underwent total knee arthroplasty using either conventional method or Zimmer iAssist navigation in 2013 was retrospectively studied. Patients were matched according to BMI, gender, and age. A senior arthroplasty surgeon performed all the operation using the same surgical approach. Perioperative and postoperative regimens were the same. All patients had standardised radiographs performed postoperatively to determine the lower limb mechanical alignment and component placement.

**Results:** There was no difference between the two groups for age, BMI, gender, side of operated knee and preoperative mechanical axis ($P>0.05$). There was no difference in the proportion of outliers for mechanical axis ($P=0.38$), coronal femoral angle ($P=0.50$), coronal tibia angle ($P=0.11$), sagittal femoral angle ($P=0.28$) and sagittal tibia angle ($P=0.33$). The duration of surgery, postoperative drop in hemoglobin level and transfusion incidence did not show statistically significant differences between the two groups ($P>0.05$).

**Conclusions:** We showed that iAssist was safe and remains a useful tool to restore mechanical axis. However, our data demonstrated no difference in lower limb alignment and component placement between the total knee arthroplasty that used accelerometer-based system and those that underwent conventional method.

## P146

## COMPARISON OF THE PRESCRIBING PRACTICE OF INJECTION TREATMENTS FOR OSTEOPOROSIS IN FOUR HOSPITALS OF A HEALTH BOARD IN THE UK: A REAL WORLD STUDY

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**Objective:** Injection treatments are approved second line treatment options for osteoporosis. National and international guidelines are available for use of these treatments. Hywel Dda University Health board has four hospitals which have equal access to these osteoporosis therapies. Our aim was to identify differences in antiosteoporotic drug prescribing between four hospitals within a health board.
**Methods:** Data was obtained from computerised dispensing pharmacy database. We identified all injectable osteoporosis prescriptions dispensed during the years 2016, 2017 and 2018 (up to September 2018).
**Results:** Across Hywel Dda Health board, denosumab was the commonest prescribed injectable antiosteoporotic drug (total of 502), followed by zoledronic acid (436) and teriparatide (192). Glangwili General Hospital was consistently the largest prescriber during 3 y. Issuing 40.2% of the denosumab prescriptions in Hywel Dda in 2016, 37.1% in 2017, and 31.3% in 2018. Zoledronic acid had the largest prescriptions in Withybush Hospital throughout the 3 y (46.1% of the total zoledronic acid prescriptions). Bronglais Hospital had the lowest uptake of teriparatide (only 2.1% of the prescriptions) in Hywel Dda. Teriparatide had the lowest uptake within the whole health board. With none being prescribed in Prince Philip Hospital in the 3 y. Glangwili Hospital had 181 prescriptions across the 3 y (94.3% of the total).
**Conclusion:** The reasons and determinants of differential prescribing across different hospitals within a single health board need further study. Therapeutic decision making could depend on patient choice, physician choice and availability of interested local osteoporosis staff and services.

## P147

## CURRENT PRACTICE OF OSTEOPOROSIS DRUG PRESCRIBING ACROSS FOUR HOSPITALS OF A UK HEALTH BOARD

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**Objective:** We studied the pattern of osteoporosis oral and injectable treatment prescriptions in four hospitals in Wales covering a population of 384,000.
**Methods:** Setting: Four UK hospitals. Period: January 2016 up to September 2018. Information was collected from pharmacy electronic database for total prescriptions issued for alendronic acid, denosumab, teriparatide and zoledronic acid. We analysed comparative usage of different osteoporosis treatments.
**Results:** Over the years 2016, 2017 and 2018 the total number of oral bisphosphonate prescriptions was 4680 (GGH had 1797, PPH had 1703, WGH had 864 and Bronglais had 316). The total number of injectable denosumab prescriptions was 502 (GGH had 183, PPH had 87, WGH had 177, and Bronglais had 55). The total number of injectable zoledronic acid prescriptions was 436 (GGH had 68, PPH had 158, WGH had 201, and Bronglais had 9). The total number of teriparatide prescriptions was 192 (GGH had 181, PPH had 0, WGH had 4, and Bronglais had 7).
**Conclusion:** Results justify maximum usage of oral alendronic acid being cheap and effective medication for osteoporosis, but there was marked variation in prescribing practice of injection treatments across four hospitals. Similar large scale studies are needed in the future to gain more detailed information on possible variations in prescribing practice and trends across different hospitals of the UK, which provides uniform free national healthcare.

## P148

## CLINICAL PROFILE OF PATIENTS ON DENOSUMAB AT A UK HOSPITAL IN 2017: REAL WORLD DATA

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**Objective:** National and international guidelines are available for use of denosumab, an injectable monoclonal antibody for the treatment of osteoporosis, as a second line drug. Our aim was to identify the clinical profile of patients prescribed injectable denosumab at a hospital in the UK.
**Methods:** We identified patients that were prescribed denosumab from Glangwili Hospital during 2017 from the pharmacy electronic database. We then accessed patients' medical records, information collected included age, gender, number and location of fracture, and latest DXA scan T-score. All patients had previous intolerance to oral bisphosphonates.
**Results:** Total 30 patients included in study. The average age of a denosumab user was 73.8 in 2017 (range 29-87), with 28 out of 30 recipients being female. On average patients had experienced 1.4 fragility fractures in the past (range 0-3). Site of fractures included vertebral (11), wrist (8), hip/femur (6), ankle (5), foot (5), ribs (3), hand (2) and elbow (1). DXA T-scores observed indicated that the spine had the lowest (-3.68). Scores observed for hip, femoral head and forearm were -2.01, -2.29, and -2.11, respectively. Data collected on vitamin D levels in patients prior to injection treatment showed that 76.7% were above 50 mmol (range 21-186 nmol/L, mean 81.4 nmol/L).
**Conclusion:** Our real world observational data show that an injection denosumab user is predominantly elderly female. Patients with osteopaenia and high fracture risk should not be denied denosumab. Further research is needed to determine reasons of low usage in male patients. The likely reason is denosumab was not approved for male osteoporosis until recently.

## P149
## TRENDS IN PRESCRIBING PRACTICE OF INJECTABLE OSTEOPOROSIS TREATMENTS AT 4 HOSPITALS OF A HEALTH BOARD IN THE UK

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[1]Glangwili Hospital, Swansea, UK

**Objective:** Injection treatments, including denosumab, zoledronic acid and teriparatide, are approved as second line treatment options for osteoporosis. National and international guidelines are available for the use of these injectable treatments. Our aim was to study the recent trends in the use of different injectable osteoporosis treatments across 4 hospitals within the same health board in Wales, UK.
**Method:** Using computerised dispensing pharmacy data we identified current users of inpatient and outpatient osteoporosis injectable treatments at Prince Philip Hospital (PPH), Withybush General Hospital (WGH), Glangwili General Hospital (GGH) and Bronglais hospital. Predicted values were calculated assuming that the same number of treatments would happen over the next 3 months.
**Results:** The total number of injectable prescriptions increased from 2016 to 2017 (405 to 412) and decreased during 2018 (actual 313 and predicted 12 month treatments is 376). Denosumab and zoledronic acid had maximum prescriptions in 2017. Teriparatide prescriptions declined from 2016 onwards.
**Conclusion:** The variable trends in prescribing practice of injection treatments for osteoporosis over three years need further analysis. Therapeutic decision-making could depend on patient choice, physician choice and availability of local osteoporosis service.

## P150
## NOVEL CLINICAL TOOL FOR ASSESSMENT OF RECOVERY AFTER ACHILLES TENDON RUPTURE

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**Objective:** We aimed to develop a novel questionnaire tool in order to facilitate clinical assessment of patient's recovery after Achilles tendon surgical reconstruction. In addition, after the questionnaire validation process and final establishment, we evaluated whether its final score has a relationship with values obtained with shear-wave elastography (SWE).
**Methods:** The questionnaire was composed of 9 questions relying on widely used Achilles Tendon Total Rupture Score and American Orthopedic Foot and Ankle Society scoring system regarding assessment of capabilities and subjective feeling after Achilles tendon reconstruction. A total of 20 internationally recognized musculoskeletal radiologists (5), orthopedic surgeons (10) and physiatrists (5) were invited to participate in the questionnaire validation. Final multiple choice questions were developed by the researchers based on the domains that were answered as "very important" by ≥70% of first and second-round survey respondents. In parallel, 24 patients were analyzed by SWE to gain insight into objective recovery.
**Results:** Content experts (5 of them) review the relevance of each question on a 4-point Likert scale. Since 4/5 experts gave score 3 or 4, according to Content Validity index (I-CVI) suggested by Martuza in 1977 (1), the validity is calculated to be I-CVI=0.80. Our novel questionnaire showed a significant and strong propensity score match with SWE results (Spearman two-sided test).
**Conclusion:** Collectively, novel questionnaire positively correlated with quantifications obtained by SWE and is therefore appropriate for subjective assessment of functional recovery after Achilles tendon reconstruction.

## P151
## HIV INFECTION IS ASSOCIATED WITH WORSE BONE HEALTH AND INCREASED FRACTURE RISK: A META-ANALYSIS

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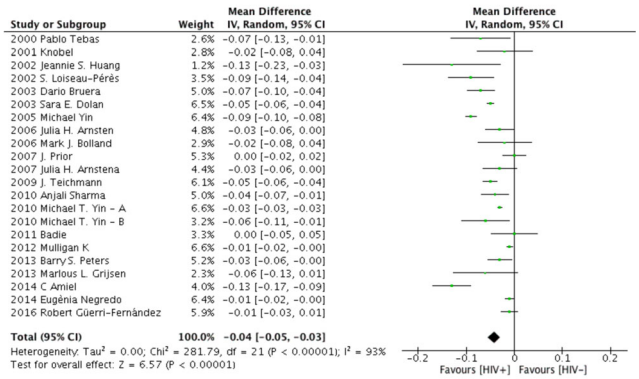
**Objective:** Treatment of HIV infection was altered by the introduction of effective antiretroviral therapy and the life expectancy of HIV infected individuals are increased. Some studies had noted a decrease in BMD among HIV infected patients, while some other reports showed increased fracture risk in HIV population.
**Methods:** We performed a meta-analysis of case-control, cross-sectional and cohort studies to investigate whether fracture rates (fragility and overall) differs in individuals with and without HIV infection. A total of 34 articles were included in this meta-analysis, with 105,773 HIV infected patients and 228,792,927 non-HIV infected controls. Our objectives were to compare the BMD, risks of fragility fractures and overall fractures between these two groups.
**Results:** HIV-infected people showed lower lumbar spine BMD (0.85 to 1.25 g/cm$^2$) than controls (0.92 to 1.31 g/cm$^2$). HIV population also have significantly lower hip BMD than controls. ($p<0.001$). HIV infected patients have higher prevalence of suffering from overall fracture injury (3.95% vs. 0.44%; RR, 1.99; 95%CI, 1.51-2.63; $P<0.001$) and fragility fracture (2.62% vs. 2.19%; RR, 1.76; 95%CI, 1.47-2.11; $P<0.001$) than non-HIV infected people. Subgroup analysis revealed that higher prevalence of vertebral fracture (1.26% vs. 0.37%; RR, 1.97; 95%CI, 1.22-3.2; $P<0.05$), hip fracture (1.38% vs. 0.81%; RR, 1.88; 95%CI, 0.99-3.57; $P=0.05$) and wrist fracture (1.38% vs. 1.29%; RR, 1.67; 95%CI, 1.13-2.45; $P<0.05$) were noted in HIV infection groups when compared with healthy controls. Furthermore, the pooling data of fracture incidence showed that incident fracture rates per 100 person-year differed between HIV infected patients and healthy

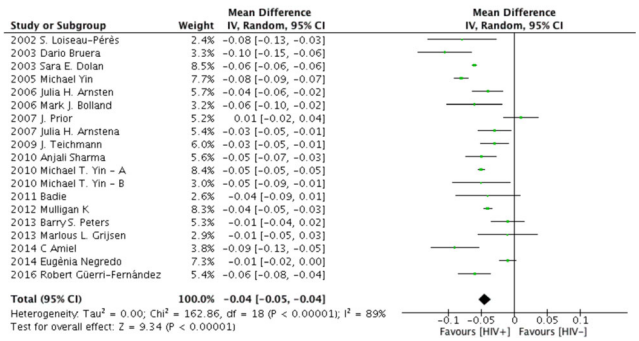
controls. (1.9 vs. 0.4 /100 person-year; RR, 1.39; 95%CI, 1.17-1.66; P<0.001).

**Conclusions:** HIV infection had a negative impact on bone health and increase fracture risks. HIV-infected people had lower BMD and high prevalence of vertebral and wrist fractures. Targeted screening and management to maintain skeletal strength and reduce fragility are urgently needed for people who living with HIV.

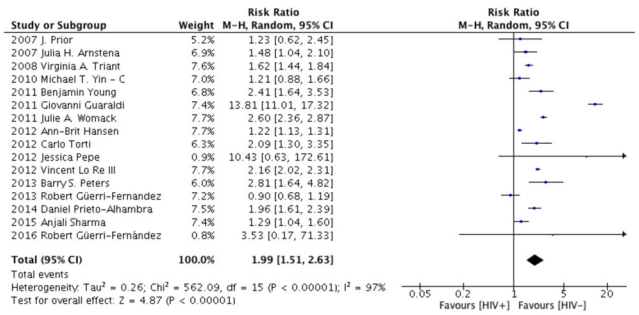
A. Spine BMD



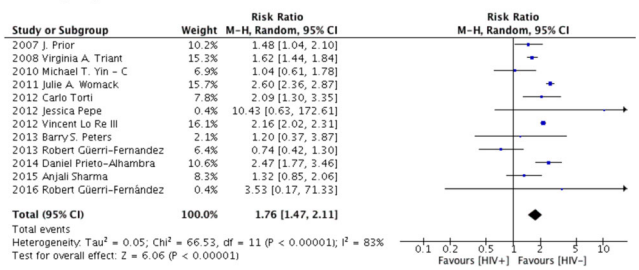

B. Hip BMD



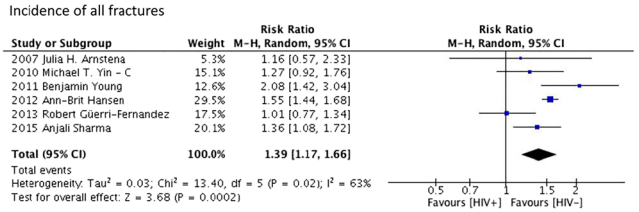

A. All fractures




B. Fragility fractures




Incidence of all fractures




## P152

## WHERE IS THE HEAD OF HUMERUS IN THIS CASE? GORHAM'S DISEASE- LIKE IN A PATIENT WITH DIABETES MELLITUS AND RHEUMATOID ARTHRITIS

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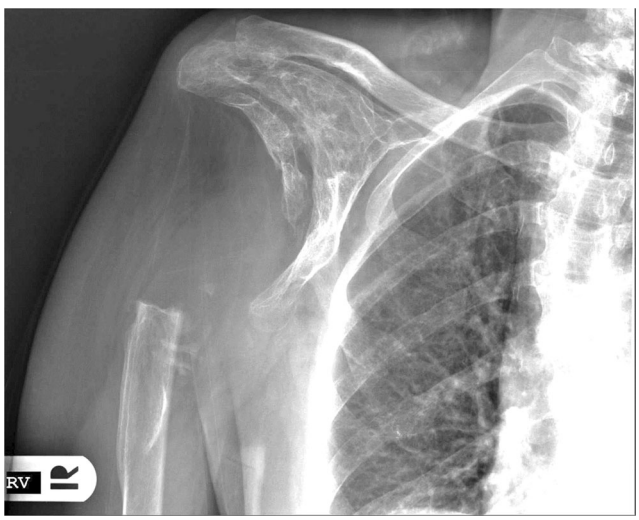
A 60 year old Arab female with history of RA for years. Also, she was suffering from T2 DM and hypertension for the last three years. Clinically, was found to have significant wasting of the shoulders most prominent in the right side (Figure 1).

The X-ray showed a total absence of the head of humerus (sharply demarcated) mimicking Gorham's disease, and dystrophic calcifications of the glenoid cavity (Figure 2).



The MRI image shows herniation of cerebellar tonsils in the foramen magnum and syringomyelia of (C2-C5) (Figure 3).

Together, these features were consistent with the diagnosis of Type 1 Arnold Chiari syndrome. So, the vanishing head of humerus was due to bone resorption secondary to an advanced and rather unusual neuropathic joint. Then, pursuing the diagnosis of Type 1 Arnold Chiari syndrome in this patient was clearly, worthwhile particularly. in presence of a coexisting DM which is capable of producing neuropathic joint. Rheumatoid arthritis on the other hand was also reported to cause Gorham's disease, though rarely.

**Conclusion:** The message derived from this report that in some clinical instances the real cause of the disorder can be overshadowed by another condition(s) that might lead to a similar presentation.

## P153
## DETERMINANTS AND HEALTH CONSEQUENCES OF A RAPID MUSCLE HEALTH DECLINE IN OLDER ADULTS FROM THE SARCOPHAGE STUDY

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**Objectives**: To characterize the muscle health decline of older adults over 1 year and its association with adverse consequences over the 3 following years.

**Methods**: The SarcoPhAge cohort follows up 534 older adults to assess health consequences of sarcopenia. Subjects are seen annually and an assessment of muscle mass (DXA), muscle strength (handheld dynamometer) and physical performance (4-m gait speed) are performed. Outcomes are collected either during annual follow-up visits or by phone. Individual relevant decline of muscle mass, muscle strength and gait speed between baseline and the 1-year follow-up was evaluated using the Edwards-Nunnally index. The association between muscle decline and occurrence of outcomes was tested using logistic regressions. Missing data were handle using multiple imputations.

**Results**: 534 subjects were recruited (73.5±6.2 y, 60.5% women) but during the first year, 7 deaths occurred. Consequently, analyses were performed on 528 subjects. The prevalence of a rapid muscle mass decline was 41.5% (n=219). Subjects presenting a decline of muscle mass had no difference of their demographic or clinical characteristics compared to subjects without decline (all $p > 0.05$). The prevalence of a rapid decline of muscle strength was 47.3% (n=149). Subjects presenting a decline in muscle strength were more often women (21.2% of male vs. 66.0% of male, p=0.02) and had a lower cognitive status (27.6 points vs. 28.1 points at the MMSE, p=0.02). A significant decline in gait speed was observed in 28.2% (n=149) of the whole population. Subjects presenting decline of physical function were older (74.5 years vs. 73.0 y, p=0.01), had lower BMI and cognitive status (25.8 vs. 26.8, p=0.03 and 27.5 points vs. 28.0 points at the MMSE, p=0.04). Over the 3 following years, a rapid decline in muscle mass and strength did not predict the occurrence of falls, fractures and hospitalisations. A rapid decline in gait speed predicted the occurrence of self-reported physical disabilities (adjusted OR=1.87[1.18-2.96]) as well as deaths (adjusted OR=2.36 [1.17-4.73]).

**Conclusion**: A significant proportion of the older population showed a rapid decline in muscle health, associated with age, sex, BMI and cognitive status. A rapid decline of gait speed predicted the occurrence of 3-y death and disabilities, highlighting the importance of an assessment of gait speed in older subjects.

## P154
## EWGSOP 2 VS. EWGSOP 1: IMPACT ON THE PREVALENCE OF SARCOPENIA AND ITS OUTCOMES

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**Objectives**: In June 2018, we published a manuscript showing that sarcopenia, characterized by the EWGSOP definition (i.e., EWGSOP1), was associated with an increased risk of mortality (doi: 10.1016/j.jamda.2018.06.004). In October 2018, the EWGSOP proposed a new operational definition of sarcopenia (i.e., EWGSOP2). We sought to compare the prevalence of sarcopenia defined by EWGSOP1 and by EWGSOP2, and to determine the major outcomes associated with each of these definitions.

**Methods**: We used data available from the SarcoPhAge (for *Sarcopenia and Physical Impairment with Advancing Age*) cohort. To characterize sarcopenia, 3 main assessments were performed: the skeletal muscle mass index using DXA, the muscle strength using hand-dynamometer and the physical performance using SPPB test. According to EWGSOP1, sarcopenia is defined as a low muscle mass (i.e., ≤5.5 kg/m$^2$ for women, ≤7.26 kg/m$^2$ for men) plus a low grip strength (i.e., <20 kg for women, <30 kg for men) and/or low physical performance (i.e., ≤8 points/12). According to EWGSOP2, sarcopenia is characterized by a low grip strength (i.e., <16 kg 7 for women, <26 kg for men) plus a low muscle mass (i.e., <6 kg/m$^2$ for women, <7 kg/m$^2$ for men). If low physical performance ((i.e., ≤8 points/12) is also present, there is 'severe sarcopenia'. Outcomes were collected yearly during interview or by phone call. Association between sarcopenia and occurrence of outcomes was tested using Cox hazards model or logistic regression with adjustment for covariates known to potentially impact muscle health, including age, sex, BMI, number of comorbidities, number of coprescriptions, nutritional status, and cognitive status.

**Results**: 534 subjects were recruited (73.5±6.2 y, 60.5% female). After 3 y, 33 participants were lost to follow-up, so data were available for 501 subjects. According to EWGSOP1, the prevalence of sarcopenia reached 13.6% and, when using the EWGSOP2, 7.4%. Sarcopenia, defined by EWGSOP1, was associated with an increased risk of 3-year mortality ($HR_{adjusted}$=2.93 [1.17-7.35]). According to EWGSOP2, this association was no longer significant ($HR_{adjusted}$=2.74 [0.98-7.65]), but remained in the same range as observed for EWGSOP1. In the subgroup of subjects with severe sarcopenia, we observed a higher occurrence of death ($HR_{adjusted}$=4.50 [1.56-12.98]) and institutionalization ($HR_{adjusted}$=5.07 [1.02-25.27]) than in non-sarcopenic individuals.

**Conclusion**: The EWGSOP2 definition of sarcopenia appears to decrease its prevalence due to changes in the algorithm and/or the thresholds compared to EWGSOP1. Furthermore, the proposed severity index, based on physical performance assessment, seems to be a determinant of the occurrence of deaths and institutionalizations.

## P155
## PILOT STUDY ON A NEW INTERVENTION PROGRAM FOR GERIATRIC HIP FRACTURE PATIENT WITH SARCOPENIA

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**Objective:** Sarcopenia and osteoporosis increase the risk of falls, resulting in fragility fracture. The prevalence of sarcopenia was found to be alarmingly high (73.6% in males and 67.7% in females) in geriatric hip fracture patients [1]. Intervention program on sarcopenic hip fracture was set up at our center.

**Method:** All patients age over or equal to 65 admitted to Caritas Medical Centre with operatively treated hip fracture and diagnosed sarcopenia were included. Interventions include inpatient nursing education, dietary advice, therapist assessment and structured 12-week geriatric day hospital (GDH) exercise program. Those not eligible for GDH training were classified as control group. Changes in relative skeletal muscle mass index (RASM), muscle strength, functional scores were measured.

**Results:** There were 9 intervention and 10 control patients. The mean age in intervention group was 81.8 and control group was 77.0. Female to male ratio in intervention group was 7:2 and control group was 8:2. All patients were noted to have increment in RASM (intervention 0.316 mm/kg$^2$, control 0.655 mm/kg$^2$, $p<0.05$), knee extension of good limb (intervention 1.32 kg, control 0.92 kg, $p<0.05$) and injured limb (intervention 5.78 kg, control 3.49 kg, $p<0.0.5$). All patients have improvement in functional scores ($p<0.05$). Between groups analysis showed there was statistically significant improvement in muscle strength of both good and injured limbs. There was also statistically insignificant decrement in RASM, MFAC and BI in intervention program group compared with control group.

**Conclusion:** Generally, there were improvement in muscle mass, muscle strength and functional recovery in all patients. There was apparent improvement in muscle strength but reduction in muscle mass in intervention group compared with control group. The result shows that intervention program with exercise prescription in sarcopenic hip fracture patient can improve the lower limb muscle strength but not muscle mass. These patients may be too frail to benefit from traditional exercise treatment for sarcopenia. Hip fracture patients with sarcopenia may represent a special group of sarcopenic individuals that are resistant to traditional exercise treatment for sarcopenia. Further studies are needed to investigate the potential benefits of extension of rehabilitation training program for this group of frail patients on sarcopenia treatment.

**Reference:** 1. Ho AW et al. Hong Kong Med J 2016;22:23

## P156
## ANOREXIA NERVOSA AS RISK FACTOR OF OSTEOPOROSIS

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**Objectives:** Anorexia nervosa happens to be one of the threatened psychological conditions which affect mostly teenagers.

Anorexia can affect people of all ages, genders, sexual orientations, races, and ethnicities. About 33-50% of anorexia patients have a mood disorder, such as depression. Anorexia nervosa imposes to be a threatened nature for future women also as it also causes osteoporosis. Our abstract describes the women who are at risk of osteoporosis due to anorexia nervosa.

**Methods:** Carried out a survey of 400 women who are in between 25±7 years old and from Europe, Asia, and Africa. Questionnaire consists of 30 questions. The questionnaire was shared among young women through social media platforms and we used variation statistics with the program Microsoft Excel 2013.

**Results:** Survey results include, students were 51%, employees were 26%, housewife were 23%. From the height and weight we obtained the respective BMI shows that women having BMI <17 were 11%, between 18-25 were 56.5%, 26-33 were 32.5%. The women who do sports were 37% and who do not were 63%. Women who were at stress are 66.5% and in this women in age of 18-20 y were 28.6%, 21-26 were 42.1%, 27-33 were 29.3% and the women who have maximum stress are at age group of 21-26 were 42.1%. The women who think by decreasing the food reduces their weight were 55.5%. Amenorrhea were seen in 50% of women and in this women in age of 18-20 years were 22%, 21-26 were 44%, 27-33 were 33% and the women who had amenorrhea in Europe were 47.6%, Asia were 23.8%, Africa were 28.6% and it is high among Russian women and in age group of 21-26. The women who were presented with pain (early symptom of osteoporosis) were 62% and in back pain was 58% and other joint pain was 42%.

**Conclusion:** Anorexia nervosa has long lasting effects causing osteoporosis and infertility, in order to stop the developing of the disorder proper nutrition rich in calcium, vitamin D, exercise and healthy lifestyle should be followed.

## P157

## RELATIONSHIP BETWEEN SERUM LEVEL OF RENALASE AND LUPUS NEPHRITIS ACTIVITY

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**Objective:** Lupus nephritis (LN) is a major risk for overall morbidity and mortality in systemic lupus erythromatosis (SLE), and despite potent anti-inflammatory and immunosuppressive therapies still ends in chronic kidney disease (CKD) or endstage renal disease (ESRD) for too many patients. Renalase is a novel, kidney secreted cytokine-like protein that promotes cell survival. Our aid was to study the relationship between level of human serum renalase (RNLS) with LN and its role in the disease activity and progression.

**Methods:** For The current cross-sectional study 23 healthy controls and 48 patients with LN were screened and 30 subjects were selected These patients were subdivided into two equal groups according to disease activity measured by SLE Disease Activity Index (SLEDAI). Human RNLS concentration was measured by a highly sensitive. commercial sandwich enzyme immunoassay which uses RNLS antibody to capture renalase from serum. Assessment before and after treatment was done for 17 patients who received prednisone and immunosuppressive therapy were recruited and followed up for three months to evaluate the serum renalase levels before and after treatment.

**Results**: The level of renalase was significantly higher in LN patients compared to healthy controls, (P<0.001). Moreover, patients with active LN had higher serum renalase levels compared to patients with inactive LN (P<0.005) Serum renalase levels were positively correlated with SLEDAI, 24-h urine protein excretion, ds-DNA and ESR and CRP but inversely correlated with serum C3 and the class (especially in proliferative type (class III, IV, more than class V). Renalase amounts decreased significantly after 3 months of standard therapy. Also we found there is insignificant difference of renalase level according to treatment by mycophenolate mofetil and cyclophosphamide during and after activity (P=0.655, 0.550).

**Conclusion:** Serum renalase levels were correlated with disease activity in LN. Serum renalase might serve as a potential indicator for disease activity in LN.

## P158

## DETECTION OF SUBCLINICAL LV MYOCARDIAL DYSFUNCTION IN RHEUMATOID ARTHRITIS PATIENTS BY SPECKLE TRACKING

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**Objective:** Patients with rheumatoid arthritis (RA) have shorter life expectancy and their risk of cardiovascular (CV) death is more than 50% higher than the rest of the population. Early myocardial dysfunction may be detectable more precisely and sooner using speckle tracking echocardiography. This study was designed to assess myocardial left ventricle (LV) systolic function by STE strain imaging in patients with RA without known CVD and to correlate the findings with characters of the disease.

**Methods:** Cross-sectional observational study enrolled 60 patients with RA (mean age 46.22±8.14 y) without known CVD, and 20 healthy controls. All subjects underwent a standard echocardiographic examination as

well as the speckle tracking assessment of left ventricle strains.

**Results:** Speckle-tracking assessment of LV systolic function revealed decreased global longitudinal strain (GLS) among the patients group (-16.80% vs. -22.35%, P<0.001). There was a negative correlation between the duration of RA and the GLS (r=- 0.301). Receiver operating characteristics curve was used to define the best cutoff value of GLS which was -20, with sensitivity of 76.7%, specificity of 80%, positive predictive value of 92%, negative predictive value of 63% with diagnostic accuracy of 83.9%.

**Conclusion:** The speckle tracking method for myocardial strain analysis showed unambiguously systolic impairment of longitudinal strain parameters. So, patients with RA should undergo a full comprehensive echocardiographic study for assessment of LV systolic function.

## P159
## "RELATIVE HYPOCALCEMIA" POST PARATHYROIDECTOMY: A NEGLECTED PHENOMENON?

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**Objective:** To describe a series of patients from Malacca Hospital, Malaysia, who developed symptoms of hypocalcemia post parathyroidectomy for primary hyperparathyroidism despite having normal serum calcium.

**Method:** The records of the above patients were retrieved and reviewed retrospectively.

**Results:** The following table summarizes the four patients we are describing:

| Patient | Calcium Pre-surgery ( 2.18-2.6 mmol/l) | Parathyroid hormone levels (1.58-6.08 pmol/L) | Vitamin D levels (26-250 nmol/l) | Complications of hyperparathyroidism | Calcium post-surgery during review with symptoms (mmol/l) | Symptoms and Severity | Duration for symptoms to resolve post-surgery | Histopathology examination |
|---|---|---|---|---|---|---|---|---|
| Patient A 30 years old, female | 2.92 – 3.1 | 50.2 | 15.93 | Low Bone Mineral Density (BMD) Renal calculi | 2.35 | Severe cramps, Positive Chvostek's sign unable to walk properly | 7 weeks | Multifocal papillary thyroid carcinoma with right inferior parathyroid adenoma. |
| Patient B 45 years old, Female | 3.08-3.32 | 50.4 | Not available | Low BMD | 2.36 | Mild numbness over hands | 12 weeks | Atypical parathyroid adenoma (tumor of uncertain malignant potential). |
| Patient C 65 years old, female | 2.86 – 3.0 | 13.6 | 40.69 | Osteoporosis | 2.36 | Mild numbness over hands | 12 weeks | Parathyroid adenoma |
| Patient D 24 years old, male | 2.7-2.9 | 17.7 | 45.02 | Renal calculi | 2.26 | Mild numbness over hands | 20 weeks | Parathyroid adenoma |

**Conclusion:** As far as we know this is the first description of "relative hypocalcemia" post parathyroidectomy. From our experience, symptoms can range from mild to severely debilitating. It is crucial for clinicians reviewing these patients to look for symptoms despite patients having normal calcium levels.

## P160
## DOES KERATOTIC TISSUE OFFER A WINDOW INTO BONE HEALTH?

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**Objective:** Using Raman spectroscopy to determine an association between collagen and keratin on exposure to systemic factors that influence bone health.

**Methods:** 12 weeks old Sprague Dawley rats were randomly assigned to 1 of 3 groups: Group 1 underwent a sham ovariectomy (n=11) and remained treatment naive while the other groups underwent either ovariectomy with no intervention (OVX, n=10), or ovariectomy with PTH (OVXP, n=12). All rats were sacrificed at 23 weeks and bone (right femur) and claw (right and left claw) samples were collected. Bone architecture was assessed using microcomputed tomography. Raman spectra were recorded on bone and claw samples using the Perkin Elmer Instrument, Raman Station.

**Results:** Raman signal signature successfully discriminated between ovariectomised rats and their sham controls for both bone (sensitivity 89%, specificity 91%) and claw (sensitivity 89%, specificity 82%). Compared to baseline, OVX reduced ordered $\alpha$-helical conformation converting it to a random conformation. OVXP prevented 80% of the protein structure randomisation, but only prevented 50% of the demineralisation, suggesting that the interaction of this intervention with the collagen is stronger than with the mineral phase. The OVXP also showed significant changes from alpha to beta sheet content, suggesting that the intervention does not lead to protein disorganisation; its structure is instead reorganised. For both operation groups the changes in bone collagen and claw keratin were qualitatively equivalent, indicating a clear systemic modulation of both proteins.

**Conclusions:** Raman signatures revealed that systemic factors mediating bone health in ovariectomised rats exhibited recordable changes within claw tissue; specifically, a greater degree of structural flexibility within both collagen and keratin. It is likely that the less ordered collagen will impact on the elasticity of the collagen and also on mineral deposition and subsequently fracture risk. The fact that the same qualitative perturbations were observed in both tissues under both systemic perturbations opens the potential of using keratin as a surrogate marker for bone health.

## P161
## LOCATION OF ATYPICAL FEMORAL FRACTURES CAN BE DETERMINED BY THE MECHANICAL AXIS OF LOWER LIMB: CT- BASED FINITE ELEMENT ANALYSIS

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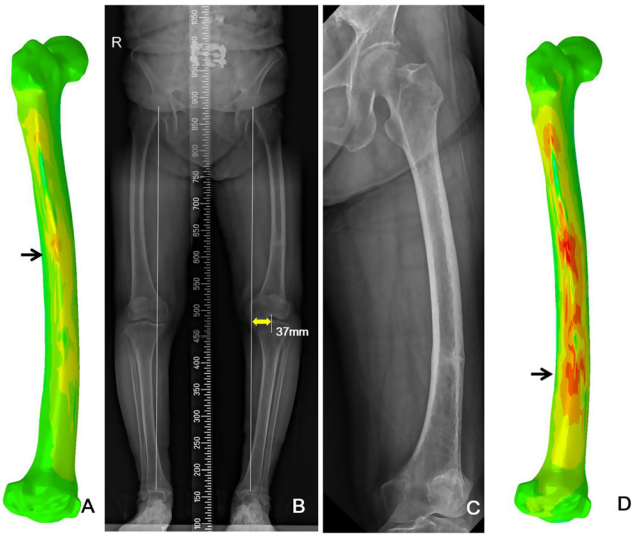
**Objective:** With increasing lateral bowing angle, the atypical femoral fracture (AFF) location was moved from the subtrochanteric area to the diaphyseal area. Besides of suppression of bone remodeling, the biomechanical factor including lower limb geometry would be considered as a cause of AFF. Although there has been reported about an early prediction of AFF, the method of early detection has not been established. We hypothesized that the lower limb axis would represent the patient-specific biomechanical factor of AFF. Thus, we developed a computed tomography (CT)-based finite element analysis (FEA) model that assesses possible fracture location to detect AFF early.
**Methods:** We retrospectively reviewed 18 patients with AFFs and gathered their CT image of the intact (contralateral) femur. We performed FEA analysis to find the maximal stress loading area of each patient and matched the location of AFF. In addition, we modified the mechanical axis as neutral, varus (5mm, 10mm, 15mm, 20mm, 25mm, 30mm) and valgus (5mm, 10mm, 15mm, 20mm, 25mm, 30mm), and analyzed the change of the maximal stress loading area according to lower limb alignment. Femoral lateral bowing was classified from 0(neutral)-3(varus).
**Results:** The average age of the participants was 77.3 y and all of them were female. There were 5 cases of subtrochanteric AFFs and 13 cases of diaphyseal AFFs. The average mechanical axis at the knee joint level was 24.5 mm (range, 0-70 mm) of varus. The grade of femoral bowing was 7 cases of grade 0, 2 cases of grade 1, 3 cases of grade 2, and 6 cases of grade 3.When the grade was0 or 1, the maximal stress point was proximal femur, while the point was midshaft or distal 1/3 in grade 2 and 3. There were 6 patients with neutral axis had the same location of the maximal stress point in the contralateral femur and the location of AFF, but the other twelve patients did not show consistency. After the adjustment of varus axis of each patient with patient's whole lower bone x-ray, the maximal stress point was exactly consistent with the fracture site. CT/FEA model showed that the maximal stress location was changed according to the change of applied axis. Maximal stress location was changed distally and laterally relative to the varus degree, and the location was moved proximally and medially relative to the valgus angle. Peak maximal stress was increased according to the varus deformity of knee joint, while that was decreased correlated with the degree of the valgus deformity.
**Conclusion:** CT/FEA demonstrated that maximal stress location was consistent with the location of AFF, and the maximal stress location was determined by the lower limb axis, not only by the femoral bowing.

Fig. 1 The change of maximal stress location according to the varus deformity of the knee. (A) The maximal stress location in neutral position (B) The lower limb geometry of the patient. (C) The patients' incomplete atypical femur fracture. (D) The maximal stress location in the varus with 37mm medial translation.




## P162
## HYPOPARATHYROIDISM: INCIDENCE AND OPTIMAL TREATMENT BY A TERTIARY REFERRAL CENTER DATABASE

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**Introduction:** hypoparathyroidism is a rare disorder, affects 24-37/100 000 persons. The most frequent cause is neck surgery complication, the autoimmune and developmental disorders are rare etiologies. For long time the only available treatment was calcium and vitamin D supplementation with activated D-hormone therapy. Since 2015 recombinant human parathyroid hormone is approved by FDA for the treatment of hypoparathyroidism.
**Objective:** the aim of our survey was to determine the frequency and the characteristics of patients with hypoparathyroidism in our tertiary referral university hospital. We aimed to investigate the medical therapy and its efficacy in our patient population.
**Material and Methods:** we performed a retrospective analysis of our patient database. We collected registered patients with hypoparathyroidism (at first visit both serum calcium and parathyroid hormone below reference range), presented

in 2017 at Semmelweis University 1st Department of Medicine endocrinology outpatient clinic, a tertiary referral center. For descriptive statistics and database management we used SPSS 17. Data are presented as mean +/- SD.

**Results:** we could collect data of 14 females and 3 males. Hypoparathyroidism was postoperative in 13 cases, idiopathic in 4 patients and caused by DiGeorge syndrome in 1 case. The average age at diagnosis was 44.5 years while the mean first measured serum calcium 1.62 mmol/l. Patients received 1608 ±620 mg elemental calcium, 2306±730 IU cholecalcipherol and 0.6±0.3 μg activated D-hormone daily therapy in average. By this therapy the mean serum calcium level is 2.23±0.21 among our patients.

**Conclusions:** the typical presentation of hypoparathyroidism was paresthesia and muscle cramps after neck surgery, but in one case secondary Parkinsonism due to Fahr-disease was the presenting symptom. Serum calcium level usually could be maintained with cholecalcipherol and calcium supplementation and activated vitamin D hormone analogue therapy. Currently the recombinant human PTH therapy is only available in clinical trials in our country.

## P163

## THE INFLUENCE OF BODY FAT CONTENT AND DISTRIBUTION ON BONE MASS THROUGHOUT ADULT LIFE: A POPULATION-BASED STUDY OF 18263 CASES

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**Objectives:** The aim of this cross-sectional study was to investigate the impact of body fat content and distribution on BMD in healthy males and females.

**Methods**: The study was consisted of 18263 subjects (8969 males and 9294 females) aged 20 y or older who had undergone routine health examinations at the Second Affiliated Hospital of Soochow University from 2008-2015 (Table 1). Percentage of local fat and BMD of lumbar spine (LS) and femoral neck (FN) were measured using DXA.

**Results**: As females age, their BMD decreased, while hip fat percentage (HF%) and waist fat percentage (WF%) increased. whereas in males, the LS BMD kept stable when WF% increasing (Fig 1). In the multiple linear regression models, BMI was the strongest predictor in the three models. HF% appeared to be a stronger predictor of LS BMD than of FN BMD in females, while WF% was stronger in determining FN BMD than LS BMD in males (Table 2). From the generalized additive models, the positive relationship between BMI and BMD were weaker at high BMI, particularly at the lumbar spine in females. As for fat percentages, a parabolic relationship with BMD was observed in female, whereas in males, the association between fat percentage and LS BMD appears weaker than FN BMD, particularly for the models with WF% as the predictor variable (Adjusted $R^2$=0.058) (Fig 2). Females in the highest HF% quartile showed significantly faster bone loss in lumbar spine than in femoral neck while males in the highest WF% quartile showed significantly faster bone loss in femoral neck than in lumbar spine (Fig 3).

**Conclusions:** In males, the waist fat has more impact on LS BMD compared with hip fat, whereas in females, the hip fat exerts more influence on FN BMD compared with waist fat, which were due to some kind of cross-effect of fat on BMD in the two sites. The low prevalence of osteoporotic fracture of lumbar spine in males could be attributed to the low hip fat percentage as well as the weak effect of waist fat on LS BMD.

**Table. 1 Descriptive statistics of study population**

| | Female (n=9294) | Male (n=8969) | P[a] |
|---|---|---|---|
| | Mean±SD | Mean±SD | |
| Age (yr) | 52.59±14.27 | 48.34±13.40 | <0.001 |
| Anthropometric measures | | | |
| Height (cm) | 158.6±5.4 | 170.7±5.8 | <0.001 |
| Weight (kg) | 57.9±8.7 | 72.0±10.4 | <0.001 |
| BMI (kg/m²) | 23.01±3.27 | 24.70±3.14 | <0.001 |
| DXA measures | | | |
| FN BMD (mg/cm²) | 860.2±154.4 | 949.0±137.4 | <0.001 |
| HF% | 25.59±5.39 | 18.849±4.53 | <0.001 |
| FN T-score(SD) | -0.58±1.29 | -0.22±1.06 | <0.001 |
| FN BMC(g/cm) | 3.895±0.811 | 4.998±0.885 | <0.001 |
| LS BMD (mg/cm²) | 1061.1±198.7 | 1125.4±166.3 | <0.001 |
| WF% | 29.23±8.82 | 26.32±8.12 | <0.001 |
| LS T-score(SD) | -0.70±1.66 | 0.22±1.39 | <0.001 |
| LS BMC(g/cm) | 29.840±7.101 | 37.049±7.140 | <0.001 |
| Waist fat to Hip fat Ratio | 1.146±0.307 | 1.406±0.421 | <0.001 |

Values are mean ± SD unless otherwise stated. To convert BMD from mg/cm² to BMD in g/cm², divide by 1000.
[a].Student's t-test.

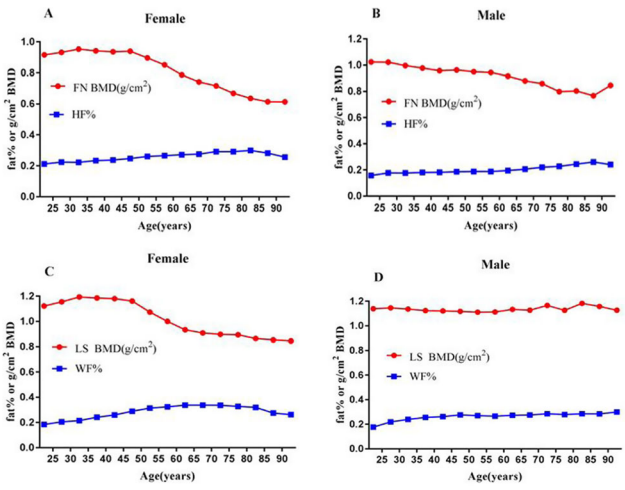


**Fig. 1 Changes of WF%/ HF% and LS BMD/ FN BMD over the lifespan of women and men.**

**Table.2 Regression coefficients of models with BMI (kg/m$^2$),HF% or WF% as the predictor variable for lumbar spine and femoral neck BMD (mg/cm$^2$)**

| | Female | | Male | |
|---|---|---|---|---|
| | β | $R_{adj}^2$ | β | $R_{adj}^2$ |
| **FN BMD** | | | | |
| **BMI** | 0.319* | 0.456 | 0.298* | 0.232 |
| **HF%** | -0.068* | 0.459 | -0.095* | 0.238 |
| **WF%** | -0.055* | 0.458 | -0.111* | 0.238 |
| **LS BMD** | | | | |
| **BMI** | 0.197* | 0.366 | 0.165* | 0.056 |
| **HF%** | -0.179* | 0.387 | -0.138* | 0.070 |
| **WF%** | -0.039** | 0.366 | -0.033*** | 0.056 |

**β: standard regression coefficient**

*** P<0.001 ** P<0.01 ***P<0.05 compared with the corresponding linear regression model.**

**Covariates adjusted in both linear regression and GAM include age, weight (for HF% and WF% only),height.**

**Linear regression analysis with BMD as dependent variable; BMI, HF% or WF% as the predictor variable.**

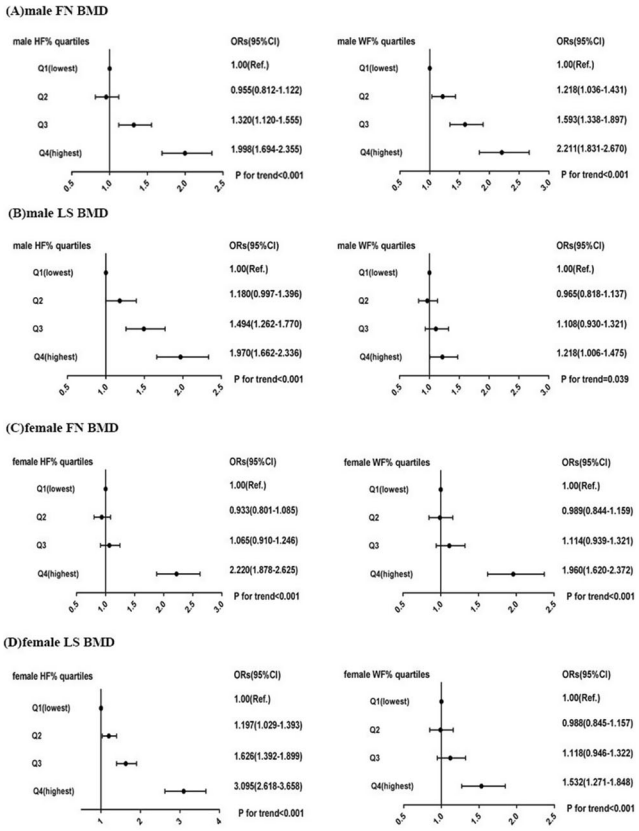


**Fig. 3. Risk of low BMD (T-score <-1.0) across quartiles of male HF%, male WF%, female HF%, and female WF%. (A) male FN BMD. (B)male LS BMD. (C) female FN BMD. (D) female LS BMD. ORs (95% CI) were calculated using multivariate logistic regression after adjusting for age, height and BMI;OR, odds ratio; CI, confidence interval.**

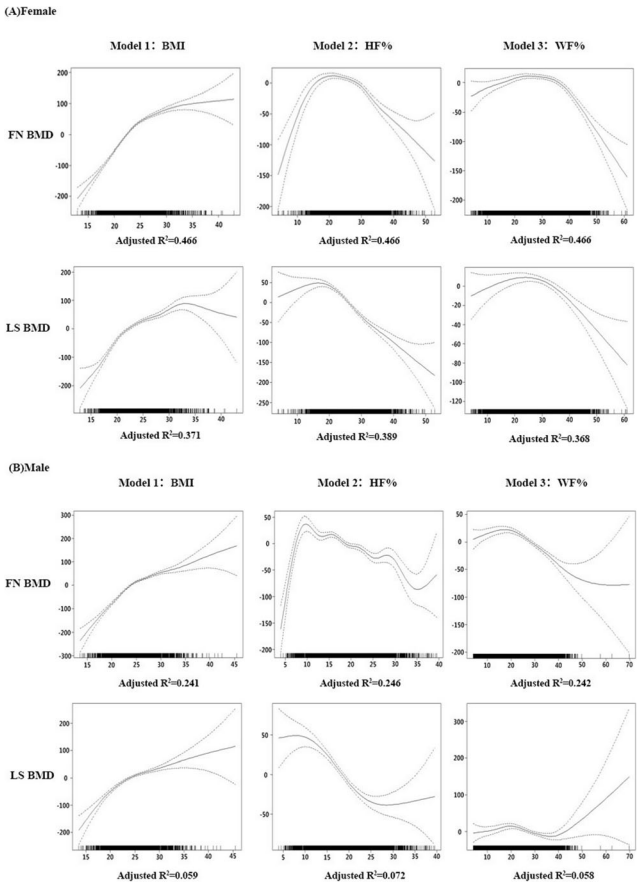


**Fig. 2. Graphic presentation of the dose–response relationship between BMI (Model 1) ,HF% (Model 2) or WF% (Model 3) in female (A) and male (B) obtained by generalized additive regression models. Models adjusted for age, weight (for the model 2 and 3 only) and height as covariates. Dotted lines represent 95% confidence intervals. The reference value for BMD is the value associated with the mean BMI, HF% or WF% for all subjects in each gender. The rug plot along the bottom of each graph depicts each observation.**

## P164

## OSTEOPROTEGERIN EXPRESSION IN HUMAN BONE: RELATION TO MENOPAUSAL STATUS AND BONE ARCHITECTURE

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**Objective:** In postmenopausal osteoporosis, bone density and architecture are greatly jeopardized. Estrogen masters a balance of anti and pro-osteoclastogenic factors production to guarantee normal bone remodeling. Estrogen deficiency is associated with accelerated bone resorption mainly due to increased osteoclast recruitment. Osteoprotegerin (OPG), the famous osteoclastogenesis inhibitory protein, is known to protect bone from the resorptive effect of RANK-RANKL interaction - a key step in osteoclast maturation - by preventing their binding. In vitro studies demonstrated estrogen stimulatory effect on OPG production;

however, in vivo data relating this effect to bone structure and stages of menopause needs further investigations. Our aim was to detect OPG expression in human bone in relation to menopausal status (early & late) and its reflection on bone architecture highlighting its impact on quality osteoporosis treatment.

**Methods:** Bone specimens from iliac crest bone grafts from 34 female patients divided into three groups pre and postmenopausal (early 5 y & late >5 y after menopause) were studied for histomorphometric assessment (bone volume, trabecular thickness, trabecular separation, eroded surface, osteoblast surface, and osteoid surface) using image analysis system LeicaQ 500 MC. Serum estradiol levels (E2) and BMD were evaluated by chemiluminescence and DXA, respectively. Osteoporosis was diagnosed according to WHO criteria. Immunohistochemistry staining of OPG was performed measuring its expression percent and correlation with E2, BMD and histomorphometric measurements.

**Results:** Area percentage of OPG expression was significantly higher in premenopausal group (3.25±0.51%) in comparison to early (1.34±0.46%) and late postmenopausal (1.05±0.31%) groups ($p<0.001$) and in nonosteoporotic compared to osteoporotic postmenopausal patient ($p<0.01$). No statistically significant difference was detected between early and late postmenopausal groups. Our results also demonstrated a highly significant positive correlation between OPG expression and E2 ($r=0.89$, $p<0.01$), BMD (at forearm $r=0.79$, at lumbar spine $r=0.65$ and at femur $r=0.73$) ($p<0.01$), trabecular bone volume ($r=0.89$, $p<0.01$) and thickness ($r=0.78$, $p<0.01$) and inverse correlation with trabecular separation ($r=-0.94$, $p<0.01$).

**Conclusions:** OPG plays a pivotal role in pathogenesis of postmenopausal osteoporosis specially in the 1st five years. It is crucial for adequate BMD and better microarchitecture quality of trabecular bone. Restoring bone OPG level would be of great benefit in early postmenopausal phase of accelerated bone loss.

## P165

## FROM EFOS TO EXFOS, POST-TREATMENT PHASE: SIMILARITIES AND DIFFERENCES OF RESULTS IN THE GREEK COHORTS

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**Objective**: Extended Forsteo Observational Study (ExFOS) is a multinational, prospective, observational study to evaluate fracture outcomes, back pain (BP), compliance and health-related quality of life in osteoporotic patients treated with teriparatide (TPTD) for up to 24 months with a follow-up of at least 18 months. Hellenic data of ExFOS follow-up period are juxtaposed to those of European Forsteo Observational Study (EFOS).

**Methods**: We have reported similarities and differences of the Hellenic EFOS and ExFOS cohort at baseline and during treatment[1, 2]. Post-treatment data (EFOS[3] $n=301$ - ExFOS $n=416$) are juxtaposed. No statistical comparisons were performed.

**Results**: During follow-up, Greek patients in EFOS and ExFOS had a preservation of improvement in self-reported health quality parameters. In EFOS, significant improvement from baseline in BP during last month was reported by 77.0% at 18 months post treatment vs. 79.2% at treatment conclusion. In ExFOS significant improvement was seen by 42.4% and 37.2% respectively. Improvements in other parameters were numerically comparable (Table). After TPTD treatment 68.0% of EFOS patients received antiresorptives (vs. 81.7% at baseline)[3]. In ExFOS, 34.7% used bisphosphonates and 25.0% used other antiresorptives at 30 months (vs. 58.8% and 33.4% with prior use, respectively).

**Conclusion**: Improvements in both cohorts, sustained through follow-up, are shown. Lower antiresorptive use after TPTD treatment is recorded. Results should be interpreted in the context of observational studies.

| | Hellenic EFOS cohort (N=301)[3] | | Hellenic ExFOS cohort (N=416) | |
|---|---|---|---|---|
| Parameter Improvement | 18 months (treatment) | 36 months | 24 months (treatment) | 42 months |
| BP during last month | 79.2% | 77.0% | 37.2% | 42.4% |
| Limitation due to BP | 72.5% | 70.9% | 62.5% | 62.2% |
| VAS–BP | -38.6 | -42.0 | -36.4 | -36.0 |
| EQ-5D–pain/discomfort | 64.9% | 59.4% | 59.9% | 57.4% |
| EQ-5D–mobility | 48.0% | 46.9% | 45.5% | 48.9% |
| EQ-5D–self-care | 39.9% | 39.1% | 37.1% | 38.0% |
| EQ-5D–usual activities | 54.6% | 48.4% | 49.5% | 54.8% |
| EQ-5D–anxiety/depression | 45.8% | 42.6% | 41.7% | 41.3% |

EQ-5D: EuroQol health questionnaire VAS: visual analogue scale score

**References:**

1. BMC Musc Disord 2015;16:136
2. Endocrine Abstracts 2016;41:EP98
3. Arch Hell Med 2012;29:454

## P166

## DETRIMENTAL EFFECTS OF EMPAGLIFLOZIN ON BONE IN TYPE 2 DIABETIC RATS IS PREVENTED BY METFORMIN THROUGH AN INTERPLAY OF PTH, RECEPTOR ACTIVATOR OF NUCLEAR FACTOR KAPPA B AND PHOSPHORYLATION OF CREB

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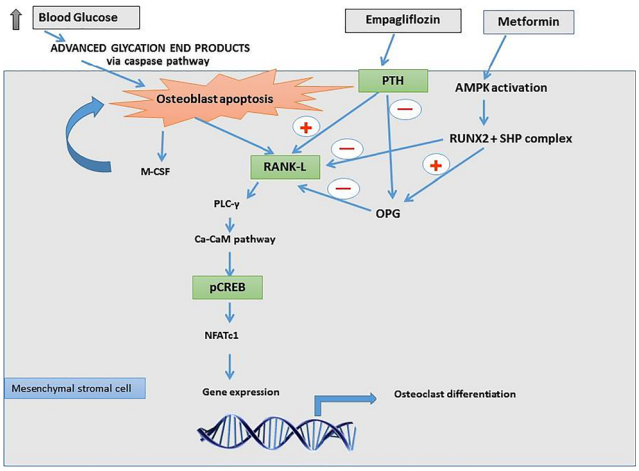
**Objectives:** Type 2 diabetes mellitus (T2DM) is known to have a detrimental effect on skeletal health. Sodium-glucose cotransporter-2 (SGLT2) inhibitors have been reported to further deteriorate bone health. Clinically, SGLT2 inhibitors are used in combination with metformin, which has bone protective effects. Therefore, through this study, we evaluated the effect of empagliflozin, a relatively new SGLT2 inhibitor,

alone and in combination with metformin on bone in high fat diet (HFD) and low dose streptozotocin (STZ)-induced T2DM in rats.

**Methods:** Male Wistar rats (6-8 weeks old) were made diabetic using HFD containing 60% fat for two weeks followed by an i.p. injection of low dose (35 mg/kg) of STZ. Empagliflozin (1 and 3 mg/kg), metformin (100 mg/kg) and their combination was administered orally for 8 weeks, following which rat femurs and tibia were isolated for studying bone microarchitecture using microCT and levels of alkaline phosphatase (ALP), acid phosphatase (TRAP), PTH, pCREB were measured using commercially available kits while OPG:RANKL expression was studied using RT-PCR. Additionally, changes in serum calcium and PTH were also recorded.

**Results:** We show that accumulated levels of AGE in diabetic rats cause osteoblast apoptosis followed by an increase in level of RANKL which via stimulation of Ca-CaM pathway through the activation of PLC-γ increase the phosphorylation of CREB triggering osteoclast gene expression. Empagliflozin (3 mg/kg but not 1 mg/kg) adversely affected bone microarchitecture as indicated by trabecular bone volume, separation and thickness and also by enhanced serum calcium, reduced ALP, increased TRAP, reduced OPG:RANKL ratio, raised serum and bone PTH and increased pCREB. The adverse effects on bone were reverted by co-administration with metformin in diabetic rats possibly through an enhanced OPG/RANKL ratio and reversal of empagliflozin-induced phosphorylation of CREB.

**Conclusions:** The detrimental effect of empagliflozin on bone and its reversal by metformin is possibly mediated by an interplay between PTH, RANKL and pCREB (Figure 1). Future studies may target this pathway in diabetic individuals undergoing therapy with these drugs.

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## P167

## OBESITY AS AN INDEPENDENT RISK FACTOR FOR POSTOPERATIVE COMPLICATIONS, MORTALITY AND FUNCTIONAL OUTCOME AFTER TOTAL KNEE ARTHROPLASTY

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**Objective:** To determine whether obesity is an independent risk factor for inpatient postoperative complications, mortality, and functional outcome in patients undergoing primary TKA.

**Methods:** We obtained our data from our hospital database of patients undergoing primary TKA between 2014-2017. The 285 patients obtained were divided according to their BMI: obese (≥30 kg/m$^2$) and non-obese (<30 kg/m$^2$). To control for potential confounders and comorbidities, each obese patient was matched to a non-obese patient using age, sex, and other 16 comorbidities. We evaluated in-hospital and later postoperative complications as well as mortality, length of stay and surgery duration. Functional outcome was evaluated using the Hospital for Special Surgery Score at 3, 6, 12 and 24 months after surgery.

**Results:** Our data showed that obese patients were more than twice as likely to have any postoperative complications (odds ratio (OR), 2.261; 95%CI, 1.279-4.015). Obese patients had a higher risk of postoperative in-hospital infection (OR, 5.609; 95%CI, 1.866–16.864; p=0.0021), wound dehiscence (OR, 2.697; 95%CI, 1.533–4.742; p<0.001) and in-hospital death after primary TKA (OR, 1.364; 95%CI, 1.173–1.719; p=0.001). There was no increase in the prevalence of cardiovascular or thromboembolic-related complications. Length of stay (6.3 vs. 5.8 d; p=0.027), and surgery duration (107.85 vs. 100.37 min; p<0.001), were also higher in obese patients. There were no statistically significant differences in the functional outcome up to 24 months after the surgery (88.14 vs. 85.95 points; p=0.46).

**Conclusions:** Obesity appears to be independently associated with a higher risk for a small number of selected in-hospital postoperative complications and mortality after matching for comorbidities linked to obesity. However, the independent impact of obesity appears to be fairly modest, as it did not appear to be an independent risk factor for many systemic complications nor poor functional outcome. These findings lead to ask if it would be necessary to update the current pre and postoperative protocols in order to improve the results.

## P168

## CUTANEOUS METASTASES FROM PRIMARY EXTREMITY LEIOMYOSARCOMA: A CLINICAL REPORT

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**Objective:** Report a case of a relatively rare tumor with an aggressive behavior leading to early skin and pulmonary metastases.
**Methods:** We report a case of an 86-year-old man with hypertension, COPD and gout referred to our trauma department with 3-month evolution ulcerative skin lesions in the right patella.
**Results:** Presumptive diagnosis was over infected tophi but the cultures were negative so further evaluation was necessary. Histological examination of the skin lesions showed a high grade leiomyosarcoma metastases. MRI revealed a heterogeneous 11x9x6 cm soft-tissue solid mass at the lateral aspect of the right leg. Extension study with thoracoabdominal CT scan was normal. After multidisciplinary team meeting it is decided transfemoral amputation of the limb. Radiotherapy and chemotherapy were dismissed because of the patient comorbidities. One month after the surgery patient developed pulmonary symptoms and a new thoracic CT scan showed right pleural effusion and a 1 cm node in the lingula with PET-CT malignancy criteria. Patient died one week after due to pulmonary dissemination.
**Conclusions:** Sarcomas are rare tumors that we should suspect in our primary care and hospital care consultations in presence of any soft tissue mass of suspicious characteristics and mainly located in lower extremities. <0.25% of patients with sarcomas develop cutaneous metastases although leiomyosarcoma is the most common primary to give rise to skin metastases. Cutaneous metastasis in these patients is usually a sign of very advanced disease, although it occasionally can be the first presenting sign of underlying malignancy. A misdiagnosis or a delay in its study can suppose an important deterioration in quality of life and survival of these patients. A multidisciplinary team for the management of these patients is needed, and it is also necessary to assess each case individually, trying to perform limb conservative surgery because no better survival results were obtained with radical surgery.

## P169
## PRIMARY HYPERPARATHYROIDISM PRESENTED WITH BROWN TUMOR

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**Objective:** We present a delayed parathyroid adenoma case that causes brown tumor. Even it has benign characteristics brown tumors can be confused with malign processes.
**Methods:** 27-year-old man admitted to the emergency department with right shoulder pain. The pain started four months ago and intensified by physical activity. A mass and dislocation were determined on direct x-ray graph. 7.5x5 cm cystic mass on the right humerus proximal epiphysis-metaphysis was reported on MRI. To understand the origin of this mass we scanned whole body and found multipl cystic lesions on the ribs and tibia. Biopsy was performed to a mass that is located at the right proximal humerus. Pathology reported aneurysmal cystic bone formation. After orthopedists realized serum calcium levels were high, the patient referred to the endocrinology clinic. Patient's medical history revealed nephrolithiasis operations. On physical examination, he had overweight appearance, BMI: 29 kg/m$^2$, right shoulder was stabilized with the bandage. No mass was palpated on neck examination. Vital findings were in normal range. Hypertension was not confirmed. Biochemical findings confirmed primary hyperparathyroidism with high serum PTH, high serum calcium, low serum phosphorous and normal vitamin D levels. A parathyroid adenoma with 21x29x7 mm diameter, hypoechoic appearance, located inferior side of right thyroid gland was suspected on neck ultrasound. Parathyroid scintigraphy (Tc-99m MIBI) was confirmed parathyroid adenoma on the right inferior thyroid gland location. After parathyroid adenomectomy, calcium replacement was started against hungry bone disease. Pathology reported 3.6x3x0.9 cm parathyroid adenoma. After 6 months from surgery, he was on calcium carbonate 5000 mg/d, vitamin D3 3600 U/d and magnesium 365 mg/d. His PT level was low, calcium and phosphorus levels were normal. His right shoulder's movements were expanded near-normal by physical rehabilitation.
**Result:** Brown tumors are major problem in patients with secondary hyperparathyroidism, especially in chronic renal failure. Long lasting parathyroid adenomas, like our case, may cause multiple brown tumors.
**Conclusion:** Brown tumors may cause pathologic fractures which can mimic malign processes. Primary treatment is parathyroid adenomectomy which regresses brown tumor.

## P170
## DISSCO STUDY: AN INTERNATIONAL, MULTICENTRE, DOUBLE-BLIND, RANDOMISED STUDY ON THE EFFECT OF DIACEREIN VS. CELECOXIB ON SYMPTOMS IN KNEE OSTEOARTHRITIS PATIENTS

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**Objective:** To prove the noninferiority of diacerein vis-à-vis celecoxib on pain reduction (WOMAC A pain subscale) after 6 months treatment in symptomatic knee osteoarthritis (OA) patients.

**Methods:** A randomised double-blind multicentre trial conducted in Europe and Canada evaluating diacerein vs. celecoxib treatment in patients with KL grade 2-3 knee OA and moderate-to-severe pain (VAS≥40). Patients (n=380) diagnosed according to ACR criteria were randomised to 6 months treatment with diacerein 50 mg once daily for the first month and b.i.d. thereafter, or celecoxib 200 mg once daily. The primary outcome was change from baseline in WOMAC pain subscale (0-50) at 6 months. Secondary outcomes included WOMAC function and stiffness, VAS pain, and OMERACT-OARSI responders. The per protocol set (PPS) (primary analysis), intention-to-treat (ITT) (sensitivity analysis), and safety populations were analysed.

**Results:** In the PPS (n=288), the adjusted mean change in WOMAC pain was -11.14 (SEM, 0.91) with diacerein (n=140) and -11.82 (0.89) with celecoxib (n=148); the intergroup difference was 0.67 (95%CI -1.83 to 3.18; p=0.597), meeting the pre-specified noninferiority margin of <5. Sensitivity analysis (ITT population) showed similar results. All other outcomes showed no difference between treatment groups. The OMERACT-OARSI responder rate was similar in the diacerein (62.1%) and celecoxib (60.1%) groups. Incidence of adverse events related to drug treatment was low and balanced between groups. The exception, a greater incidence of GI side effects (diarrhoea) with diacerein (10.2% vs. 3.7%), led to 4.8% permanent discontinuation in the diacerein group vs. 1.6% in the celecoxib group. Diarrhoea was considered mild-to-moderate in all but one case with complete resolution.

**Conclusion:** In symptomatic knee OA patients, diacerein has comparable (noninferior) efficacy to celecoxib in reducing pain and stiffness and improving function after 6 months. Diacerein also demonstrated a good safety profile with positive benefit:risk ratio.

**Disclosures: Study funded by TRB Chemedica International SA. JPP and JMP are consultants for TRB Chemedica and shareholders in ArthroLab Inc. JPR is a consultant for, and PP an employee of ArthroLab Inc.**

## P171
## FAMILIAL PSEUDOHYPOPARATHYROIDISM

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Pseudohypoparathyroidism (PHP) is a rare disorder characterized by target organ resistance to PTH, resulting in hypocalcemia and hyperphosphatemia. The subtypes are type1a,1b,1c,2 and PHP. Prevalence is 0.79/100.000. The 2 main subtypes PHP-1a and 1b,are caused by molecular alterations within or upstream of the imprinted GNAS gene, that encodes the G protein that activate cAMP-dependent pathways, due to a GNAS mutation on the maternal allele of the chromosome 20q13.3,with autosomal dominant (AD) inheritance. PHP-1a is characterized by the expression only of the paternal GNAS gene, with resistance to PTH and by the phenotype of Albright's hereditary osteodystrophy (AHO) with round facies, short stature, obesity, subcutaneous ossifications, brachydactyly, and in some cases mental retardation. To date, the genetic anomaly responsible for PHP-2 and 1c has not yet been identified, although in a few 1c patients, GNAS heterozygous mutations have been detected. It has been hypothesized that PHP-2 might be an acquired defect secondary to vitamin D deficiency. PHP can be sporadic or inherited AD with parental imprinting. We want to report patients with various clinical features of PHP in the same family. 23 y.o. F presented with numbness around lips and forgetfulness. In anamnesis wholebody numbness after a state of anxiety then severe hypocalcemia was found at the hospital 2 y ago. Family history was relevant to PHP, mother and brother. She had healthy appearance, height 165 cm, BMI 21.7 kg/m$^2$, BP 110/70 mmHg, and no Troussea's sign. The physical findings were not compatible with AHO. PHP was confirmed by lab tests. Calcitriol (CCT) and calcium carbonate (CC) were started. She was fine without vitamin D or CC therapy last 3 months. 59 y.o. F was admitted to the hospital with cyanotic appearance, numbness around lips and hands in 4th decade of her life. After the finding of hypocalcemia, CCT and CC treatment was started. 2 of the 3 children were diagnosed with PHP. She had healthy appearance, height 158 cm, BMI 34.4kg/m$^2$, BP 120/70 mmHg and Troussea's sign was observed. The physical findings were not compatible with AHO. She was fine with CCT and CC therapy. Genetic testing on GNAS1 gene was performed for the affected family members. Our patients do not show the features of AHO. According to clinical features of patients they are compatible with the type 1b.

## P172
## THE ASSOCIATION OF DIETARY PATTERNS WITH KNEE SYMPTOMS AND MRI DETECTED STRUCTURE IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objective:** To examine the cross-sectional and longitudinal associations of dietary patterns with knee symptoms and structures in knee OA patients.

**Methods:** Participants were selected from a randomised, placebo-controlled trial in Tasmania (N=261) and Victoria

(N=152), who had symptomatic knee OA and vitamin D deficiency at baseline and received 50,000 IU vitamin $D_3$ or placebo monthly for 24 months. Dietary was assessed by the Anti-Cancer Council of Victoria food frequency questionnaire. Exploratory factor analysis was used to identify dietary patterns. Each participant received a score for each dietary pattern, with a higher score indicating a great intake of food composing that pattern. At baseline and 24 months, knee symptoms were assessed using WOMAC and knee structures using MRI. Associations between dietary pattern scores and knee OA outcomes were examined using linear regressions with adjustment for covariates.

**Results:** Three dietary patterns "western pattern", "vegetable and meat pattern" and "healthy pattern" were identified in Tasmania, and two dietary patterns "meat and high fat pattern" and "vegetable pattern" were identified in Victoria. Participants with higher "healthy pattern" or "vegetable and meat pattern" scores had lower baseline dysfunction scores (b: -47.0, 95%CI: -88.4, -5.6;b: -45.01, 95%CI: -80.4, -9.8) and lower baseline total WOMAC scores (b:-59.2, 95%CI: -106.5, -11.9; b: -61.0, 95%CI: -116.5, -5.5). Participants who adhered to "western pattern" had significantly increased total WOMAC and dysfunction scores overtimes (b: 115.3, 95%CI: 33.5, 197.0;b: 94.1, 95%CI: 35.9, 152.3). Additionally, participants who adhered to "vegetable pattern" had significantly decreased knee symptoms impairment: pain (b: -25.4, 95%CI: -48.4, -2.5), dysfunction (b: -82.4, 95%CI: -151.7, -113.7), stiffness (b: -12.5, 95%CI: -23.5, -1.5); and effusion-synovisit volume (b: -0.95, 95%CI: -1.85, -0.05) over 24 months.

**Conclusions:** Our findings suggest that maintaining a healthy dietary pattern is associated with less knee function disability, whereas maintaining a western dietary pattern may contribute to increased functional disability over time. High intake of vegetables may be beneficial for joint symptom and effusion-synovitis. Our findings provide evidence for developing potential dietary strategies, such as keeping a healthy dietary, may improve joint symptoms and effusion-synovitis in OA patients.

## P173

## PSYCHOTROPIC MEDICATIONS AND PROTON PUMP INHIBITORS AND THE RISK OF FRACTURES IN THE TERIPARATIDE VS. RISEDRONATE "VERO" CLINICAL TRIAL

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**Objective:** VERO is fracture endpoint study in women with established osteoporosis. The risks of new vertebral fractures (VFx) and clinical fractures in patients receiving teriparatide were reduced compared with risedronate[1]. We analysed the effects of several concomitant medications associated with higher risk of low bone mass and fractures in the VERO cohort.

**Methods:** 1360 postmenopausal women with at least 2 moderate or 1 severe VFx and BMD T-score ≤-1.50 were randomized to SC daily teriparatide 20 μg or oral weekly risedronate (35 mg) in a double-blind, double-dummy 2-y trial. This *post hoc* analysis investigates the homogeneity of the treatment effect on the primary (new VFx) and key secondary fracture endpoints. Logistic and Cox proportional hazards regression models were used to analyse a potential treatment effect modification driven by the use of psychotropic drugs [hypnotics, benzodiazepines and antidepressants (selective serotonin- or norepinephrine-reuptake inhibitors: SSRIs and SNRIs)] and proton pump inhibitors (PPIs). A treatment-by-subgroup interaction p-value <0.1 was considered as evidence for the corresponding subgroup acting as an effect modifier. Additionally, we investigated whether these medications were associated with a higher risk of incident fractures during the VERO study.

**Results:** 406 (29.9%), 347 (25.5%) and 176 (12.9%) subjects were taking PPIs, benzodiazepines/hypnotics, and SSRIs/SNRIs at the randomization visit, respectively. For all fracture endpoints, the superior risk reduction of teriparatide vs. risedronate did not significantly differ in the categories of psychotropic drugs. In contrast, the risk reduction shown by teriparatide was statistically significantly higher in PPIs users vs. non-PPIs for clinical and nonvertebral fractures (NVFs) (Table). The risk of new VFx was higher in PPIs users vs. non-PPIs users (RR=1.70; p=0.0141) regardless of study treatments, but not for NVFs. Benzodiazepines/hypnotic drugs use increased the risk of clinical fractures (HR=1.79; p=0.0109) and NVFs (HR=2.12; p=0.0041). Similar increases in the risk of clinical fractures (HR=1.84; p=0.0232) and NVFs (HR=2.19; p=0.0089) were seen in SSRIs/SNRIs users.

| | TPTD | RIS | HR (95% CI) TPTD vs RIS |
|---|---|---|---|
| **Clinical fractures[a]** | | | |
| PPIs: Yes (n=406) | 9 (4.1%) | 27 (14.4%) | 0.271 (0.127-0.576) |
| PPIs: No (n=954) | 21 (4.6%) | 34 (6.9%) | 0.659 (0.383-1.136) |
| *Treatment-by-subgroup interaction p-value* | | | *0.061* |
| **Non-vertebral fragility fractures** | | | |
| PPIs: Yes (n=406) | 7 (3.2%) | 17 (9.1%) | 0.344 (0.143-0.830) |
| PPIs: No (n=954) | 18 (3.9%) | 21 (4.3%) | 0.924 (0.492-1.734) |
| *Treatment-by-subgroup interaction p-value* | | | *0.074* |
| **Main non-vertebral fragility fractures** | | | |
| PPIs: Yes (n=406) | 5 (2.3%) | 16 (8.6%) | 0.262 (0.096-0.714) |
| PPIs: No (n=954) | 13 (2.8%) | 15 (3.0%) | 0.935 (0.445-1.965) |
| *Treatment-by-subgroup interaction p-value* | | | *0.046* |

[a]clinical VFx plus non-vertebral fragility fractures
CI=confidence intervals; HR=hazard ratio; NVF=non-vertebral fractures; PPIs=proton pump inhibitors; RIS=risedronate; TPTD=teriparatide

**Conclusion:** In postmenopausal women with severe osteoporosis, the superior antifracture efficacy of teriparatide compared with risedronate was consistent in patients taking psychotropic drugs. PPI use was associated with a higher risk of fracture in subjects on risedronate compared with teriparatide.

**Reference:** 1. Kendler DL et al. Lancet (2018)

**Acknowledgement:** Supported by Lilly

## P174
## OSTEOPOROSIS TREATMENT AFTER FRAGILITY FRACTURES OF THE HIP: EFFECTIVENESS OF A SECONDARY PREVENTION PROGRAM

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**Objective:** After a low-energy hip fracture, there is effective medication to treat the underlying osteoporosis but we need a better system to get patients on correct treatment. This study uses the fracture liaison (FLS) model to show that a successful program is possible in a national healthcare system.
**Methods:** At Shaare Zedek Medical Center, Jerusalem, Israel, we performed a prospective randomized study to show the effectiveness of an intervention program.

- Control group: At the time of discharge, patient were given a letter instructing them to discuss evaluation and treatment with their family physician.
- Intervention group: patients were given printed information on osteoporosis, DXA scan was performed during their initial hospitalization, patients were given a specific medication recommendation to give to their physician, and monthly phone calls were made by the FLS coordinator.

The primary outcome measure is whether the patient was on correct treatment at 4 months post-fracture. The study was powered assuming 20% of control would be on correct treatment vs. 50% of the intervention group. The secondary measure is mortality at one year.
**Results:** 18 months after starting the study, we treated 643 patients with hip fractures of which 305 were eligible. Of those, 200 patients (66%) were enrolled and randomized and we have 4-month data on 180 patients. Our secondary outcome is mortality rate at one year and we have data on 122 of those patients.
Intervention Efficacy:

- Control group - on correct treatment=5/84 (5.9%)
- Intervention group - on correct treatment=64/79 (81%)
- Intervention is significantly more effective, P<0.0001

Mortality Rate at one year: overall 16%

- On-treatment=2/52 (3.8%)
- Off-treatment=18/70 (26%)
- Being on treatment is associated with lower mortality, P<0.04 (t-test).

Age for the group on-medication was younger (76.0) compared to off-medication (81.3). However, with logistic regression analysis, the age was found to be not significant with regards to mortality (p=0.20) while treatment remained significant (p=0.013), ROC=0.74.
**Conclusions:** The most successful programs worldwide have a FLS coordinator that manages evaluation and guides treatment using a predetermined protocol. We show that in the setting of a national healthcare system, such a system is effective.

## P175
## MUSCULOSKELETAL DISORDERS AND PERCEIVED WORK DEMANDS AMONG FEMALE NURSES AT A TERTIARY CARE HOSPITAL IN INDIA

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**Objective:** Musculoskeletal disorders (MSD) are common among nurses and can affect patient outcomes. The study objective was to measure prevalence of MSD and their association with perceived work demands and sociodemographic variables among female nurses at a tertiary care hospital in South India.
**Methods:** A cross-sectional study was conducted starting June 2016 to May 2017 through interviewer administered questionnaires which comprised three parts: sociodemographic data, modified Nordic questionnaire, and perceived physical and psychological work demands.
**Results:** 296 nurses with a mean age of 30.4 y participated. Prevalence of any MSD in the last seven days was 60.5% with low back pain being the most common and elbow pain the least common. Occurrence of any MSD was associated with age, number of children, working hours at home, BMI, and total work experience. High perceived physical demands score was associated with lower back (OR: 3.06) and knee pain (OR: 7.73).
**Conclusion:** Prevalence of MSD was high and occurrence of lower back and knee MSD was associated with perceived physical demands. This information should be used as a benchmark and guiding tool for designing work place interventions to improve working conditions and health of nurses.

## P176
## MULTI- AND EXTENSIVELY-DRUG RESISTANT GRAM-NEGATIVE OSTEOMYELITIS: MICROBIOLOGICAL AND PATIENTS' CHARACTERISTICS

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**Objective:** Few series of osteomyelitis due to multidrug (MDR) or extensively drug resistant (XDR) gram-negative bacteria exist. A retrospective study of MDR and XDR

gram-negative osteomyelitis cases was performed, aiming to investigate causative organisms, management and outcome.
**Methods:** All patients, treated at the University hospital of Crete between 2009-2018 for osteomyelitis, due to MDR or XDR gram-negative pathogens were evaluated.
**Results:** A total of 14 patients (8 males) were identified with a mean age of 50.6 y. Five *Acinetobacter baumanii* cases, 3 XDR and 2 MDR, were found. Furthermore, 3 MDR *Klebsiella pneumoniae* and 3 MDR *Enterobacter cloacae* isolates were identified. Additionally, 2 MDR *Escherichia coli*, as well as 2 *Pseudomonas aeruginosa*, 1 XDR and 1 MDR, were isolated. One case of *Roseomonasgilardii* was also identified. In 5 cases the same pathogen was also isolated from blood. Five out of the 14 patients were smokers, 6 were suffering severe injury, 4 had diabetes mellitus, 2 chronic renal disease and 2 were obese. Most causative organisms had hospital origin. All patients received first line empirical combination antimicrobial treatment, proven effective in 4.
**Conclusions:** The incidence of bacteremia observed was higher than that in similar studies. The study included mainly young individuals, most likely due to the high incidence of traffic accidents involving young adults in Crete. Emergence of resistant pathogenic bacteria has become a significant public health issue. Compliance with strict hygiene rules, as well as physicians' stewardship for appropriate antimicrobial use may contribute to successful management of these infections.

## P177
## DOES VITAMIN D LEVELS AFFECT CHANGES IN PQCT BONE DENSITY AND MICROARCHITECTURE IN POSTMENOPAUSAL WOMEN AFTER CONSERVATIVELY TREATED DISTAL RADIUS FRACTURES? AN EXPLORATORY STUDY

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**Objective:** Distal radial fractures (DRF) in postmenopausal women are among the most common types of low energy fractures and in most cases are associated with low serum VitD levels. The pivotal role of VitD deficiency in the pathogenesis of DRF fractures is generally accepted, but there still seems to be no sustainable consensus regarding VitD influence in early changes in vBMD and architecture of trabecular and cortical bone at radius after a DRF. The object of this experimental study was to obtain further information about the role of vitamin D on bone microarchitecture parameters during the first weeks of fracture healing period in postmenopausal women with distal radius fracture using pQCT scan.
**Methods:** The study group consisted of postmenopausal women with a DRF conservatively treated by cast immobilization. Patients were classified into 2 groups according to initial serum 25(OH)D level, Group A (25(OH)D ≥15 ng/ml) and group B (25(OH)D <15 ng/ml). All patients were followed over a period of 12 weeks at three outpatient visits: at 1 week (visit 1), at 6 weeks (visit 2) and at 12 weeks (visit 3) postfracture. PQCT measurements were performed at visit 1 in fractured and contralateral nonfractured distal radius (baseline), at visit 2 ($6^{th}$ week) and at visit 3 ($12^{th}$ week) on the fractured side.
**Results:** During a $19^{th}$ month period we identified 57 women meeting the inclusion criteria, but only 39 women completed the protocol. The mean age was 66.69±10.12 (range: 51-88 y), 51.3% (n=20) of the fractures occurred at the right radius, while 51.3% (n=20) at the dominant side. Mean 25(OH)D levels were 15.60±7.35 ng/ml (3.5-41.7). At the peripheral trabecular site there was no interaction between baseline 25(OH)D levels and changes in trab BMC, vBMD and CSA. At the cortical site, cort BMC, cort vBMD and cort CSA progressively decreased ($p<0.001$) during the 12 weeks of the study, but there was no difference in cort BMC, vBMD and CSA at any of the three time points between group A vs. group B.
**Conclusion:** Our data indicate that vitamin D deficiency does not modulate the early post fracture response. Moreover we observed significant increase in trabecular BMC and vBMD at the fracture site, while there was deterioration in almost every pQCT derived parameter of cortical bone, independent of vitamin D levels, probably related to immobilization. Furthermore higher age and higher bone remodeling were associated.

## P178
## EARLY FRACTURE LIAISON SERVICE EXPERIENCE IN HONG KONG: ONE YEAR REVIEW

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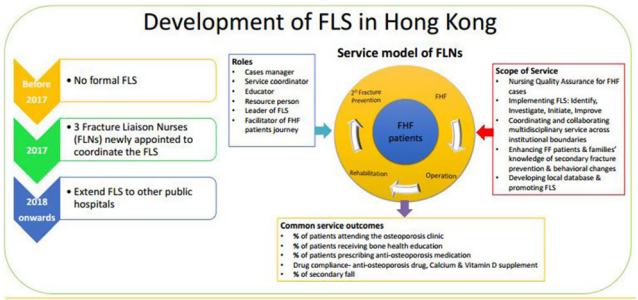
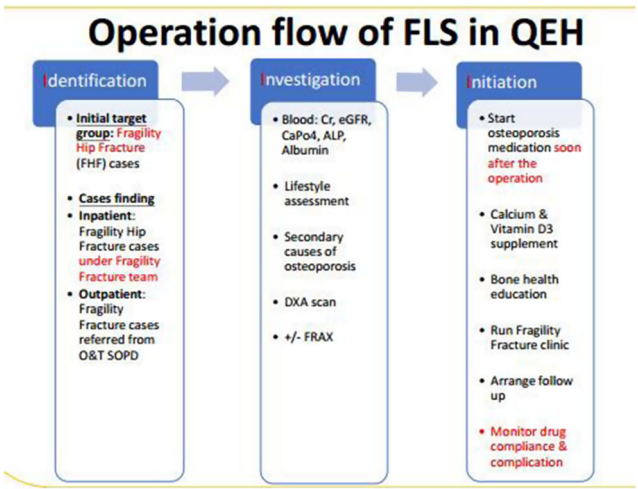
**Objective:** The rapidly aging population of Hong Kong (HK) with increasing life expectancy poses high prevalence of osteoporosis. Among the 7000+ incidence a year, 98% of fragility hip fractures in HK were managed by the public hospitals system under Hospital Authority (HA) (Man, Ho & Wong, 2016). In 2017, HA has appointed 3 Fracture Liaison Nurses (FLN) to develop Fracture Liaison Service (FLS) in 3 different hospitals. Queen Elizabeth Hospital (QEH), a centrally located,

largest hospital with 2000 acute beds, as a pilot center for the development of FLS. QEH FLS team was established in 2017, The 3 I protocol was advocated (Identification, Investigation & Initiation). We started a comprehensive secondary fracture prevention programme since 1/1/2018 to all patients admitted with fragility hip fractures. Our aim was to share and report the preliminary result of Early FLS experience in HK.




**Methods:** A retrospective reviews of all fragility hip fracture patients admitted to Queen Elizabeth Hospital from 1/1/2018 to 31/12/2018.

**Results:** Total of 800 patients was admitted and managed from 1/1/2018 to 31/12/2018 with a fragility hip fracture, (M/F: 1/2), Age 65-103, mean age of 84.5. 622 of them undergone operative managements (365 internal fixations and 257 hemiarthroplasties). All 800 patients (100%) were discharged with calcium and vitamin D supplements (22.9% in all hospital in 2012 HK, 69% in UK (Leung et al 2017)). Overall of 84.0% of patients (187) who are eligible and fitted for secondary prevention were treated with either intravenous zoledronate acid infusion or denosumab injection after FLN screening during the stay in acute hospital. (Figure 1) Although no evidence of decrease secondary fracture incidence in this first year report, all 157 patients received secondary osteoporosis treatment reported good compliances and no complication of treatment.

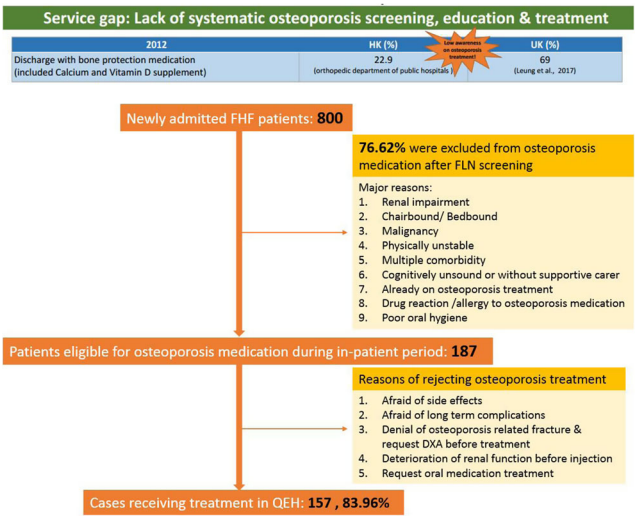



Figure 1

**Conclusions:** Confusion over who is responsible for osteoporosis care after a fragility fracture is a major barrier to effective treatment (Miki et al. 2008). This is an introduction of FLS in HK, our model focused on secondary fracture prevention on patients after fragility hip fracture at the moment. We proved that is a feasible model with satisfactory result in one of the busiest hospital in HK which operated >750 hip fractures yearly (including younger hips and pathological fractures). As a pilot and an example, we hope the service can be extended to all fragility hip fracture cares in HK in the future.

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**Acknowledgments:** Thanks to the dedication, passion and trust to all members of the QEH FLS team.

## P179

## CROSS-SECTIONAL BETWEEN MRI AND CONVENTIONAL RADIOGRAPH OF ABNORMALITIES AND HAND SYMPTOMS IN OLDER ADULTS

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**Objective:** To describe associations between presence of MRI-detected effusion, bone marrow lesions, erosions, collateral ligaments (CL), osteophytes; radiograph-detected osteophytes and joint space narrowing (JSN) with joint symptoms and grip strength in older community-based adults.

**Methods:** Distal and proximal interphalangeal index finger joints (n=221, mean age=72, 44% females) were imaged using MRI, conventional radiographs (CR) and assessed using the Oslo hand osteoarthritis (HOA) score and OARSI atlas, respectively. Joints were assessed clinically for pain and tenderness. Hand pain, function, and stiffness were assessed using the Australian/Canadian HOA index (AUSCAN) questionnaire; grip strength was assessed using a dynamometer. Data was analysed using log binomial, ordinal logistic, and linear regression adjusted for age, sex, and other MRI or CR abnormalities.
**Results:** Participants with above average (worse) AUSCAN pain scores were more female (55%), meet ACR HOA criteria (92%) and have poorer grip strength (9psi) and quality of life (AQoL utility 0.66) than those with mild or no pain. Absent CL's on MRI (RR=3.33 (95% confidence interval; 1.45, 7.61)) and JSN on CR (RR=2.47 (1.06, 5.74)) had a higher risk of a painful joint after adjustment for other structures. Those with JSN had a higher risk of moving to a higher category of AUSCAN pain (OR=1.59 (1.08, 2.35)) while effusion, surprisingly, had a lower risk (OR=0.51 (0.28, 0.91)) of pain. JSN was also associated with lower grip strength independent of pain and other features (β=-0.95 (-1.74, -0.15)). No abnormalities were independently associated with tender joints, function limitation or stiffness.
**Conclusion:** Absence of CL and JSN were independently associated with painful joints; JSN was also associated with weak grip strength. Unexpectedly, effusions were associated with reduced odds of pain. This data does not support using MRI to identify potential targets for therapeutic interventions for hand pain.

## P180

## SAFETY OF INTRA-ARTICULAR HYALURONIC ACID INJECTIONS IN OSTEOARTHRITIS: OUTCOMES OF A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** To assess the safety of intra-articular hyaluronic acid (IAHA) in the management of osteoarthritis (OA) in a systematic review and meta-analysis of randomized, placebo-controlled trials.

**Methods:** A comprehensive literature search was undertaken in the databases MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL), and Scopus. Randomized, double-blind, placebo-controlled, parallel-group trials that assessed adverse events (AEs) with IAHA in patients with OA were eligible for inclusion. Authors and/or study sponsors were contacted to obtain the full report of AEs. The primary outcomes were overall severe and serious AEs, as well as the following MedDRA System Organ Class (SOC)-related AEs: gastrointestinal, cardiac, vascular, respiratory, nervous system, skin and subcutaneous tissue disorders, musculoskeletal, renal and urinary disorders, infections and infestations, and hypersensitivity reaction.
**Results:** Database searches initially identified 1481 records, from which, after exclusions, 22 were included in the qualitative synthesis, and 9 studies having adequate data were included in the meta-analysis. From the studies excluded according to the review protocol, 21 papers with other pharmacologic OA treatments permitted were included in a parallel qualitative synthesis, from which 8 studies were included in a parallel meta-analysis. No statistically significant difference in odds was found between IAHA and placebo for all types of SOC-related disorders, except for infections and infestations for which significantly lower odds was found with IAHA compared with placebo, both overall (odds ratio [OR]=0.61, 95% confidence interval [CI] 0.40, 0.93; $I^2$=0%) and in studies without concomitant anti-OA treatment (OR=0.49, 95%CI 0.27, 0.89; $I^2$=0%). There was significant increased odds of reporting serious AEs in the IAHA group both overall and with concomitant anti-OA treatment (OR=1.78, 95%CI 1.10, 2.89; $I^2$=0%).
**Conclusions:** Using the available data on studies without any concomitant anti-OA treatment during clinical trials, IAHA appears not to be associated with any safety issue in the management of OA. A possible association with increased risk of serious AEs, particularly when used with concomitant OA medications, requires further investigation.

## P181

## COST-BENEFIT ANALYSIS TO THE MEDICAL SYSTEM FOR A FRACTURE LIAISON SYSTEM (FLS) FOR SECONDARY FRACTURE PREVENTION

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**Objective:** To better understand the costs and benefits of an FLS system within a national healthcare network.
**Methods:** A prospective, randomized study was performed at Shaare Zedek Medical Center, Jerusalem, Israel to determine efficacy of a program for osteoporosis treatment. In parallel, a detailed cost analysis was made for each patient.
**Results:** 18 months after starting the study, we treated 643 patients with hip fractures of which 305 were eligible. Of those, 200

patients (66%) were enrolled and randomized and we have 4-month data on 180 patients. National Health Plan Perspective (Kupah): The average payment from the Kupah to the hospital was 32,800 NIS per hip fracture. Rehabilitation adds approximately 16,800 NIS bringing the total average cost per hip fracture to 50,055 NIS. Hospital Perspective: Despite income from the Kupah, the hospital lost an average of 17,810 NIS per hip fracture. Expected refractures based on Horizon study: Using our rates of effectiveness of our orthopedic department FLS program, and using the Horizon study[2] reduction in new fractures per year (13.9% vs. 8.6%), we calculated the following (6000 fractures in Israel per year): The rate of refracture would be reduced by 3.94% or 236 less fractures per year. Loss per hip fracture is calculated at 67,865 NIS resulting in 16 million NIS savings. For comparison, with both primary and secondary prevention, Kaiser Permanente Southern California has achieved 40% reduction in fragility fractures. Cost of Secondary Prevention Program: Using the Kaiser Permanente FLS program as a guide[1], we estimate 50 full-time personnel would be needed for a national secondary prevention program. Using local salary costs, we estimate a cost of 9.1 million NIS to save 16 million NIS. This cost savings does not include lives saved.

**Conclusions:** Everyone loses with low energy hip fractures: patients, hospitals and the national healthcare system. The solution is to invest. We show that compared to the salary of a FLS coordinator, investing in secondary fracture prevention is cost-effective.

**References:**

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## P182

## IN VITRO EFFECTS OF INTERMITTENT PTH(1-34) ON HUMAN ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS DURING OSTEOGENIC DIFFERENTIATION AND MINERALIZATION

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**Objective:** PTH is a peptide of 84 amino acids, secreted by the parathyroid glands, which controls $Ca^{2+}$ homeostasis by regulating intestinal absorption and renal secretion and playing an important role in bone metabolism. In hypoparathyroidism (HypoPT), there is a severe PTH deficiency, leading to persistent hypocalcemia and hyperphosphoremia, high urinary $Ca^{2+}$ excretion and reduced levels of active vitamin D. Patients with HypoPT present a reduction in bone remodelling, with an increase in bone mass compared to healthy subjects. Therapy with PTH peptides makes possible to reduce $Ca^{2+}$ and active vitamin D administration; however studies are necessary for a better understanding of how PTH acts on osteoprogenitor cells. We aim to analyze the *in vitro* effects of PTH (1-34) on osteogenic differentiation and mineralization of mesenchymal stem cells derived from human adipose tissue (hADMSCs).

**Methods:** hADMSCs were obtained by enzymatic digestion and mechanical dispersion, and cultured in growth medium. Multipotency was evaluated inducing hADMSCs towards different phenotypes. Cells were exposed to $10^{-8}$ M, $10^{-10}$ M, $10^{-12}$ M of PTH(1-34), for 6 h/d for 3 d. ALP activity and $Ca^{2+}$ deposition were quantified by fluorometric assay up to 28 d of osteogenic induction. Statistical analysis was performed by ANOVA followed by Bonferroni's test.

**Results:** hADMSCs confirmed the ability to differentiate in 3 phenotypes. hADMSCs osteoinduction with PTH $10^{-10}$ M and $10^{-12}$ M showed significant increases (*$p<0.05$) in ALP activity vs. control after 7 d, and then it returned to values similar to the control. Regarding the mineralization process, tested PTH at $10^{-10}$ M, $10^{-12}$ M resulted in significant increases (*$p<0.05$) in the deposition of $Ca^{2+}$ nodules vs. control, especially after 28 d.

**Conclusion:** The work aims to identify PTH (1-34) concentrations to which hADMSCs respond positively. Preliminary results have shown that the osteogenic activity and the mineralization of hAMDSCs are increased using intermittent administration of PTH at $10^{-10}$ M and $10^{-12}$ M. Studies are in progress in order to evaluate OPG and RANKL genes.

**Acknowledgment:** This work is supported by FIRMO.

## P183

## IMPORTANT CLINICAL BENEFITS OF HAVING A SECONDARY FRACTURE PREVENTION PROGRAM

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**Objective:** Our orthopedic department started a secondary fracture prevention program using the successful fracture liaison service (FLS) model. The objectives of this study are to share the clinical benefits to the patients of having an FLS system and estimate the sensitivity of fracture prediction tools.

**Methods:** A prospective study was done evaluating patients with fragility fractures of the hip. Evaluation included the following labs: calcium level, albumin level, thyroid function, liver and kidney function and PTH level when indicated. During their hospitalization a DXA scan was performed and fracture risk assessment tool (FRAX) was calculated. The results of DXA and FRAX separately and together were analyzed to determine how well the fragility fracture could have been predicted.

**Results:**
155 patients are included in this analysis:

- 12 patients had labs that showed an underlying potentially treatable cause for their weak bone – 7 had high PTH levels and 5 had low TSH levels.
- 36 patients had labs that changed their treatment: 4 had low calcium levels that needed correction, 17 had elevated TSH levels and were started on thyroid supplement, and 15 had a new diagnosis of reduced kidney function.
- Overall 31% of patients had labs that were clinically important.

FRAX scores:

- Major osteoporotic fracture was correctly predicted in only 49%
- Hip fracture was predicted in 83%

DXA scores:

- Showed osteoporosis in only 46% of hips
- Showed osteoporosis in only 26% of spines

Taking the two most specific measures, hip FRAX and hip DXA:

- Requiring only one OR the other measure to be abnormal, would have predicted a fragility fracture 93% of the time.

**Conclusions:**

1. Laboratory evaluation in patients with a fragility fracture of the hip had significant benefit to 31% of the patients including identifying an underlying treatable cause or providing benefit to their overall health.
2. Hip FRAX was more predictive of a hip fracture than major osteoporotic prediction ($p<0.0001$).
3. DXA showed osteoporosis more often in hip than in spine ($p<0.023$).
4. The combination of FRAX hip score and DXA hip was the most sensitive in identifying the risk of a potential osteoporotic fracture.

## P184
## CLINICAL ASSESSMENT OF PATIENTS WITH ISOLATED HIP FRACTURES ASSOCIATED WITH AN UPPER LIMB FRACTURE

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**Objective:** Some patients with a hip fracture also present a concomitant upper limb fracture. We want to know whether these patients have a worse functional level and whether they have any differences in various clinical parameters compared with patients with an isolated hip fracture.
**Methods:** We retrospectively reviewed 1061 discharge reports from the Orthogeriatrics Unit. We collected information on several clinical parameters of the fractures. Subsequently, we performed a statistical analysis of the data by comparing the associated fracture group with the isolated fracture group.
**Results:** We detected 44 patients with associated upper limb fracture, 90.9% were women (40) and the average age was 84.45 y. 81.8% of the upper limb fractures were distal radius or proximal humerus. Pertrochanteric fractures were the most common (none of them were subtrochanteric fractures). Surgical delay was 2.60 d and the average hospital stay was 12.30 d. 64.3% were nail surgery and 31% arthroplasty. The mean Barthel Index score was 84.88 (P=.021). 52.5% of the patients in the study group were referred to a functional support unit (P=.03). The in-hospital mortality rate was 4.2%, with no differences between groups.
**Conclusions:** Patients with an associated fracture have a higher previous functional capacity and they are more independent. Nevertheless, after the fracture they need more help from the healthcare system for optimal functional recovery.

## P185
## OSTEONECROSIS OF THE JAW MANAGEMENT IN THE CLINICAL SETTING

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Osteonecrosis of the jaw (ONJ) is a pathological condition often attributed to antiosteoporotic therapy. Although it is low prevalence and incidence, the impact of ONJ over treatment discontinuation is clear. There are international consensus on the issue but ONJ remains a defying condition to manage in the clinical setting. This activity is aimed to provide the tools needed to manage patients considered for an oral invasive procedures (implants, extractions and bone grafts) at the same time that they are under anti-osteoporotic therapies. Examples will be provided for discussion.
**Objectives:**

- Provide background on the ONJ incidence and osteoporosis treatments
- Describe the mechanisms underlying increased risk of ONJ and most probable scenarios
- Give directions about ONJ risk evaluation
- Describe effects of bone pharmacological agents related to the ONJ
- Outline clinical guidance for management of ONJ

## P186
## CARDIOVASCULAR AUTONOMIC NEUROPATHY CAUSES AN IMPAIRMENT OF QUALITY OF LIFE IN SUBJECTS WITH CHRONIC HYPOPARATHYROIDISM

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**Objective**: Patients with postsurgical hypoparathyroidism (hypoPT) complain fatigue and seems to have an increased risk of mortality. Hypoparathyroid patients on conventional treatment with calcium and vitamin D supplementation show a reduction of Quality of life (QOL). Cardiovascular autonomic neuropathy (CAN) is an impairment of the cardiovascular autonomic system and it represents a cause of increased mortality and fatigability. Recently, we have demonstrated that patients with chronic post-surgical hypoparathyroidism show an increased risk of CAN. No previous studies have investigated the association between CAN and QoL in hypoparathyroidism. We tested the hypothesis that CAN would be associated with impaired QOL measures in subjects with chronic post-surgical hypoparathyroidism.
**Methods**: We included 49 postsurgical hypoparathyroid patients treated with calcium and calcitriol. Subjects completed the RAND 36-Item Short Form (SF-36) Health Survey, a measure of health-related QOL covering eight domains of physical and mental health. QOL has also been evaluated using Fatigue score (version 4). CAN was assessed by heart rate (HR) response to deep breathing, HR response to the lying-to-standing test, HR response to the Valsalva maneuver and blood pressure response to standing. Participants were considered to have "early CAN" (EC) if they had one abnormal result in the HR tests and "definite CAN" (DC) with two or more abnormal results.
**Results:** The prevalence of patients without CAN (WC) was 22% (n=11), the prevalence of EC was 39% (n=19), the prevalence of DC was 39% (n=19). Only DC subjects showed a statistically significant lower fatigue score compared to patient without CAN (35.1±5.8 vs. 44.4±4.6, P=0.004). These results have been confirmed after adjustment for age, calcium concentration, calcitriol and calcium supplementation (β:-9.31, P=0.004). No statistically significant differences between groups were found for mental and physical component summary scores. Role limitation due to physical problem represents the only domain that showed a significant reduction between groups (WC: 82.6±33.4, EC: 72.4±33.2, DC: 50 ±38.2, ANOVA P=0.044).
**Conclusion:** Patient with chronic postsurgical hypoparathyroidism and definite CAN show an impairment of QOL. The presence of cardiovascular autonomic neuropathy could explain the fatigue, a common complaint in patients with hypoparathyroidism.

## P187
## NONSPECIFIC INFLAMMATORY RESPONSE PARAMETERS IN THE PATHOGENESIS OF VASCULAR WALL AND BONE REMODELING IN POSTMENOPAUSAL FEMALE PATIENTS WITH ARTERIAL HYPERTENSION

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**Objective:** The searching study at the subclinical level of general pathogenetic mechanisms of atherosclerosis and osteoporosis in a steady ageing of the population is of considerable importance in prevention of development of complications. Our aim was to study the role of markers of vascular inflammation as a predictor of cardiovascular and degenerative bone complications in postmenopausal female patients with arterial hypertension (AH) and osteoporosis (OP).
**Methods:** 153 patients (mean age 57.45±6.16 y) were examined and divided into three groups. Gr.1 included 42 healthy individuals, Gr. 2 included 50 female patients with AH and Gr. 3 included 64 postmenopausal female patients with AH and OP. By age, patients in Gr. 2 and 3 were comparable. Patients had an average history of AH 12.31±8.91 y. All patients received optimal hypertensive therapy. The parameters of 24-h blood pressure (systolic and diastolic BP) monitoring using ABMP–04 Meditex device; sphygmography by Vasera VS-1000 Fucuda (pulsewave velocity - PWV), osteodensitometry performed on the spiral computed tomography Siemens Somatom Emotion (calcium content CA-HA, standard deviation of the peak T-score); intima-media thickness (I/M) of carotid arteries; lipid profile parameters, inflammatory markers (hs-CRP, TNF-α homocysteine, interleukin (IL) 1β, 6, 8); endothelial dysfunction markers (endothelin-1, nitrites); parameters of calcium metabolism (calcium, ionized calcium, vitamin D, calcitonin) and sex hormones like (estradiol, progesterone and testosterone) were measured.
**Results:** The levels of estradiol and progesterone were significantly higher in Gr. 1 (p=0.0001). The levels of total cholesterol, LDL cholesterol, APO-B, hs-CRP, homocysteine, IL6 and 8 and endothelin-1 have been above the reference value in Gr. 2 and 3. Additionally, in Gr. 3 statistically higher levels of office SAD and DAD, I/M, lower levels of sex hormones, vitamin D, total calcium, ionized calcium and peak T-score. Besides, in Gr. 3 there were registered negative correlations between peak T-score with ade, PWV, office SBP and DBP, duration of menopause, IL6, hs-CRP, homocysteine and between PWV with estradiol; positive correlations between T-score with progesterone and between PWV with IL6, LDL cholesterol, hs-CRP, TNF-α, endothelin-1, mean daytime systolic SBP, in day time SBP variability SBP and DBP variability (p<0.005 for all correlations).

**Conclusions:** The association of pulse wave velocity and T-score with nonspecific inflammatory response markers, the level of female sex hormones and parameters of calcium metabolism can be part of the pathogenesis combining the subclinical atherosclerosis with vascular stiffness and bone remodeling in postmenopausal women with hypertension.

## P188
## ASSOCIATION OF NEUTROPHIL-LYMPHOCYTE RATIO WITH THE SEVERITY OF PRIMARY KNEE OSTEOARTHRITIS IN A SAMPLE OF IRAQI PATIENTS

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**Objective:** Osteoarthritis is the most common form of arthritis. It is a leading musculoskeletal cause of disability in elderly persons all over the world and a major cause of physical limitations and reduced quality of life. Osteoarthritis is increasingly recognized as a disease with a significant inflammatory component. Blood neutrophil-lymphocyte ratio (NLR) is the ratio between the absolute neutrophil and lymphocyte counts. The systemic inflammation modulates the coagulation process, so NLR has emerged as a simple, cheap and useful tool that represents inflammation in many other systemic circumstances. Our aim was to evaluate the association between severity of knee osteoarthritis (KOA) and NLR levels.
**Methods:** This was a case-control study conducted at Baghdad Teaching Hospital, unit of Rheumatology during the period from September 2016 to June 2017. A total of 126 patients with KOA diagnosed according to the ACR clinical criteria and 126 apparently healthy subjects, age and gender matched to the patients regarded as controls were recruited in this study after obtaining their consent. Patients with history of trauma, infection, malignancy, connective tissue diseases and very high ESR and CRP were excluded. Investigations that we did including: X-rays of both knee joints in anterior-posterior view in standing position and record the severity according to Kellgren-Lawrence grading system. Blood samples were collected under aseptic venipuncture and send for laboratories to complete investigations. This include CBC, WBC count, platelets count, neutrophil, lymphocyte, ESR and CRP. Blood NLR was calculated for every participant.
**Results:** KOA patients had higher NLR compared to healthy population. Higher NLR is weakly associated with severity of KOA. NLR is a poor predictor of severity of KOA. Age was a stronger predictor of severity of KOA than NLR.
**Conclusions:** NLR alone should not be depended on as a marker or predictor of severity of KOA. Further studies with larger sample size included other markers in order to generalize the results.

## P189
## PREVALENCE OF MAJOR DEPRESSIVE DISORDER AMONG POSTMENOPAUSAL IRAQI WOMEN WITH OSTEOPOROSIS

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**Objective:** Osteoporosis is a reduction in BMD that increases susceptibility to fractures. Major depressive disorder is one of the most prevalent psychiatric conditions characterized by depressive mood, anhedonia, and sleep abnormalities. They are chronic diseases that affect large population groups with great impact on morbidity, mortality and quality of life. In Iraq, the prevalence of osteoporosis in postmenopausal women was found to be 22.8% and the prevalence of major depressive disorder was 12% for age group 50-64 y and 13% for age group 65 y and above. Our aim was to find out the prevalence of major depressive disorder among postmenopausal Iraqi women with osteoporosis. To determine the association of major depressive disorder with osteoporotic vertebral fractures and history of other fragility fractures.
**Methods:** This was a cross-sectional study was conducted in Baghdad Teaching Hospital – Rheumatology Unit from October 2017 to April 2018. A total of 100 postmenopausal women were included in the study. They were diagnosed to have osteoporosis according to WHO criteria (T-score <-2.5). All women were screened for major depressive disorder by using the DSM5 diagnostic criteria of depression and severity of their depression was assessed by using the Arabic translation of Beck Depression Inventory scale. Thoracolumbar spine x-ray (lateral view) were performed for all women and osteoporotic vertebral fracture assessed by using the semiquantitative method. History of nonvertebral low trauma fractures were assessed by self-reports.
**Results:** The prevalence of major depressive disorder in postmenopausal Iraqi women with osteoporosis was 18%. Major depressive disorder was significantly higher among women who had vertebral fractures in comparison to women with history of others type of fragility fractures or no fracture. Major depressive disorder was insignificantly associated with sociodemographic data of osteoporotic women except for household crowding index where there was significant association.
**Conclusions:** A study with larger sample size over a long periods of time is needed to examine the causal relationship to determine which occurred first, prevalent vertebral fracture or major depressive disorder. Clinicians who manage osteoporosis should recognize the importance of checking for depressive symptom in their patients, and Clinicians who treat major depression should be alert to any evidence of fractures, bone loss, or osteoporosis.

## P190
## FIBRONECTIN ANTIBODIES IN IMMUNODIAGNOSIS OF OSTEOARTHROSIS

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**Objective:** In the process of rheumatic inflammation fibronectin undergoes structural changes becoming immunogenic and starting to cause production of immune complexes that trigger cartilage deformation. The level of fibronectin antibodies indicates the activity of the pathological process. Detecting the antibodies using fibronectin-based high capacity immobilized magnetocontrollable sorbents is an additional criterion of osteoarthrosis (OA) activity. Our aim was to study the regularities of production of fibronectin antibodies by means of immobilized granulated antigen preparations with magnetic properties in patients with OA with reference to the stage and course of disease.
**Methods:** We observed 30 apparently healthy individuals and 121 patients with OA. Fibronectin antibodies were determined using indirect enzyme immunoassay with immobilized granulated antigen preparations. Immobilization was achieved by way of emulsion polymerization in a flow of gaseous nitrogen with inclusion of magnetic material in the structure of polyacrylamide gel.
**Results**: In healthy individuals the fibronectin level was 345.0 ±63.1 μg/ml, the level of fibronectin antibodies was 0.032 ±0.0028. The amount of fibronectin antibodies increased along with the increase in the number of affected joints. Elevated fibronectin antibodies were detected in patients with quickly progressing disease; their level was 0.112±0.011 absorbance units; the amount of fibronectin in patients' plasma was 554.5±56.0 μg/ml. The highest values of fibronectin antibodies were detected in patients with OA of stage II and III and multiple joint involvement, which correlates with the extent of osteoarticular destruction (fibronectin level 561±65.0, fibronectin antibodies 0.124±0.016 absorbance units).
**Conclusion**: By means of enzyme immunoassay using an immobilized magnetocontrollable sorbent we detected fibronectin antibodies whose level correlated with the stage and course of disease.

## P191
## IDENTIFICATION OF VERTEBRAL FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS USING BONE MINERAL DENSITY AND TRABECULAR BONE SCORE

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**Objective:** Bone involvement is the main joint complication of rheumatoid arthritis (RA). Patients with RA have a greater risk of osteoporosis (OP) and of fracture than the general population. The prevalence of osteoporosis in RA is 20-30% in the spine and 7-26% in the hip. The diagnosis of OP is based on BMD. The main limit of the latter lies in the overlap of BMD values between fractured subjects and unfractured subjects. The trabecular bone score (TBS) is an indirect measurement of bone microarchitecture. Work has shown that a TBS low is correlated with the presence of fracture and this regardless of the outcome of the BMD. The aim of our work is to demonstrate the role of TBS in predicting fracture risk in patients with RA.
**Methods:** This is a retrospective type case study conducted at the level of at the level of the rheumatology department of the University Hospital of Tizi Ouzou concerning women with RA. 167 women with RA according to the ACR criteria were recruited at the BMD unit as part of the routine procedure. The questionnaire included a clinical assessment of demographic data (age, weight, height, BMI, duration of illness, corticosteroid dose, age of menopause). The activity of the disease by the DAS28, the health assessment question (HAQ) for the quality of life as well as the different basic and biological treatments taken. A radiological evaluation by the search for vertebral fracture (VF) using the VFA tool (vertebral fracture assessment) of T4-L4. The evaluation was performed qualitatively and semi-quantitatively according to the Genant classification. BMD was measured by DXA (Hologic) at the lumbar and femoral spine. TBS was evaluated in the same measurement regions (L1-L4) as those used for BMD, using TBS iNsight® V1.0 (Med-Imaps).
**Results:** 25 patients with VF (case) were identified and 142 without VF (controls). Cases were older, had a higher DAS28, a more impaired HAQ and a duration of higher menopause than controls ($p<0.001$). The BMD and the TBS were lower in cases vs. controls ($p<0.001$). Comparing TBS coupled to BMD vs. BMD alone, according to a logistic regression model, it appears that the area under the curve (AUC) of the association lumbar BMD + TBS=0.74 (0.65-0.83) vs. AUC of BMD alone=0.61 (0.49-0.72) and that TBS + BMD femoral neck=0.84 (0.77-0.90) vs. AUC of the TBS alone=0.74 (0.65-0.84). The determination of the diagnostic threshold value of TBS (corresponding to the TBS value having a better sensitivity and specificity) by the Youden index is 0.424 corresponding to a TBS value of 1.148 (with a sensitivity of 70% and a specificity of 72%).
**Conclusion:** TBS in RA, supplemented or not with BMD, has diagnostic value and this whatever the densitometric zone on patients matched or not for age and or at the DMO. Its use in clinical routine should be promoted to improve the care of our patients.

## P192
## PREVALENCE OF GENU VARUM/VALGUM IN ALGERIAN CHILDREN AND ADOLESCENTS WITH LOW VITAMIN D AND CALCIUM STATUS

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**Objective**: The prevalence of lower extremity deformities is high in some areas of the world, often associated with low vitamin D status and low calcium intake. These bone deformities are physiological until the age of five. There is no published data on bone deformities in the lower limbs of healthy children living in North Africa.
**Methods**: We evaluated the prevalence of bone deformities and other clinical parameters, vitamin D status, calcium intake, calcium, phosphorus and alkaline phosphatase in 435 children aged 5-15 years old.
**Results**: There were bone deformities of the lower limbs in 72 children, a prevalence of 16.6%. Compared to the other 363 children without bone deformities, they have several potential risk factors for hypovitaminosis D. They also had lower 25OHD concentrations as well as elevated levels of PTH and alkaline phosphatase.
**Conclusion**: Low vitamin D status during winter associated with other potential risk factors such as low calcium intake, dark phototype, high BMI, poor living conditions are associated with increased risk of genu varum/valgum in healthy children and teenagers living in Algeria.

## P193

## EFFECT OF BISPHOSPHONATE VS. MENOPAUSAL HORMONE THERAPY ON FRACTURE RECURRENCE AND MORTALITY AFTER HIP FRACTURE SURGERY IN POSTMENOPAUSAL KOREAN WOMEN: A RANDOMIZED, OPEN-LABEL TRIAL

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**Objective:** Bisphosphonate reduces fracture recurrence and death in patients with hip fracture. Menopausal hormone therapy (MHT) prevents osteoporotic fractures in menopausal women. However, antifracture efficacy of MHT has not been studied yet in women with hip fracture.
**Methods:** We conducted a prospective, open-label, randomized trial to compare the effect of bisphosphonate vs. MHT in postmenopausal women. Among 1165 women 50 or older with acute and lower-energy trauma hip fracture, 317 were recruited after surgery. A total of 223 patients were randomly assigned to receive risedronate 35 mg weekly (n=114) or percutaneous 17β-estradiol gel (0.1%, 1.5 g/d) plus oral micronized progesterone (100 mg/d) daily (n=109). Thoracic and lumbar spine X-ray examinations were undergone every six months. The primary endpoint was fracture recurrence over a period of 48 months.
**Results:** The overall new fracture rate including spinal deformity was 25.6% over the 48-month period. The dropout rates in the risedronate and MHT groups were 53.5% and 67.0%, respectively. The incidence of re-fracture per 100 person-years was 8.63 for the risedronate group and 12.86 for the MHT group. There was no difference between the two groups on survival analysis (*P* value by log rank test=0.180). The incidences of death per 100 person-years in participants receiving risedronate and MHT group were 3.58 and 4.40, respectively. Survival analysis did not demonstrate any difference between the two groups (*P* value by log rank test=0.503).
**Conclusion:** This randomized, open-label trial showed no significant difference in the rates of new fractures and death with risedronate vs. MHT following hip fracture surgery in postmenopausal women.

## P194

## OUTCOMES OF TOTAL HIP ARTHROPLASTY IN PATIENTS WITH STEROID-INDUCED OSTEONECROSIS OF THE FEMORAL HEAD FOLLOWING BRAIN TUMOR SURGERY

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**Objective:** Despite the extensive use of steroid therapy in brain tumor surgery, there is little information in the literature about total hip arthroplasty (THA) in brain tumor surgery patients. The aim of this study was to evaluate the results of THA in patients with steroid-induced osteonecrosis of the femoral head (ONFH) following brain tumor surgery and to compare the results with those for ONFH with no history of brain tumor surgery.
**Methods:** We retrospectively identified 32 THAs performed in 26 patients who have a history of brain tumor surgery in Samsung Medical Hospital and subsequent development of steroid-induced ONFH. Using the propensity score matching, the study group was matched to non-brain tumor surgery ONFH control group of 55 THAs in 52 Patients. All patients received cementless components with ceramic-on-ceramic bearing. Mean duration of follow-up for the study group was 6.39 y (range, 2–13.1 y). The medical record and radiographic data were retrospectively reviewed.
**Results:** No significant differences were found between the two groups with regard to mean operative time and intraoperative complications. In patients with steroid-induced ONFH following brain tumor surgery, mean Harris hip score improved from 45.0 points preoperatively to 79.3 points at the final follow-up and no hips were revised during the follow-up period. No significant differences were found between the two

groups with respect to mean postoperative Harris hip scores and postoperative complication rates.
**Conclusion:** Our study showed encouraging clinical and radiographic results of THA in steroid-induced ONFH patients following brain tumor surgery without increased risk of adverse events compared to those in ONFH patients with no history of brain tumor surgery.

## P195
## PREVALENCE, RISK FACTORS AND PROGNOSTIC IMPLICATIONS OF DYSPHAGIA IN ELDERLY HIP FRACTURE PATIENTS

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**Objectives:** The influence of dysphagia on prognosis of elderly hip fracture patients has not been well studied. This study aimed to investigate (1) the prevalence of dysphagia with a protocol using clinical screening and VFSS, and (2) prognostic implications dysphagia, and (3) risk factors of dysphagia in elderly hip fracture patients aged 65 y and more.
**Methods:** A total of 393 female and 154 male hip fracture patients aged 65 y or more who underwent operation between 2015-2018 were retrospectively analyzed. Dysphagia was diagnosed by videofluoroscopic swallowing study (VFSS). VFSS was performed in patients who had history of aspiration pneumonia, complained of aspiration, or suspected dysphagia. To determine the prognostic implications of dysphagia, the incidence of pneumonia, hospital stay, frequency of the intensive care unit (ICU) admission, and in-hospital mortality rates were compared between patients with and without dysphagia.
**Results:** Dysphagia was found in 5.3% (29/546) of all hip fracture patients after VFSS. The mean age of patients with dysphagia was 82.3 y (range: 72-95 y) and that of patients without dysphagia was 80.1 y (range: 65-104, P=0.109). The percentage of male patients and patients with ASA classification more than 3 was higher in patients with dysphagia than those without dysphagia (P=0.012 and 0.005, respectively). Hip fracture patients with dysphagia showed higher rate of pneumonia, ICU admission, and six-month mortality, and longer hospital stay than those without dysphagia (P<0.001, 0.005, 0.026, 0.013, respectively). After logistic regression analysis, only albumin level <3.5 g/dL was found to be a risk factor for dysphagia.
**Conclusion:** Dysphagia was associated with longer hospital stay and higher rate of delirium, pneumonia, aspiration pneumonia and ICU admission. Serum albumin level lower than 3.5 g/dL was found to be a risk factor for dysphagia. Therefore, diagnostic test should be performed to detect dysphagia especially in patient with low albumin level and care should be taken to prevent postoperative complications in patients with dysphagia.

## P196
## SEROTONIN REUPTAKE INHIBITOR FLUOXETINE REDUCE BONE FORMATION AND INCREASE BONE RESORPTION POSSIBLY THROUGH A CENTRAL EFFECT

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**Objectives:** Studies have reported that treatment with serotonin reuptake inhibitors (SSRIs) antidepressants may result in bone loss. Gut and brain derived serotonin are reported to have opposite effects on bone formation, therefore, carbidopa, blocking the peripheral serotonin synthesis, might help ascertain the role of brain serotonin, if any, in mediating the effects of SSRIs.
**Methods**: Male Wistar rats were administered fluoxetine and carbidopa for 40 d following which effects on bone formation markers viz alkaline phosphatase (ALP), sclerostin and dickkopf-1 (DKK-1), two Wnt signaling pathway inhibitors and markers of bone resorption including tartrate resistant acid phosphatase (TRAP5b) and RANKL were measured.
**Results:** Fluoxetine treatment resulted in elevated plasma sclerostin and DKK-1 and reduced ALP in femora bone. Further, its treatment caused elevated TRAP5b and RANKL levels. Blocking the peripheral synthesis of serotonin by carbidopa, a peripheral decarboxylase inhibitor, could not reverse the effects of fluoxetine on bone formation or resorption though carbidopa alone had a positive effect on bone formation markers.
**Conclusion**: Fluoxetine treatment may result in reduced bone formation and increased bone resorption. The effects of fluoxetine on bone formation may not be related to gut serotonin while brain serotonin is likely involved in its observed effects on bone resorption.

## P197
## TILLIE FRACTURE OF THE ADULT: A PURPOSE OF A CASE

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The fracture of the anterolateral portion of the distal epiphysis of the tibia or Tillaux fracture is a rare lesion of the child-adolescent. The concurrence of two factors favors its appearance: the epiphyseal plate is weaker than the distal anterior tibiofibular ligament, and there is an asymmetry in the closure

of the physis. Therefore, this fracture pattern is exceptional in adult patients, since these anatomopathological features are not present.

We present the case of a 61-year-old woman who, after a casual fall, had a right ankle injury, showing a fracture of the undisplaced peroneal malleolus and the anterolateral margin of the tibial pylon. The imaging study was completed by computerized axial tomography.

The patient underwent surgery with open reduction and internal osteosynthesis, with the aim of restoring tibiotalar joint congruence.

The fracture of Tillaux is infrequent in the adult, being able to happen unnoticed or to be undervalued. Given the diagnostic suspicion, it is recommended to complete the study with a CT scan.

The anatomical reconstruction of the joint surface is essential, recommending the surgical reduction of the fracture when the joint disruption is >2 mm to prevent degenerative changes and restore joint stability.

## P198
## WHEN WE FIX THE FRACTURE BUT NOT TREAT OSTEOPOROSIS

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**Objective:** To show the need for early diagnosis and treatment of osteoporotic disease from the point of view of traumatology, in order to avoid undesirable consequences for the elderly patient

**Methods:** We present the case of a 76-year-old woman who came to the clinic for a wrist fracture treated conservatively, as medical history included: arterial hypertension, atrial fibrillation, hysterectomy due to uterine prolapse and total left knee arthroplasty. After the fracture was followed up in consultation but was not prescribed any drug against osteoporosis. One year later, she went to the emergency room after a fall, presented a pertrochanteric fracture of her left hip, we performed osteosynthesis with a proximal femur nail. At hospital discharge, she was able to walk with a walker, but she also did not start taking any antiresorptive or osteoformative medicine. A few months later a bone densitometry showed osteopenia.

**Results:** After one year, she suffered another fall, presented a peri-implant fracture on her left femur and was performed an osteosynthesis with a plate. This type of fracture is much more complex to handle, without allowing the load to consolidate the fracture, and as a result the disability and deterioration of the patient

**Conclusion:** We must pay special attention to the osteoporotic fractures of the elderly patient or with risk factors, for multidisciplinary detection and treatment, to prevent new fractures of greater severity and thus the inability of our patients.

## P199
## SARCOPENIA IN A RHEUMATOLOGY CENTER: DESCRIPTIVE STUDY

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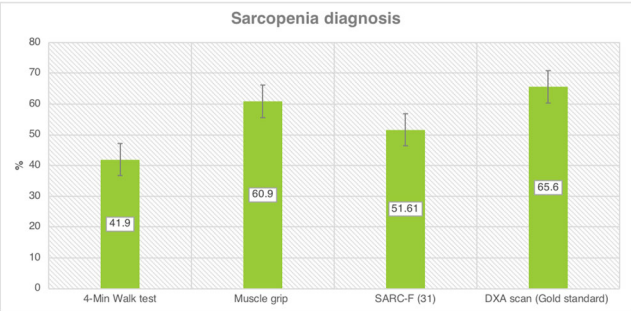
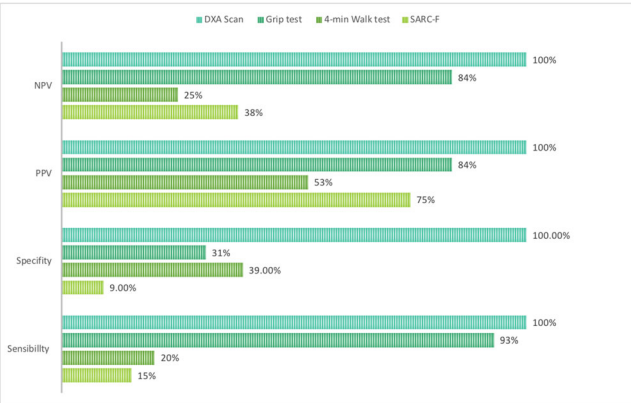
**Objective:** Sarcopenia is defined as an abnormal loss of muscle mass associated with aging. It has been validated that sarcopenia can predict functional deterioration. The purpose of this study is to determine the diagnosis of sarcopenia by conventional methods and gold standard.

**Methods:** Prospective observational study of patients attending a rheumatology center, to whom anthropometric and densitometric measurements were taken in order to determine sarcopenia.

**Results**: A total of 93 patients were studied, from which 89% were women and 11% men. 66% presented sarcopenia by means of the gold standard test (DXA). The mean age was 66.39±9.70 [44-89]. The mean age for women was 66.4±9.8 and the average age of menopause was 46.97±5.61 and 63% were found to have sarcopenia. In men, the mean age was 66.7 ±9.2 and 43% had sarcopenia. Anthropometric measures were determined. The mean BMI was 26.54±4.69, which corresponds to ideal weight. Three tests were performed in addition to the gold standard (Fig 1). The average gait speed test was 0.92±1.25 s and 42% were positive for sarcopenia. The mean of the muscle strength test (dynamometer) was 19.99±9.90 and 61% had sarcopenia. The mean of the SARC-F screening questionnaire was 3.29±2.32 and 52% were positive for sarcopenia. According to the measurement of muscle mass by DXA, the mean appendicular skeletal muscle mass (ASMM) was 16.15±3.66, ASMM index 6.79±1.13 and the total skeletal muscle was 21.48±4.88. Men presented a higher muscle mass index compared to women [7.82±1.93 vs. 6.67 ±0.94]. When grouping patients by BMI, sarcopenia was

present in 3% of the patients with low weight, 27% in the ideal weight group, 46% in the overweight group and 18% in the obesity group. A statistically significant relationship was found between sarcopenia and sex [0.01], weight and height [<0.001], gait test [0.04], muscle strength test [<0.001] and DXA [<0.001]. In addition, the sensitivity and specificity of the tests were determined (Fig 2). SARC-F had a 15% sensitivity and a 9% specificity, with a positive predictive value of 75% and a negative predictive value of 38%. The gait speed test 20% sensitivity and 39% specificity, with a positive predictive value of 53% and negative predictive value of 25%. The muscle strength test had a 93% sensitivity and 31% specificity, with a positive predictive value of 84% and negative predictive value of 84%.




**Conclusion:** This is the first study of determination of Sarcopenia in a Rheumatology Center in the city of Guayaquil. 66% of the studied population presented sarcopenia. It is evident that conventional methods may determine a diagnosis, however, a definitive diagnosis can be established by DXA. Because sarcopenia is a multidisciplinary entity, more studies are needed to determine the usefulness of the conventional methods.

## P200
## TRABECULAR BONE SCORE IS A USEFUL PARAMETER FOR THE PREDICTION OF VERTEBRAL FRACTURES IN PATIENTS WITH POLYMYALGIA RHEUMATICA

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**Objectives:** Polymyalgia rheumatica (PMR), a benign rheumatic disorder, requires long-term glucocorticoid therapy, which could be associated with osteoporosis. In the present study, we compared BMD, trabecular bone score (TBS), and frequencies of vertebral fracture (VF) between patients with PMR or rheumatoid arthritis (RA) and controls.
**Methods: 53** postmenopausal women with PMR aged 50 y or older were eligible for inclusion in this study. Subjects with RA (n=106) and controls (n=106) were selected by propensity score matching, controlling for age, BMI, and the use of antiosteoporotic agents.
**Results:** The frequency of VF was significantly higher in patients with PMR (30.2%) than in patients with RA (13.2%) and controls (13.2%, P=0.017). The mean TBS was significantly lower in patients with PMR (1.317±0.092) than in patients with RA (1.336±0.089) and controls (1.373±0.073, P<0.001). In receiver operating characteristics analysis for VF in patients with PMR, the area under the curve was 0.759 (95%CI 0.601-0.918, P=0.003) for TBS and 0.618 (95%CI 0.445-0.791, P=0.175) for L-spine BMD. Multivariate analysis identified a lower TBS (OR: 0.000, 95%CI: 0.000-0.754, P=0.043) as a factor associated with VF in patients with PMR.
**Conclusion:** TBS could be a supplementary tool for discriminating osteoporotic fractures in postmenopausal patients with PMR.

## P201
## FRAGILITY FRACTURE RISK PREDICTION IN ELDERLY PEOPLE BASED ON A MICRORNA PANEL

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**Objective:** Often seen as promising targets for the establishment of new biomarkers, microRNAs (miRNAs) are short non coding RNA sequences implicated in translational repression. Study of miRNA can be easily achieved through biomolecular techniques. Regarding the diagnosis field, several advantages can be pointed out: miRNAs are highly stable and highly

accessible through serum and plasma. Furthermore, miRNAs are often tissue-specific and can be used to design a disease signature. Fractures have a major impact on quality of life in elderly people. Comorbidities and loss of autonomy represent more than a trivial cost for our healthcare systems. Several studies show that risk-fracture prediction based on a simple blood test can be really cost-effective. Because several miRNAs have been implicated in bone homeostasis, we decided to evaluate the ability of the "osteomiR score" to predict the Fragility fracture risk.

**Method:** People selected for this study were implicated in a long term prospective study called the Sarcophage study. Serum was collected at the enrolment in the study. We selected 17 persons which developed a fracture within 3 y after entering the study. The control group is composed of 16 persons that did not fracture in the meantime. For those 2 groups, 19 miRNAs implicated in bone homeostasis (the so called "osteomiR panel") have been tested through qPCR technique (LighCycler 480 (Roche°)). Then, we calculated the "osteomiR score" as design by TamiRNA°.

**Results:** Separately, none of the 19 miRNAs harbored a statistically significant difference. Nonetheless, the "osteomiR score" based on the combination of the results obtained for 10 out of the 19 miRNAs showed a statistically significant increase in the fracture group compared to the control group. When a cutoff is defined at the median value of the osteomiR score, the predictive positive value is 68% with a sensitivity of 76%. Additionally, we compared "osteomiR" score specifications to IOF-FRAX algorithm and we observed a higher sensitivity for the "osteomiR" score on this cohort.

**Conclusion:** The osteomiR score seems a good predictive score in the establishment of the fragility fracture risk. The "osteomiR" score possesses a predictive value which appears to be in the same range as the one obtained from the IOF-FRAX algorithm. It could be interesting to further assess whether the addition of osteomiR to the IOF-FRAX algorithm will improve the overall performance of FRAX, in terms of fragility fracture prediction.

## P202

## THE ROLE OF "D" HORMONE IN ANTIRESORPTIVE TREATMENT OF OSTEOPOROSIS: THE ROLE OF VITAMIN D IN ANTIRESORPTIVE TREATMENT PLANNING – OSTEOPOROSIS NATIONAL ASSOCIATION

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**Objective:** There is a lot of talk about the pandemics of "D" hormone deficiency around the world. We all know, that supplementation with calcium and vitamin D3 is very important for the antiresorptive treatment of osteoporosis. Consequently, the question arises about how the concentration of vitamin D can influence the efficiency of the antiresorptive treatment, and is the recommended dosage of vitamin D supplement set in general guidelines is sufficient for successful treatment of narrow endemic population.

**Methods:** We have analyzed the results of 3 y treatment of 420 patients. 210 patients were treated with zoledronic acid (5mg) – 1 IV transfusion annually); 95 patients were treated with ibandronic acid (150 mg monthly); 115 patients were treated with risedronate (35 mg weekly). The concentration of vitamin D was measured in peripheral blood before start of treatment and at the end of each year of treatment.

**Results:** The results were devastating. 390 patients (93%) out of 420 showed insufficient concentration of vitamin D in their blood (< 30 ng/ml), 220 patients (55%) diagnosed to have deficiency of vitamin D (<20 ng/ml). During treatment all patients received calcium carbonate (500 mg) and cholecalciferol (800 IU daily).

**Conclusions:**

1. Majority of Georgian patients diagnosed with osteoporosis patients have vitamin D3 insufficiency and deficiency.
2. Concentration rise of vitamin D in the blood correlates to the effectiveness of antiresorptive treatment (i.e., with BMD). The lower the concentration of vitamin D3 in the blood, the lower is the BMD maintenance or increase after the treatment.
3. Therapeutic effectiveness of antiresorptive drugs is 50% higher in patients who have higher vitamin D concentration in blood (>30 ng/ml.).
4. It is recommended to optimize the dosage of vitamin D3 supplement, specifically for Georgian population in the process of antiresorptive treatment.

## P203

## MUSCULOSKELETAL INJURIES CAUSED BY YOGA IN OSTEOPENIA AND OSTEOPOROSIS: A RETROSPECTIVE ANALYSIS

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**Objective:** To analyze injuries that were directly associated with yoga practice and identify specific poses that should be avoided in patients with osteopenia or osteoporosis.

**Methods:** We retrospectively reviewed records of patients with injuries that were primarily caused by yoga. Patients were seen from January 1, 2006 through December 31, 2018. Injuries were categorized into 3 groups: 1) soft tissue injury, 2) axial no bony injury, and 3) bony injury. Patients underwent evaluation and were counseled on activity modification.

**Results:** 89 patients were included in the study. Within the soft tissue group, 66 (74.2%) had mechanical myofascial pain due to overuse. Rotator cuff injury was seen in 6 (6.7%), and trochanteric bursopathy was observed in 1 (1.1%). In the axial group, exacerbation of pain in degenerative joint disease (n=46 [51.7%]) and facet arthropathy (n=34 [38.2%]) were observed. Radiculopathy was seen in 5 (5.6%) patients. Within the bony injury category, kyphoscoliosis was seen on imaging in 15 (16.9%). Spondylolisthesis was present in 15 (16.9%) patients. Anterior wedging was seen in 16 (18%), and compression fractures were present in 13 (14.6%). The poses that were most commonly identified as causing the injuries involved hyperflexion and hyperextension of the spine.
**Conclusion:** To our knowledge, this report describes the largest case series of medically documented yoga-related injuries to date. Yoga potentially has many benefits, but care must be taken when performing positions with extreme spinal flexion and extension. Patients with osteopenia or osteoporosis may have higher risk of compression fractures or deformities and would benefit from avoiding extreme spinal flexion. As yoga gains popularity, prevalence of yoga-related injuries are also expected to increase. Physicians are encouraged to discuss such risks with their patients when asked about the safety of yoga, and appropriate exercise programs should be recommended on a case-by-case basis.

## P204
## VITAMIN D VALUES IN TWO COHORTS OF PATIENTS WITH RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS, WITHOUT VITAMIN D SUPPLEMENTATION

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**Objective:** The association between vitamin D deficiency and autoimmune diseases (AID) has been supported by epidemiological studies demonstrating higher prevalence of vitamin D deficiency among autoimmune patients, in comparison to the general population. Furthermore, with the increasing awareness of vitamin D's necessity to human health and its wide association with various medical conditions. It is becoming hard for researchers to identify many patients with AID and who are not receiving vitamin D supplementation. Hypovitaminosis D (insufficient and deficient) on the other hand is known to be high among the general population of UAE (between 78-90%) reaching up to 96% in some recent studies.
**Methods:** Data of 61 patients (35 and 26) adults with rheumatoid arthritis (RA) and systemic lupus erythematosus were sought. Their data were compared to those of other 77 individuals without AID who were also not on vitamin D supplementation (control group).
**Results:** The prevalence of hypovitaminosis D (25(OH)D3 <30 ng/ml) was not different between patients with RA 26 (74%)and 19 (73%) in SLE patients, p=1.000 but was significantly higher (71,92%) in the control group, than in the RA p=0.0156 and in SLE p=0.0179 patients respectively. The mean of 25 (OH)D3 in individuals with hypovitaminosis was also not different in RA and SLE patients (20.9±4.76 vs. 21.3±8.19 ng/ml) respectively, p=0.87 but significantly lower (18.0±5.77 ng/ml) in the control group, p=0.021 & p=0.047 towards rheumatoid and lupus patients respectively. Secondary hyperparathyroidism (PTH >65 ng/ml) was identified in 8/26 (30.5%) of RA and in 3/18 (16.5%) of SLE patients, p=0.483 compared to 29/71 (41%) in the control group (p=0.482 and p=0.098 towards the two groups) respectively.
**Conclusions:** RA and SLE patients exhibited comparable vitamin D values. The patients without AID, had significantly higher prevalence of hypovitaminosis D along with lower D values compared to each of the RA and SLE groups individually. These findings are in contrast to previous and widely spread reports suggesting the contrary. Nonetheless, before concluding further on the issue. larger number of patients need to be assessed in future studies.

## P205
## MALORHEOSTOSIS OF THE HAND

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**Objective:** Malorheostosis is a rare mesenchymal dysplasia which develops with sclerotomal distribution, usually affecting only one limb. On radiologic exam is characteristic the melting "candle wax" sign, which is the irregular cortical hyperostosis occurring in one side of the affected bone. We present 2 rare cases of malorheostosis of the hand.
**Methods:** The first case involves a 55 years old Greek woman presented with a malorheostosis of the left hand. The disease involved the lunate, the capitate, the metacarpal and the phalanges of the middle and index fingers. The patient complained for pain and dyskinesia between metacarpals, as well as the proximal and middle phalanges. Clinical examination revealed that flexion of MCP joint of index finger was 20° and of PIP joint 0°. To the patient proposed surgical intervention where under general anesthesia through a straight incision between $2^{nd}$ – $3^{rd}$ metacarpal extensive tenolysis of the extensor tendons was attempted. During the procedure removing the "murble" like bone spurs two saw blades were destroyed, so any effort to continue stopped and a plaster cast was used for 2 weeks for protection and rest. The second case was involved a 36 years old Albanian woman who reported pain and mild stiffness at her left hand. The radiological study revealed malorheostosis affecting the lunate, the capitate, the metacarpal bones of the middle and index finger and

the proximal and middle finger. The patient was informed about this pathology and proposed operative treatment, but she denied.

**Results:** The first patient 3 months post operatively showed no improvement in relation to her previous condition. Also, she denied any suggestion of ray amputation of any or both of the affected fingers. The second patient continues her professional as a hair stylist, without the need of any surgical intervention.

**Conclusion:** Current literature lacks evidence considering effective surgical intervention for the cortical hyperplasia in cases of malorheostosis of the hand. Ray amputation seems as the only alternative in cases of extensive hand dysfunction, only after taking into consideration the special needs of each patient.

## P206

## DEVELOPMENT OF GENOTYPIC DIAGNOSIS OF DUCHENNE MUSCULAR DYSTROPHY BY MULTIPLEX PCR IN ORAN: A STUDY OF 5 CASES

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**Objective:** Duchenne muscular dystrophy (DMD) is the most common and severe form of muscular dystrophy, reaching one out of every 5000 male births in the world population. It is characterized by progressive muscular degeneration from a young age and leads to serious failures of the body which lead to the death of the patient. The gene responsible for DMD is located on chromosome X. It encodes a membrane cytoskeleton protein the "dystrophin". The alterations affecting this gene are essentially deletions with a proportion of 65%. That is why we have interested to develop in our laboratory a technique that will allow us to detect this type of mutations in 5 sporadic cases with Duchenne myopathy from western Algeria.

**Methods:** The study consisted in amplifying by PCR multiplex that cover 19 exons of the DMD gene most commonly deleted in 5 Duchenne muscular dystrophy cases recruited at Oran and Tlemcen Hospitals.

**Results:** This study allowed us to reveal two different deletions, the first involving the promoter of the gene and the second one the exon 43. These first results confirm the data reported in the literature which classify these two regions as deletion hotspots.

**Conclusion:** The results obtained represent a first in the western Algerian and could lead to the generalization of genotypic diagnosis and genetic counseling with a view to improve the care of patients in Algeria.

## P207

## BONE MINERAL DENSITOMETRY IN NIGERIAN BLACKS: AN EVIDENCE BASED ANALYSIS

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**Objectives**: DXA of bone mineral densitometry is the goal standard for the diagnosis of osteoporosis before fracture occurs. Osteoporosis is an important public health issue that is recognized widely due to its morbidity, mortality and financial involvement when accompanied by complications such as skeletal fractures. There is paucity of data of the use of DXA in our environment hence the study.

**Method**: This Unigamma machine is in Enugu, southeast Nigeria and has introduced routine BMD screening in this part of the country. Respondents are mostly patients who either came for routine BMD screening or were referred for DXA test on account of need by physicians. They were duly introduced to the topic either at awareness programs and or presented with questionnaires.

**Result**: This is a prospective study involving 89 subjects.56 females and 33 males. Age range is from 20-89 y. 60-69 age range was highest frequency. 39 (44.3%) of the participants were obese while 35.2% were overweight. Subjects with normal BMI were 15.9%. 30 out of the 39 obese subjects are osteopenic. The highest frequency of osteopenia was 60-69 age range and were 31 respondents followed by 70-79 age range. Females (47) had more osteopenia than males (27). Osteopenia was demonstrated most in the femur than in the lumbar spine. Osteopenia/osteoporosis is most demonstrable in the ward triangle followed by greater trochanter then the femoral neck.

**Conclusion:** Females formed about 2/3 of the total number of study population. Slightly less than half are obese. Most of the respondents have reduced BMD.

## P208

## CONCENTRATED HYALURONIC ACID INTRA ARTICULAR INJECTION IS WELL TOLERATED BY OSTEOARTHRITIC JOINT AND PREVENTS PRO-INFLAMMATORY MECHANISMS IN THE OSTEOARTHRITIC SYNOVIUM

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Intra-articular (IA) injection of hyaluronic acid (HA), currently administered at 1%, is effective in treating pain and

improving function and viscoelasticity in patients with osteoarthritis (OA). The increase in the concentration of this compound could improve its rheological properties, although its biocompatibility in previously inflamed OA tissues has not been studied. Furthermore, the anti-inflammatory effects of HA in high concentrations on chondrocyte cultures is not well described.

We studied the biocompatibility of 2% HA (Tedec-Meiji Farma S.A.) on the synovial membrane, the cartilage and the subchondral bone in an experimental surgically-induced knee instability model of OA in rabbits that were treated with 3 IA weekly doses of 0.5 ml 2% HA. We also studied the effect of 2%HA in the synthesis of different pro-inflammatory mediators, such as IL-1β and cyclooxigenase-2, in the synovial membrane, and the presence of metalloproteases in the articular cartilage. We also employ the mice chondrogenic line ATDC5 to determine, by *in vitro* studies, the effect of high concentrations of HA on oxidative stress evoked by $H_2O_2$ incubation, and in the gene expression of different detoxifying enzymes.

No additional joint damage was observed in rabbits with knee OA treated with 2% HA in comparison to untreated OA ones, neither in swelling nor in post-treatment edema. On the contrary, 2% HA treatment induced a decrease in the protein synthesis of IL-1β in the synovial membrane of OA rabbits. In turn, the treatment of chondrocytes with high HA concentration partially prevented the deleterious effect of $H_2O_2$ on the gene expression of superoxide dismutase and hemoxygenase-1, and it has a trend to decrease the gene expression of inducible nitric oxide synthase, as well as catalase. These data suggest that high concentrations of HA decrease oxidative stress in cultured chondrocytes, a process that is partly responsible for the unleashing of the catabolic program in OA cartilage.

2% HA is a biocompatible product for joint tissues that are damaged during OA. It seems that a more concentrated HA may have a specific effect in the control of pro-inflammatory mechanisms in the synovium. The impact of this effect on the progression of OA in patients is not known right now, and should be considered in future studies in human disease.

## P209

## IS THERE A CONNECTION IN A USE OF THIAZIDE DIURETIC AGENTS AND LOWER INCIDENCE OF HIP FRACTURE?

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Thiazide diuretic agents are known to lower the urinary excretion of calcium and improve calcium balance. Their use has also been associated with increased bone density. However, their role in the prevention of osteoporotic fractures has not been consistently supported by epidemiologic studies.

A prospective study included 476 people 65 or older in our data basis which were people that are ordinary patients in our healthcare center on department of internal medicine. We had opportunity to investigate the relation between the use of thiazide diuretic agents and the risk of hip fracture during four years of follow-up. In this investigation, the differences between thiazide users and nonusers in BMI, impaired mobility, and several other potential risk factors for hip fracture were taken into consideration. At base line, 24-30% of the subjects were thiazide users. In the subsequent 4 y, 24 subjects had hip fractures. The incidence rates of hip fracture were lower among thiazide users than nonusers. The Mantel-Haenszel relative risk of hip fracture, adjusted for age, was 0.63 (95%CI, 0.46-0.86). The protective effect of the use of thiazides was independent of sex, age, impaired mobility, body-mass index, and current and former smoking status; the multivariate adjusted relative risk of hip fracture was 0.68 (95%CI, 0.49-0.94). Furthermore, the protective effect was specific to thiazide diuretic agents, since there was no association between the use of antihypertensive medications other than thiazides and the risk of hip fracture. These prospective data suggest that in older men and women the use of thiazide diuretic agents is associated with a reduction of approximately one-third in the risk of hip fracture.

## P210

## LEVEL OF BIOCHEMICAL MARKERS OF BONE METABOLISM IN PATIENTS WITH OSTEOPOROSIS IN THE PRESENCE OF RHEUMATOID ARTHRITIS

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**Objective:** To study the biochemical markers of bone metabolism in patients with osteoporosis in the presence of rheumatoid arthritis.

**Methods:** We observed 70 women with a reliable diagnosis of rheumatoid arthritis (RA) and with osteoporosis (OP). The average disease duration of RA was 6.56±0.88 y. The comparison group included 45 practically healthy women in menopause between the ages of 45-66 y. BMD was studied by the method of DXA using the Lunar DPX Pro apparatus (GE, USA). We studied the biochemical parameters of bone formation (osteocalcin and alkaline phosphatase) and also examined of bone resorption markers (urinary crosslaps in terms of creatinine and tartrate resistant acid phosphatase).

**Results:** The level of osteocalcin blood (normal 8.8-37.6 ng/ml) in the group of patients with RA against the background of OD was 10.44±2.1 ng/ml, in the group of healthy individuals 12.14±2.2 ng/ml ($t=1.38$, $p>0.05$). Crosslaps of urine in terms of creatinine (normal 49-460 μg/ml mol of creatinine) in the group of patients with RA against the background of OP amounted to 542.6±16.4 μg/mmol, in the group

of healthy individuals - 92.9±17.6 μg/mmol (t=18.71, p<0.001). The level of acid phosphatase (normal 67-167 nmol/s*l) is 189.6±17.3 nmol/s*l and 113.2±14.6 nmol/s*l, respectively (t=3.35, p<0,001). Thus, markers of bone resorption in patients with OP in the presence of RA complicated by OP were significantly increased.

**Conclusions:** These data may suggest that osteoclast activity is increased in patients with RA, with normal osteoblast activity. Thus, osteoporosis in RA proceeds mainly with an increase in bone resorption.

## P211

## ROLE OF BONE TRAP5B AND PINP FOR CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS

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**Objective:** Serum band 5 tartrate-resistant acid phosphatase (TRAP5b) reflects the number of osteoclasts and useful as an indicator of bone resorption in adult. Type I collagen with N-terminal propeptides (PINP) is used to investigate bone formation in adult especially due to cancer disorders. But a lack of appropriate reference data has hampered use of PINP and TRAP5b in pediatrics. Our aim was to determine the role of TRAP5b and PINP for patients with juvenile idiopathic arthritis (JIA).

**Methods:** The study included 10 patients with JIA within 9-18 y; there were 60% of female and 40% of male. Assessment of children was based on physical, laboratory and instrumental tests. ELISA method was used for the measurement of TRAP5b. ECLIA method was used for the measurement of PINP. Stagraphics 3.0 was used for statistic processing of the data.

**Results:** Patients with JIA were classified as a polyarthritis with negative rheumatoid factor (RF) in 50% of children; 20% of patients had polyarthritis with positive RF; another 20% of kids - oligoarticular form, and 10% - enthesitis-associated arthritis. All patients took NSAID and methotrexate, and 40% of patients were treated with immunobiological preparation. Despite treatment radiological changes III degree by Steinbrocker score in 50% of cases and IV degree in 30% of kids were determined. The levels of TRAP 5b and PINP depend on age and gender. The level of TRAP5b was 7.81 ±3.79 U/L, PINP 378.78±370.80 ng/ml, serum calcium 2.34 ±0.07 mmol/L and phosphorus 1.58±0.36 mmol/L, which were within normal range. In patients with JIA bone TRAP5b correlated with patient's age (r=-0.68; p=0.03), level of PINP (r=0.76; p=0.01), duration of IBP (r=0.74; p=0.02) and activity of inflammatory process (r=-0.55; p=0.01).

**Conclusion:** Measurement of bone TRAP5b and PINP is not sensitive for determination of osteoporosis in children with JIA. Correlation between level of bone TRAP5b and degree of inflammatory activity and duration of IBP proved importance of this marker as an indicator of osteoclast activation due to autoimmune inflammation.

## P212

## CORRELATION BETWEEN SAGITTAL ALIGNMENT AND ADJACENT FRACTURE AFTER VERTEBROPLASTY IN OSTEOPOROTIC COMPRESSION FRACTURE

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**Objectives**: To investigate the natural history of new fracture following vertebroplasty for osteoporotic vertebral compression fracture (OVCF) and to evaluate the risk factors for adjacent vertebral fracture (AVF) and remote vertebral fracture (RVF) separately.

**Methods**: 205 consecutive patients who underwent a vertebroplasty for OVCF with a minimum follow-up of 1 y were retrospectively analyzed. A separate survivorship analysis of AVF and RVF was performed using the Cox proportional hazards model.

**Results**: Of the 47 patients (22.9%) with new vertebral fracture, AVF developed in 21 patients (10.2%) and RVF in 26 patients (12.7%). The median survival time was 4.0 months for AVF and 14.0 months for RVF. Multivariate analyses revealed that sagittal alignment imbalance and initial vertebroplasty at the thoracolumbar junction were independent risk factors for AVF (hazard ratio=9.6 and 4.7, respectively), whereas the significant risk factor for RVF was a sagittal alignment imbalance (hazard ratio=11.5). A low BMD of the spine (T-score ≤-3) was shown to be a risk factor for AVF and RVF on univariate analyses, but not on multivariate analyses.

**Conclusions**: AVF developed at a median of 4 months and RVF at a median of 14 months. An initial vertebroplasty at the thoracolumbar junction was an independent risk factor for AVF, and patients with sagittal alignment imbalance had a high risk of AVF and RVF after vertebroplasty for OVCF.

## P213

## ASSOCIATION OF CALCIUM INTAKE WITH OSTEOPOROTIC VERTEBRAL FRACTURES AND QCT BONE MINERAL DENSITY IN A LARGE CHINESE COHORT

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**Objective:** Calcium is widely recognized as an effective intervention for the prevention of osteoporosis. However, some recent studies and meta-analyses indicate that calcium supplements may be ineffective to prevent fracture. The association of dietary calcium intake with vertebral fracture and spinal volumetric BMD (vBMD) in low calcium intake population is unknown.

**Methods:** China Action on Spine and Hip Status (CASH) study is a multicenter, community-based cohort study of 3457

participants from 12 centers across China from March 2013 and August 2017. We documented their baseline dietary calcium intake using validated food frequency questionnaires with a median of 10 y before the spine CT screening of CASH study. Vertebral fracture of CT images was defined as the primary outcome and the main measures included volumetric BMD at participants' median of 10 y visit and dietary calcium intake at baseline. Odds ratio (OR) and 95%CI were obtained for the associations of vertebral fracture with dietary calcium from logistic regression models. Because only 14.5% reached Chinese Dietary Reference Intakes (CDRI) calcium target of ≥800 mg/d, we selected 500, 600, 700, 800 mg/d of calcium intake from food as cutpoints for modeling, respectively.

**Results:** Of the 3457 CASH participants, 3273 (94.7%) were used for analysis including 2052 women (mean [SD] age, 52.1 [9.0] y) and 1221 men (53.3 [9.1] y). Total vertebral fracture prevalence was 16.5% (n=551). The mean daily calcium intake from the FFQ was calculated as 517.0±266.4 mg. 8% reduction of fracture risk was observed per 100 unit increase of calcium intake from food among females (OR, 0.92; 95%CI, 0.87-0.97), but results among males were not significant (OR, 0.98; 95%CI, 0.92-1.04). No interaction was detected between vBMD and calcium intake from food (P>0.05). When high calcium intake groups had enough sample sizes (i.e., calcium ≥500 or ≥600 mg/d), negative associations of fracture risk with calcium intake were found among females (≥500 vs. <500 mg/d: OR, 0.62; 95%CI, 0.47-0.80; ≥600 vs. <600 mg/d: OR, 0.59; 95%CI, 0.44-0.79), but this trend as not shown when cutpoints of calcium intake were set as 700 or higher. The same regressions were performed for male participants, but no significance was found. A positive correlation of calcium intake and vBMD was observed for females (P=0.01), but there was a nonsignificant negative trend for males (P=0.16).

**Conclusion:** Higher dietary calcium intake was associated with lower vertebral fracture among healthy women with low calcium intake. Further, higher calcium intake in women was related to a modestly greater volumetric spine BMD. Among men, more data are required.

## P214

## TREATMENT OF DYSTROPHIC SKIN CALCIFICATIONS IN PATIENT WITH UNUSUAL COMBINATION OF LIMITED SYSTEMIC SCLEROSIS AND PSORIATIC ARTHRITIS WITH EXTRACORPOREAL SHOCKWAVE LITHOTRIPSY FOLLOWED BY INTRALESION INJECTIONS OF SODIUM THIOSULPHATE: A CASE REPORT

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We report the case of 63-year-old woman, who at the age of 45 had been diagnosed with the limited systemic sclerosis on the basis of Raynaud's phenomenon, sclerodactyly, skin thickening, telangiectasia, anticentromere antibody positivity, and late nailfold videocapillaroscopy pattern. Our patient had been worked for 25 y in the petrochemical industry and where she was exposed to vinyl chloride monomer. She was treated with vasodilatory therapies. At the age of 53 had been diagnosed with the dystrophic skin calcifications both knees, left elbow and fingertips (right thumb and index and left third finger). On both knees there were fistulas from where the small stones calcification and white, cream-like material spontaneously went out. She was treated with supportive therapies such as pain, treatment of infection, without effective response in regression of lesions. At the age of 61, she had surgical skin incision with drainage on the tip of her right knee, but this treatment is not sufficient. She had slow wound healing, skin infection and decreased range of motion right knee. At the age of 62 had been diagnosed psoriasis and hyperuricemia. She was treated with febuxostat 40mg once daily. At the age of 63 had been diagnosed psoriatic arthritis. Rodnan skin score was 7/51. X-ray (knee/elbow/hand) showed diffuse subcutaneous calcification. Laboratory data revealed normal serum phosphorous, calcium and vitamin D level. Rheumatoid factor was negative. DXA scanning showed osteopenia (T-score of total hip was -1.6, and spine -0.2). She had been treated with a methotrexate 15 mg/week, folic acid, calcium channel blocker, febuxostat, vitamin D, and pain relief medication. Also, she received 6 extracorporeal shock wave lithotripsy (ESWL) session at week intervals in the both knees. Then she was paused for 6 weeks and again had 6 ESWL sessions. Thereafter, she received intralesional injections of sodium thiosulphate 150 mg/ml every week for 4 weeks. During follow-up calcifications were spontaneously eliminated, with the remnants of crater-shaped defects. Also, we found healing of the ulcers, functional improvement, and partial radiographic regression of calcinosis lesions. In addition, visual analog scale pain scores (range 0-10) decreased from 10 to 2.

## P215

## RESULTS OF THE TEN-YEAR MONITORING OF OSTEOPENIC DISORDERS IN CHILDREN OF THE EAST REGION OF UKRAINE

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**Objective:** Identify factors which determine bone density in the growing child and young adult.

**Methods:** **10**-y prospective cohort study of 2500 eastern Ukrainians aged 9-18. Developmental, medical, family, diet, activity, injury, and social history databases were collected by physician team. The functional state of bone tissue (SFS BT) was measured with Sonos-2000 ultrasound at the heel bone. Laboratory Ca, P, Mg, Se, K, Zn, Cu, I, Zr, and Ni; Toxic Pb, As, Cr, Sr, At, and Al; and ratio isotopes 44Ca/48Ca were all determined. Hair samples were irradiated by Bremsstrauhlung on electron acceleration with E=22 MeV and I=500 uA. Gamma radiation was measured using Ge(Li)-detector.
**Results:** The prevalence of primary osteopenia (OP) of different degrees of severity was significantly increased from 21.6% to 37.2% from 2007 to present ($p<0.005$). In 2007, 96.5% primary OP was characterized by impaired calcium metabolism and moderate increase of Pb. Now, 77.8% primary OP is characterized by reduced Ca accumulation and significant increase of Sr in 17%, Al in 74.9%, and Cr in 69.4%. Also, this study documents increasingly significant and prevalent deficiencies of Mg, Zn, and K. The isotope ratio of 44Ca/48Ca in hair without OP is 1.0; with OP, varies from 0.87 to 0.91. Bone mass deficiency of 25% was found in 44.6% of adolescents; 35% deficiency, in 28.2%; and 40% deficiency, in 14.4%. Normal bone density is now found in only 12.8% of young adults aged 17 and 18.
**Conclusion:** Decreased bone density in growth is related to mineral deficiency and toxic exposure. Decreased bone density is now documented to be increasingly prevalent and severe in Eastern Ukraine. This study indicates a careful history, measurement of SFS BT, and laboratory testing are all indicated in routine pediatric practice to ensure good bone health through adolescence and on reaching maturity as a young adult.

## P216
## ROLE OF ULTRASOUND IN ASSESSMENT OF JOINT PAIN AMONG HEMODIALYSIS PATIENTS

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**Objective:** Few studies including limited number of patients assessed the rheumatologic effects of hemodialysis (HD) on joints using ultrasonography. Joint ultrasound has been emerged as a cheap noninvasive tool for assessment of joint pain among HD patients. This was the aim of our study to make use of such tool in such life quality threatening complaint. Our aim was to determine the role of ultrasound in evaluation of joint pain and its causes among patients on regular HD.
**Methods:** 104 patients with endstage renal disease (ESRD) who were regular on HD three sessions/week, 4 h/session were subjected to history taking, complete physical examination stressing on musculoskeletal examination and ultrasonography of painful joints by an ultrasonography expert.
**Results:** Dialysis related arthropathy (DRA) was not the only cause of joint pain among HD patients but there were diverse causes in different joints. As regard affected joints, knee was the most affected one then came wrist, shoulder, ankle and elbow respectively. As regard causes of joint pain, DRA was the commonest one then came osteoarthritis, nonspecific ultrasonographic findings and few cases showed normal ultrasonographic studies.
**Conclusion:** This study confirmed that joint pain in HD patients has diverse causes not DRA by necessity but other causes must be considered as well as multifactorial etiologies.

## P217
## RESIDUAL LIFETIME FRACTURE RISKS AND YEARS OF LIFE LOSS DUE TO OSTEOPOROSIS IN THE AUSTRALIAN POPULATION: AN APPLICATION OF AN OSTEOPOROSIS HEALTH ECONOMIC MODEL

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**Objective:** To evaluate residual lifetime fracture risks (RLFR) and years of life lost (YLL) due to osteoporosis by sex, BMD level and number of clinical risk factors (CRFs).
**Methods:** A state-transition microsimulation was developed based on our previously validated osteoporosis model for the Chinese population [1]. Its development followed the recent international guidelines on health economic modelling in osteoporosis [2]. Patients were allowed to have multiple fractures in the simulated lifetime. Tracker variables were used to record patient characteristics, consequently, transition probabilities were varied in patients with heterogeneity. The FRAX® equations were used to calculate annual fracture risks. First-order Monte-Carlo simulation was conducted with 10,000 hypothetical patients at age 60 y over a lifetime simulation horizon. RLFR of 44% and 25% for Australian women and men aged 60 y were used to determine the reference life expectancies [3]. RLFR and YLL (or years of life gained, YLG) were reported by sex, BMD level (measured by T-score) and number of CRFs.
**Results:** At age 60 y, RLFR ranged from a low of 8.2% for Australian women with no CRF and a T-score of 0 up to a high of 93.9% for Australian women with 6 CRFs and a T-score of -4.0. Those for Australian men ranged from 4.9% to 88.1%, respectively. There was a clear trend of reduction in YLL with higher T-scores and lower number of CRFs (see Table). The LE gap between those who had T-score of -4.0 and 6 CRFs compared to those who had T-score of 0 and no CRF was 3.9 and 6.1 y for women and men respectively. Of note, reducing

CRFs was shown to be as important as improving BMD when impact on LE was considered. For example, for an Australian woman with 5 CRFs and a T-score of -4.0, YLLs could have been 0.34 or 0.32 y less if the CRFs could be reduced to 4 or T-score could be improved to -3.5.

**Table.** Residual lifetime fracture risk (RLFR) and years of life lost (YLL) due to osteoporosis for Australian women and men aged 60 years

| T score | RLFR by number of CRFs, % | | | | | | | YLLs by number of CRFs , years | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Women | | | | | | | | | | | | | | |
| -4.0 | 40.3 | 53.6 | 67.1 | 78.2 | 86.3 | 91.3 | 93.9 | -0.11 | 0.40 | 0.97 | 1.54 | 1.99 | 2.33 | 2.60 |
| -3.5 | 30.9 | 42.3 | 55.5 | 68.4 | 79.1 | 86.8 | 91.2 | -0.48 | -0.04 | 0.47 | 1.00 | 1.59 | 2.01 | 2.33 |
| -3.0 | 23.9 | 33.8 | 45.6 | 58.4 | 70.5 | 80.0 | 87.2 | -0.73 | -0.38 | 0.05 | 0.59 | 1.09 | 1.61 | 2.03 |
| -2.5 | 19.4 | 26.1 | 36.7 | 48.8 | 60.9 | 72.1 | 81.6 | -0.89 | -0.67 | -0.29 | 0.17 | 0.68 | 1.16 | 1.66 |
| -2.0 | 15.4 | 21.5 | 29.4 | 39.7 | 52.1 | 63.7 | 74.6 | -1.03 | -0.83 | -0.55 | -0.19 | 0.28 | 0.77 | 1.28 |
| -1.5 | 12.4 | 17.7 | 24.1 | 33.5 | 43.6 | 56.0 | 66.9 | -1.13 | -0.95 | -0.74 | -0.40 | -0.03 | 0.44 | 0.90 |
| -1.0 | 10.7 | 15.1 | 20.9 | 27.7 | 38.0 | 48.6 | 60.1 | -1.18 | -1.04 | -0.85 | -0.62 | -0.24 | 0.15 | 0.61 |
| -0.5 | 9.5 | 12.9 | 17.8 | 23.9 | 32.2 | 42.4 | 53.2 | -1.21 | -1.12 | -0.94 | -0.74 | -0.44 | -0.06 | 0.34 |
| 0.0 | 8.2 | 11.3 | 15.4 | 21.0 | 27.9 | 36.9 | 47.6 | -1.25 | -1.16 | -1.01 | -0.83 | -0.59 | -0.26 | 0.16 |
| Men | | | | | | | | | | | | | | |
| -4.0 | 27.9 | 41.0 | 53.0 | 64.8 | 74.8 | 82.6 | 88.1 | 0.26 | 1.08 | 1.88 | 2.75 | 3.61 | 4.41 | 5.00 |
| -3.5 | 20.4 | 31.7 | 43.1 | 54.2 | 65.1 | 74.7 | 82.9 | -0.21 | 0.46 | 1.19 | 1.91 | 2.74 | 3.56 | 4.37 |
| -3.0 | 16.1 | 24.3 | 33.9 | 45.1 | 54.9 | 65.7 | 76.1 | -0.50 | -0.03 | 0.57 | 1.29 | 1.93 | 2.76 | 3.61 |
| -2.5 | 12.5 | 18.9 | 26.4 | 36.4 | 46.5 | 56.6 | 68.8 | -0.70 | -0.37 | 0.08 | 0.70 | 1.35 | 2.02 | 2.94 |
| -2.0 | 9.9 | 15.1 | 21.0 | 29.0 | 38.7 | 48.8 | 60.3 | -0.87 | -0.58 | -0.24 | 0.25 | 0.83 | 1.49 | 2.27 |
| -1.5 | 7.9 | 12.0 | 17.1 | 23.8 | 31.6 | 40.9 | 51.7 | -0.96 | -0.76 | -0.48 | -0.06 | 0.39 | 0.97 | 1.66 |
| -1.0 | 6.5 | 9.9 | 13.9 | 19.3 | 25.8 | 34.0 | 44.9 | -1.03 | -0.89 | -0.64 | -0.33 | 0.04 | 0.53 | 1.16 |
| -0.5 | 5.5 | 8.2 | 11.6 | 16.4 | 21.8 | 28.9 | 38.4 | -1.07 | -0.95 | -0.78 | -0.51 | -0.18 | 0.22 | 0.78 |
| 0.0 | 4.9 | 7.1 | 10.3 | 14.3 | 19.1 | 25.7 | 33.4 | -1.10 | -1.01 | -0.86 | -0.61 | -0.34 | 0.03 | 0.45 |

Note: a negative YLL indicates years of life gained.

**Conclusions:** We have generated RLFR and YLL due to osteoporosis for Australians with different risk profiles using our osteoporosis health economics model. This modelling suggests that interventions targeted at reducing CRFs could be as important as those improving BMD for reducing life years lost.

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## P218

## ASSOCIATIONS OF RANKL AND OPG GENE POLYMORPHISMS IN ARAB WOMEN WITH AND WITHOUT OSTEOPOROSIS

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**Objective**: RANKL and osteoprotegerin (OPG) genes have been identified as susceptibility loci for postmenopausal osteoporosis in various populations. None of these have been investigated in the Saudi Arabian population. The present study aims to fill this gap.

**Methods**: A total of 372 postmenopausal Saudi women (osteoporosis group, N=174; without osteoporosis (control group), N=198) were screened for the presence of two single nucleotide polymorphisms (SNPs) in *RANKL* [rs2277438 (290A>G) and rs9533156 (-643C>T)] and two SNPs in *OPG* [rs2073618 (1181G>C) and rs3102735 (163T>C)] using TaqMan genotyping assays. BMD at lumbar spinal (LS) and femoral neck (FN) was measured using DXA. Anthropometrics were measured and fasting blood samples were taken for the assessment of serum 25(OH)D and bone markers.

**Results**: The distribution of genotype frequencies for *OPG* SNP rs2073618 (1181G>C) varied significantly among the two groups. The heterozygous genotype CG was found to occur less frequently in the osteoporotic group (36.8%) than in the control group (47%) (OR: 0.6, 95%CI: 0.3-0.097; p=0.041). There was no significant difference in the frequency distribution of genotypes or alleles with respect to *OPG* rs3102735 (163T>C), *RANKL* rs2277438 (290A>G), *RANKL* rs9533156 (-643C>T) gene polymorphisms. However, *OPG* rs3102735 (163T>C) genotypes showed significant differences in femoral BMD (p=0.04) among the osteoporosis patients. The *RANKL* rs2277438 (290A>G) heterozygote AG exhibited significantly lower levels of 25(OH)D than other genotypes in the osteoporosis group (p=0.02).

**Conclusion**: The results require confirmation but suggest a role of *OPG* rs2073618 (1181G>C) in the genetic susceptibility to osteoporosis among postmenopausal Saudi women.

## P219

## ASSOCIATIONS OF BONE METABOLISM MARKERS WITH NECK CIRCUMFERENCE IN ADULT ARAB WOMEN

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**Objective:** Body fat distribution is associated with decreased bone resorption and neck circumference (NC), a surrogate measure for upper body fat, has never been tested as a marker that can reflect bone turnover. This is the first study aimed to analyze the associations between NC and several bone biomarkers among adult Saudi women.

**Methods:** This cross-sectional study included a total of 265 middle-aged Saudi women [86 nonobese (mean age 52.7±8.1; mean BMI 26.9±2.3) and 179 obese (mean age 50.6±7.5; mean BMI 35.7±4.5)] recruited from primary care centers in Riyadh, Saudi Arabia. Anthropometrics included BMI, NC, waist and hip circumferences, total body fat percentage (%) and blood pressure. Biochemical parameters included glucose and lipid profile which were measured routinely. Serum levels of 25(OH) D, PTH, RANKL, sclerostin, C-terminal telopeptide of collagen I (CTX-I), Dkk1, IL-1β, osteoprotegerin, osteopontin and osteocalcin were measured using commercially available assays.

**Results:** In all groups, NC was inversely associated with PTH (R=-0.22; p<0.05) and positively associated with osteoprotegerin (R=0.20; p<0.05) even after adjustments for age and

BMI. Using all anthropometric indices as independent variables showed that NC was inversely and significantly associated only with CTX-I [β=-0.27 (-0.003-0.001); p=0.049]. In the nonobese, waist-hip ratio (WHR) was significantly associated with sclerostin (R=0.40; p<0.05) and body fat was significantly associated with osteopontin (R=0.42; p<0.05).

**Conclusion:** NC is modestly but significantly associated with bone biomarkers, particularly the bone resorption markers, among adult Saudi women. The present findings highlight the importance of NC as measure of upper body subcutaneous fat in influencing bone biomarker expression in adult females.

## P220

## ASSOCIATION OF GENETIC POLYMORPHISMS WITH OSTEOPENIA IN SAUDI POSTMENOPAUSAL WOMEN

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**Objective:** The RANKL/RANK/OPG pathway plays an important role in regulating bone remodeling and bone turnover. However, the association of the gene variants with BMD and osteopenia in Saudi postmenopausal women has not been reported yet. This study aims to investigate the distribution and associations of RANK, RANKL and OPG polymorphisms with osteopenia in Saudi postmenopausal women.

**Methods:** A total of 437 [223 osteopenia (age in years, 55.8 ±8.0) and 214 normal (age 53.5±6.0)] adult Saudi women were recruited for genetic analyses. Anthropometrics and fasting blood samples were taken for the assessment of routine glucose and lipids. They were screened for two polymorphisms; RANK (rs1805034 and rs35211496), RANKL (rs2277438 and rs9533156) and OPG (rs2073618 and rs3102735).

**Results:** No significant differences were found in BMI, WHR and diastolic blood pressure in both normal and osteopenia group. The odds ratio 2.37 (1.00-5.69) of RANK (rs1805034) indicates that patients with the CC genotype are at higher risk of developing osteopenia than the TT genotype. Similarly, RANKL (rs2277438), patients with AG genotype have a significant protective effect 0.36 (0.13-0.96) than the AA genotype. None of the OPG SNPs had a significant association with osteopenia.

**Conclusion:** The association of RANK polymorphisms with osteopenia shows its clinical importance in the diagnosis and prognosis of bone diseases. Here we suggest that patients with RANK polymorphisms may develop osteoporosis at an earlier age and as such should be considered high risk.

## P221

## DISCRIMINATION OF HIP FRACTURE TYPE FOR MEN WITH SPATIAL DIFFERENCES IN THE DISTRIBUTION OF BONE

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**Objective:** Little is known about the spatial distribution differences in volumetric BMD and cortical bone structure at the proximal femur between femoral neck fractures and trochanteric fractures. Fracture types play a distinct role in predictors, but few studies have subdivided fracture into types. Further, DXA-based methods or quantitative computed tomography (QCT) measures or combined assessments have shown limited ability in discrimination of hip fracture types.

**Methods:** In this case-control study, a total of 67 men with fragility hip fractures, 33 with femoral neck (FN) fractures (mean±SD age: 77.4±9.5 y) and 34 with trochanteric (TR) fractures (76.9±9.5 y), and 115 control subjects (71.0±6.3 y) were included for the comparisons. By using cortical bone mapping based on QCT data, we accurately assess the spatial distribution of cortical and trabecular bone related to hip fracture type. Differences in the spatial distributions of cortical BMD (CBMD), cortical bone thickness (CTh), cortical mass surface density (CM), and endocortical trabecular BMD were investigated using surface-based statistical parametric mapping (SPM). We compared these spatial distributions between controls and both types of fracture, and between the two types of fracture.

**Results:** Using SPM, we showed that all spatial assessments were significantly different in fracture cases vs. cohort in some specific regions, although CBMD, CTh and CM were not different in regions appropriate to fracture type. We also found spatially heterogeneous endocortical trabecular BMD differences between control subjects and subjects with hip fracture that varied by fracture type. SPM results of direct comparisons of two fracture types indicated that there were spatial differences in cortical thickness of specific regions of upper FN between FN and TR cases.

**Conclusions:** Our results suggested that focal cortical bone thinning might be more relevant in FN fractures and endocortical trabecular BMD might play a significant role in hip fracture

## P222

## OSTEOPOROSIS AND GASTROINTESTINAL DISEASES

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**Objectives:** Osteoporosis, a condition characterized by decreased bone strength, is prevalent among postmenopausal

women but also occurs in men and women with underlying conditions or major risk factors associated with bone demineralization. The aim of this study was first of all to identify the connection between osteoporosis/osteopenia and gastrointestinal diseases.

**Methods:** Obtaining and processing of patients started on 2013. The study group consisted of 200 patients, 194 female patients and 6 male patients, aged from 35-92 years old. These patients were patients of osteoporotic outpatient department in I. Department of Internal Medicine, in Mickiewizcova. Assessment of BMD (hip and spine) was investigated by the use of wholebody densitometer.

**Results:** From the 200 patients, 48 had osteoporosis and 152 had osteopenia. Moreover, 69 of them had a positive fracture history and the most common fracture was on upper extremities. In our survey, we found out that out of 200 patients 35% had associated osteoporotic fracture and 65% did not have. In an investigation, which was done in 2000, found that from 337 patients only 28% had associated osteoporotic fracture and 71% did not have any fracture [1]. In a study, which was done in 2002, about gastrointestinal diseases and osteoporosis they found out that the most common related gastrointestinal diseases to osteoporosis are inflammatory bowel disease, celiac disease, post gastrectomy [2]. According to our research, we discovered that out of 200 patients only one had celiac disease and only had post-gastrectomy. In another study was demonstrated that patients who received warfarin or heparin have an increased risk of developing osteoporosis, which complies with the result from our probe [3]. 27 patients received drugs that have an extremely strong connection with high risk of osteoporosis (e.g., levothyroxine sodium, warfarin, etc.).

**Conclusion:** Osteoporosis is a common disease and has become a major public health problem, especially in the USA and Europe, as the number of elderly people in the population has increased. Despite the profound effect of osteoporosis on the quality of life of millions of people, preventive measures and the various treatment options can be strategically used to minimize both the morbidity of the disease and its burden on society.

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## P223
## BONE EVOLUTION IN PATIENTS TREATED WITH TERIPARATIDE DUE TO OSTEOPOROSIS: NEW RISK OF FRACTURE

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**Objective:** Bone fractures, of any type, location or severity, cause resources and worsen the quality of life. They also bring about an increase in morbidity and mortality. Teriparatide is the treatment of choice in case of osteoporosis with fracture, objectifying both in studies and in real life, an optimal bone gain. In this study, the objective is to evaluate whether treatment with teriparatide (for 18-24 months) in patients with osteoporosis and fractures (low impact) decreases the risk of new fractures as a function of bone gain during the treatment period. Bone density with DXA will be assessed at baseline and at the end of treatment. We will include patients with more than six years since they finished treatment with teriparatide.

**Methods:** Prospective cohort study. Population under study: Patients who have received complete treatment with teriparatide (at least 18 months) for osteoporosis (criteria for BMD) and associated fracture, coming from the rheumatology clinic of the Hospital of Calahorra, with a reference population of 95000 people. The total was 138 patients (126 females and 12 males, all of them over 65 y of age except 4 (females) under the age of 65. Baseline variables: For each patient the following variables: -Clinical variables: Age, sex, time of known evolution of the disease, smoking, weight, height; -Biochemical variables: PTH, vitamin D, calcium, phosphorus, albumin, magnesium, urea, creatinine, TSH, alcaline phosphatase; -Other determinations: radiology of dorsal and lumbar spine and DXA (BMD). Clinical endpoint is the appearance of new bone fracture. Cohort follow-up: all patients are prospectively followed up until the onset of a new fracture, until their death or until the study closes. Follow-up period: start of follow-up in January 2005 and last patient included finished treatment in September 2015. The minimum observation period is 6 y after the end of treatment with teriparatide. All our patients received alter this treatment, three doses of intravenous zoledronic acid (once a year during 3 y) except 4 patients who were treated with denosumab instead because of contraindication. Statistical methods: the quantitative variables are described by their means and standard deviation or by their median and qualitative variables by frequency distribution. The comparison of quantitative variables will be done by student's t-test for independent samples and that of qualitative variables by chi-squared test, with linear trend test where appropriate. As proof of normality we will use the Kolgomorov-Smirnov test.

**Results:** We have not completed the collection of all the variables because we have many patients that have not completed the minimum followed up of 6 y after treatment yet. However, we notice that the tendency is to reduce the incidence of refracture in those with greater bone mass gain measured through DXA.

**Conclusion:** In case of reduction of refractures after treatment with teriparatide, cost-efficiency studies should be carried out in order to assess the indication of such treatment in patients at high risk of fracture without a previous low impact fracture.

## P224
## BONE MINERAL DENSITY EVOLUTION IN PATIENTS AFTER BARIATRIC SURGERY: FIVE YEARS OF FOLLOW-UP

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**Objective:** Bariatric surgery is an effective treatment for obesity, achieving a significant weight loss and the comorbidities that accompany this disease. Depending on the surgical technique, it is more or less frequent the appearance of nutritional and metabolic deficiencies. These deficits are more frequent when mixed surgical techniques are used, with a restrictive and malabsorptive component, such as gastric bypass or biliopancreatic diversion. Nutritional deficits are due to lower intake and also to malabsorption of fats and fat-soluble vitamins such as vitamins D or A, in addition to other micronutrients such as calcium. As a consequence, alterations in the bone mineral metabolism, the increase of the remodeling and the disorders of the bone mineralization can develop. In this study, the objective is to evaluate the state of BMD of patients after bariatric surgery and the evolution over time. We also want to evaluate the benefit of treatment with calcium, vitamin D and drugs if there is osteoporosis or even as a prevention.
**Methods:** Prospective cohort study. Population to study: Patients undergoing bariatric surgery in a hospital in Zaragoza. These patients are controlled at the endocrinology clinic specialized in bariatric surgery. Basal Variables: For each patient the following variables: -Clinical variables: age, sex, tall, smoking, weight, physical activity, BMD (by DXA), supplements of calcium and/or vitamin D and treatment for osteoporosis (byphosphonates, denosumab, teriparatide); -Biochemical variables: PTH, calcium, phosphorous, vit D, vit A, urea, creatinine, alkaline phosphatase, albumin, magnesium, urinary calcium and urinary phosphorus. Cohort follow-up: A prospective follow-up of all patients undergoing bariatric surgery is performed. BMD is performed after the intervention and every 2 y to see the evolution. It will be supplemented with calcium and vitamin D, maintaining them at normal serum levels (calcium: 8'4-10'2 mg/dL and vitamin D >40). Follow-up period: start of follow-up in September 2016. Statistical methods: quantitative variables will be described by their means and standard deviation or by their median and the qualitative through frequency distribution. The comparison of quantitative variables will be done by Student t-test for independent samples and that of qualitative variables by chi-square, with linear trend test where appropriate.
**Results:** In phase of data collection.
**Conclusion:** Alterations in bone metabolism such as vitamin D deficiency, calcium malabsorption and secondary hyperparathyroidism are frequent after bariatric surgery. In addition, there is a marked increase in bone remodeling and a loss of bone density following surgery which could be linked proportionally to weight loss. It would be of interest to know and quantify, with objective data, the evolution of the bone density of these patients, as well as the speed of deterioration of the same. Another question to be evaluated would be the cost-efficient benefit of an osteoformer/osteoprotective treatment at initial stages as primary prevention added to the already established supplementation with calcium and vitamin D.

## P225
## COMPARISON OF PAIN CONTROL AND SHORT AND LONG-TERM EFFECTIVENESS OF INTRA ARTICULAR INJECTIONS (CORTICOIDS VS. HYALURONIC ACID VS. PRP)

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**Objectives:** Osteoarthritis (OA) is the most common form of arthritis, affecting millions of patients worldwide. The pathogenesis is not fully understood, inflammatory and degenerative factors concurring towards slowly degradation of the joint cartilage. EULAR recommendations underline the use of non-pharmacological (lifestyle changes, rehabilitation medicine) and pharmacological methods for the management of knee OA. Intraarticular injection of corticoids is recommended especially in acute exacerbations with effusion in the knee, while intraarticular hyaluronic acid does not benefit from too many data in order to formulate a full recommendation. Our aims were:

- to compare effectiveness in short-term and long-term pain management between different modes of intraarticular treatment (corticoid, hyaluronic acid, PRP, combinations) of the knee;
- to compare the cost-efficiency of the metods previously mentioned;
- evaluation of immediate and long-term adverse events.

**Methods:** 100 patients with knee OA that presented between 1 January 2017 and 15 September 2017 were included in the analysis. 66 patients underwent intraarticular injections with corticoid (46 with betamethasone and 20 with triamcinolone), 26 patients with intraarticular hyaluronic acid (half in combination with corticoid) and 8 with PRP. Pain was evaluated on the patient VAS before and during the procedure, 1 d, 1-3 months and 6 months after the procedure. Range of motion was also evaluated by patient using a scale from 0-10. Ultrasound evaluation was performed in all patients before and after the procedure. Injection was done in the lateral parapatellar recesses of the knee, thickness of fluid accumulation being used as measurement. Statistical analysis was performed using EpiInfo and Jamovi software, applying ANOVA test analysis.

**Results:** There were reductions VAS of pain in all study groups after the procedure, differences between groups being seen in the persistency of pain control with and without oral NSAIDs, better early pain control being obtained with corticoids and late control being found in the other therapy groups (p=0.002). Improvement in the range of motion was unanimously noticed, being persistent over follow-up period. Ultrasound changes were noticed over the follow-up period, better control in fluid formation being seen in the corticoid and corticoid and hyaluronic acid group compared to the others (p=0.003). Other evaluations were made, such as reduction in NSAIDs use (declarative by patients), ability to perform better in household activities and to participate in other activities with family and hobbies.

**Conclusions:** More data will be needed to fully assess the potential of intraarticular injections and to formulate recommendations (e.g., big randomized cohorts, collaboration between different international centers with different approaches on the subject), especially in patient with acute exacerbation of knee OA. The present analysis does not suggest a superiority of any product, all of them should be used selectively in patients depending on the agreement between the physician and the patient. As a final conclusion: intraarticular injections are an efficient method of pain control, safe if all the precautions are made for good interventions and that improves quality of life in patients with knee OA.

## P226

## MODULATION OF THE WNT PATHWAY THROUGH INHIBITION OF CLK2 AND DYRK1A BY SM04690: A NOVEL POTENTIAL DISEASE-MODIFYING TREATMENT FOR KNEE OSTEOARTHRITIS

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**Objectives:** Wnt pathway upregulation contributes to osteoarthritis (OA) through differentiation of stem cells into osteoblasts, increased catabolic enzymes, and inflammation. SM04690, a novel small-molecule Wnt pathway inhibitor, previously demonstrated chondrogenesis and cartilage protection. SM04690 was evaluated in preclinical studies to determine its mechanism of action for Wnt pathway inhibition, chondrogenesis, and anti-inflammatory effects.

**Method:** Kinase activity was measured using Z-lyte and Lantha assays. Protein phosphorylation in human mesenchymal stem cells (hMSCs), chondrocytes, and synovial fibroblasts was measured by western blot. Expression of Wnt pathway and chondrogenic genes and LPS-induced inflammatory cytokines were measured in siRNA knockdowns in hMSCs and BEAS-2B cells by qPCR. *In vivo*, effects of SM04690 on inflammation, pain, and function were evaluated in rat OA models, followed by single intra-articular (IA) injection of SM04690 or vehicle.

**Results:** SM04690 primarily inhibited intranuclear kinases cdc-like kinase 2 (CLK2, $EC_{50}$: 5.8 nM) and dual-specificity tyrosine kinase (DYRK1A, $EC_{50}$: 26.9 nM). SM04690 inhibited CLK2-mediated phosphorylation of alternative splicing regulators, serine/arginine-rich (SR) proteins, and DYRK1-mediated phosphorylation of Sirt1 and FoxO1. siRNA knockdowns identified roles for 1. CLK2 and DYRK1A in Wnt pathway modulation with no effects on β-catenin and 2. CLK2 inhibition in early chondrogenesis with DYRK1A inhibition playing a role in enhancing late chondrocyte function. NFKB and STAT3 inhibition by SM04690 resulted in reduced inflammatory cytokines compared to controls. DYRK1A knockdown was sufficient, while combined DYRK1A/CLK2 knockdown enhanced DYRK1A knockdown anti-inflammatory effects. *In vivo* models showed SM04690 inhibited inflammatory cytokine production and expression of cartilage degradative enzymes, resulting in increased joint cartilage, decreased pain, and improved function.

**Conclusions:** Inhibition of CLK2 and DYRK1A by SM04690 demonstrated a novel dual mechanism for inhibiting the Wnt pathway, enhancing chondrogenesis, chondrocyte function, and anti-inflammation in rat models of knee OA. SM04690 shows potential as an agent which may improve structure, symptoms, and function of OA.

## P227

## EFFECT OF DIGITAL ORTHOPEDIC TECHNOLOGY-ASSISTED MIPPO IN THE TREATMENT OF PROXIMAL TIBIOFIBULAR FRACTURE

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**Objective:** To investigate the digital orthopedic technology-assisted MIPPO in the treatment of proximal tibiofibular fracture in patients.

**Methods:** 32 cases of proximal tibiofibular fractures were randomly divided into two groups: digital orthopedic technology assisted MIPPO group and MIPPO group, sixteen cases in each group. The patients in digital orthopedic technology-assisted MIPPO group use Minmics software to simulate reduction and fixation before operation, and to determine the surgical protocol. The patients in MIPPO group's operation plan was determined according to the imaging data. The incision length, operation time, bleeding volume, fluoroscopy times, hospitalization time, and first healing rate of the wound, functional reduction excellent rate, Johner-Wruhs excellent rate and the healing time of the fracture were compared between two groups.

**Results:** Between digital orthopedics technology-assisted MIPPO group and MIPPO group, there was no significant

difference in aspects of incision length [12±1.21 cm *vs.* 13.1 ±1.41 cm], wound healing rate (100% *vs.*100%), Johner-Wruhs excellent rate (93.8% *vs.* 87.5%), fracture healing time [3.1±0.2 m *vs.* 3.3±0.7 m]. There were significant differences in aspects of bleeding volume [50.21±3.1 mL *vs.* 78.2±2.7 mL], operation time [46.2±2.1 min *vs.* 67.2±2.1 min], fluoroscopy times (6.2±3.41*vs.*10.2±2.1), hospitalization time [8.2 ±.1.9 d *vs.* 11.2±2.1 d], excellent rate of fracture reset function (93.8% *vs.* 75.0%), P<0.05.

**Conclusion:** According to patient's condition, digital technology-assisted MIPPO could develop the best surgical plan, shorten operation time, reduce bleeding volume and fluoroscopy times, improve fracture reset function rate, it is worthy of clinical application.

## P229

## LOW LEVELS OF SEX STEROIDS ARE ASSOCIATED WITH ACCELERATED DETERIORATION OF CORTICAL MICROARCHITECTURE IN OLDER MEN

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**Objective:** To study the relationship between baseline sex steroids levels and bone microarchitecture prospectively assessed in older men.

**Method:** 823 men older than 60 years old were followed during 8 y. At baseline, total estradiol (17βE2) and total testosterone (tT) were measured and bioavailable estradiol (bio-17βE2) and apparent free testosterone concentration (AFTC) were calculated. Bone microarchitecture at distal tibia and distal radius was assessed by HR-pQCT at baseline, then after 4 and 8 y.

**Results:** Men in the lowest quartile of tT (<8.7 nmol/L) had more rapid decrease in cortical area (Ct.Ar), thickness (Ct.Th) and volumetric BMD (Ct.vBMD) at the radius and the tibia (p<0.05 for all) vs. men in the highest quartile. Findings for 17βE2, AFTC and bio-17βE2 were similar: at the distal radius, men in the lowest quartile of each of the three above hormones had more rapid decrease in Ct.Ar, Ct.Th and Ct.vBMD vs. the highest respective quartile (p<0.05). At the distal tibia, total vBMD and bone mineral content decreased, whereas trabecular area increased, more rapidly in the lowest bio-17βE2 quartile vs. the highest one (p<0.005, p<0.01 and p<0.005, respectively). The findings were similar for AFTC. Finally, men having both AFTC (<190 pmol/L) and bio-17βE2 (<28 pmol/L) in the lowest quartile (high risk group) had faster bone loss compared to men with levels of each hormone in the three upper quartiles jointly "reference group). For instance, Ct.Th decreased more rapidly in the high risk group vs. the reference group at the distal radius (2.61±0.25 vs. 1.35±0.44%/y, p<0.01) and at the distal tibia (1.46±0.20 vs. 0.49±0.35%/y, p<0.005).

**Conclusion:** In a cohort of 823 older men followed-up prospectively for 8 y, low levels of AFTC and bio-17βE2, and less importantly tT and 17βE2, are associated with accelerated deterioration of cortical bone.

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## P230

## CIRCULATORY PATTERN OF CYTOKINES, ADIPOKINES AND BONE MARKERS IN POSTMENOPAUSAL WOMEN WITH LOW BMD

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**Objective:** In addition to some well characterized bone turnover markers, cytokines and adipokines have also been suggested to be linked to osteoporosis seen in menopause. However, there is much controversy on the possible association between these markers and BMD. This study was aimed at measuring circulatory levels of selected cytokines and adipokines in postmenopausal women with normal and low BMD.

**Methods:** The study population included 71 postmenopausal women, 25 of whom 25 had normal BMD, 31 had osteopenia and 13 had osteoporosis. Circulatory levels of selected proresorptive (TNF-a, IL-1b, IL-6, IL-8, IL-12, IL-17), antiresorptive (IFN-g, IL-4, IL-10, IL-13, TGF-b) and five adipokine markers (adiponectin, adipsin, lipocalin-2/NGAL, PAI-1 and resistin) were measured using the multiplex system and read on the Magpix ELISA platform. Further, two bone turnover markers (PINP, CTX) as well as estradiol levels were assayed from the same samples.

**Results:** While circulatory levels of cytokines were comparable between groups, women with low BMD had statistically significantly higher median circulatory levels of adipokines as compared to those with normal BMD. Further, while levels of CTX were not different between the two groups; PINP, PINP/CTX ratio and estradiol levels were significantly lower in women with low BMD. Levels of adiponectin, PINP, PINP/CTX ratio and estradiol correlated significantly with BMD of the hip and spine.

**Conclusion:** While the associations between the studied markers and BMD may be complex and multivariate, our data provide insights into the possible use of circulatory levels of cytokines, adipokines and bone turnover markers on the pathogenesis of postmenopausal osteoporosis.

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## P231
## CASE REPORT: APLICATION OF RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY IN FORMER ATHLETE WITH PLANTAR FASCIITIS

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**Objective:** Plantar fasciitis (PF) is a problem that is affecting a majority of people who are former athletes. The cause includes inflammation and degeneration of the plantar fascia. These days, the treatment options available include autologous plasma transfusions, corticosteroid injections, physiotherapy and radial extracorporeal shock wave therapy (RESWT). Our aim was to evaluate the effectiveness of radial shockwave therapy in male patient suffering from PF.
**Method:** 52 years old sport coach former footballer with diagnosed PF on the right foot. He had foot pain for 3 months. Initially he used nonsteroidal anti-inflammatory drugs for 3 weeks. The pain decreased but was still present and affected daily activities. The treatment included RESWT application and stretch exercise. RESWT with continual frequency was applied once a week, a total of 5 sessions. The pain was determined by a visual analogue scale for pain and functional ability with foot function index (FFI) before therapy and at $6^{th}$ week after the start of the treatment. At the end of the patient follow-up the score on VAS was decreased and there was significant improvement in the FFI score.
**Conclusion:** RESWT is safe, alternative treatment for PF. Further studies are needed which includes more patients to show the role of RESWT.

## P232
## RELATIONSHIP OF THYROID LESIONS AND RHEUMATOID ARTHRITIS

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**Objective:** Rheumatoid arthritis (RA) is one of the most urgent problems of modern rheumatology. It affects people of predominantly Mature, most able-bodied age and leads to their early disability. Currently, RA is considered as a systemic disease that leads to damage not only to the joints, but also to the internal organs. Changes in the functional state of the thyroid gland in patients with RA are recognized by many scientists. The range of lesions is 9.8-34% against 0.4-2% in the general population. Some researchers indicate a decrease in the functional activity of the thyroid gland in a significant part of patients with RA, more pronounced in systemic manifestations of the disease. Others determined in these patients increased thyroid function in 9.8-21% of cases, and only 2% hypothyroidism. The aim of our work is to study the data on the functional activity of the thyroid gland in RA, as well as to assess the degree and nature of thyroid lesions in RA in patients undergoing inpatient treatment in the Hospital № 25.
**Methods:** We examined 43 patients (including 33 women and 10 men) who are on hospital treatment in the rheumatology Department of the Ministry of HEALTH № 25 with a confirmed clinical and laboratory diagnosis of RA. The average age of patients was 54.68 y. The articular form of the disease was noted in 32 patients, articular-visceral in 11 people. The average duration of the disease 10, 5 y. Data patients the study was conducted rheumatoid factor, CEC, antinuclear factor and thyroid function, including determination of the amount of thyroid hormones - TSH, FT4 (ELISA).
**Results:** Our examination revealed 28 seropositive patients (positive RF) (20 women and 8 men) and 11 patients (10 women and 1 man) had positive ANF. In these patients, thyroid pathology was found in 6.97% at 0.4-2% in the general population. The most common form of thyroid lesions (according to the clinical and quantitative changes of thyroid hormones – TSH and FT4 – autoimmune thyroiditis, Hashimoto's syndrome hyperthyroidism. An important place among the mechanisms of joint damage in RA is given to the so called "proinflammatory " cytokines: IL-1, TNF, which synthesized in excess by the cells of the synovial membrane have a variety of pathological effects on the components of the joint, thereby causing the degradation of cartilage. These substances can also enhance immune responses, although their direct impact on thyroid cells is not excluded. In turn, thyroid hormones T3 and T4, have a stimulating effect on the functions of the immune system cells. In conditions of deficiency Of t-suppressor function of lymphocytes in RA, there are other clones of T-lymphocytes, which promote the synthesis of antibodies to thyroid components, the main of which are IG class G, as well as rheumatoid factor. They interact with the receptors of thyrotropin and stimulate the production of thyroid hormones. Therefore, with an increase in the number of RF, an increase in the number of thyroid hormones - T3 and T4, respectively, should be expected.
**Conclusion:** From this it follows that the problem of thyroid pathology in RA remains relevant to this day, since the percentage of its damage may be higher, since the formation of autoantibodies occurs in RA, which can block freely circulating thyroid hormones, thus masking the presence of a pathological process in the thyroid gland.

## P233
## CLINICAL CHARACTERISTICS OF OSTEONECROSIS OF THE JAW IN OSTEOPOROTIC PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** To evaluate clinical characteristics of osteonecrosis of the jawin osteoporotic patients with rheumatoid arthritis.

**Methods:** Four female patients (average age 75.2 years old) were referred to the Diabetes and Rheumatic Diseases Center of Asahikawa Medical Center, Japan, for osteonecrosis of the jaw in osteoporotic patients with rheumatoid arthritis. Steinbrocker of stage was II; three, III; one. Steinbrocker of class was 2; two, 3; two. The averages of RA duration, disease activity score 28-ESR, mHAQ in four rheumatoid arthritis patients with osteonecrosis of the jaw were 14.75 y, 3.32 and 0.69, respectively. The mean titers of rheumatoid factor and anticitrullinated protein antibody were 404.7 IU/ml and 195.5 U/ml, respectively.
**Results:** Four osteoporotic rheumatoid arthritis patients developed typical osteonecrosis of the jaw signs and symptoms, such as bone exposure, and pain and swelling at different sites of the mandible. Only one patient was diagnosed as surgical-triggered osteonecrosis of the jaw as the patient referred tooth extractions. Antiresorptive agents were used in three patients with osteonecrosis of the jaw. The mean duration of anti-resorptive agents was 30 months, one patient; ibandronate and two patients; denosumab. Three patients had received mean 5.5 mg of prednisolone daily. Two patients were provided with treatment of conservative management with the use of daily hydrogen peroxide mouthwash and antibiotics, the other two patients were needed for surgical management of debridement of necrotic bone.
**Conclusions:** We have reported four osteonecrosis of the jaw patients with osteoporotic rheumatoid arthritis. Clinical characteristics of osteonecrosis of the jaw in osteoporotic rheumatoid arthritis patients were clinically characterized that the mean treatment duration with anti-resorptive agents was less than that reported for postmenopausal osteoporosis. In collection, rheumatologists and dentists should cooperate possible early to improve dental health in rheumatoid arthritis patents.

## P234
## NONPHARMACOLOGICAL AND NONSURGICAL INTERVENTIONS TO MANAGE PATIENTS WITH KNEE OSTEOARTHRITIS: WHAT'S NEW?

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**Objective:** Update the last known umbrella review and summarize the available high quality evidence from systematic reviews on the effectiveness of nonpharmacological and nonsurgical interventions for patients with knee osteoarthritis (OA).
**Methods:** The systematic reviews were identified through electronic databases, such as MEDLINE, Embase, Physiotherapy Evidence Database (PEDro), The Cochrane Library, SciELo, Science Direct, Google Scholar, Research Gate and B-ON. The studies' selection respected the following terms to guide the search strategy using the P (humans with knee OA) I (nonpharmacological and nonsurgical treatments) C (pharmacological, surgical, placebo, no intervention, or other nonpharmacological/nonsurgical conservative treatments) O (pain, functional status, stiffness, inflammation, quality of life and patient global assessment) model.
**Results:** Following the PRISMA statement, 41 systematic reviews were found on the electronic databases that could be included in the umbrella review. After methodical analysis (R-AMSTAR), only 35 had sufficient quality to be included. There is good evidence that standard exercise programs can reduce pain and improve physical function in patients with knee OA. Additionally, there is moderate evidence for acupuncture, aquatic exercise, electroacupuncture, interferential current, kinesiotaping, manual therapy, moxibustion, pulsed electromagnetic fields, tai chi, ultrasound, yoga, and wholebody vibration. For other interventions, the quality of evidence is low or did not show sufficient efficacy from the systematic reviews to support their use.
**Conclusion:** Comparing to the last known umbrella review, similar results were achieved on acupuncture and exercise interventions to improve the patients' pain, stiffness, function and quality of life, but different results were found regarding the utilization of transcutaneous electrical nerve stimulation and low-level laser therapy as they do not improved the patients' pain and physical function.

## P235
## EFFICACY OF DENOSUMAB IN PATIENTS WITH AROMATASE INHIBITOR INDUCED BONE LOSS

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**Objective:** Aromatase inhibitors are associated with accelerated bone loss over the 3 y treatment period. The aim of our study was to assess the efficacy of denosumab in estrogen receptor-positive (ER+) breast cancer patients with aromatase inhibitor induced bone loss.
**Methods:** 42 postmenopausal Caucasian women (48-71 y) with BMD T-score ≤-2,5 were enrolled in the study. All of them were receiving aromatase inhibitors (AIs): anastrozole or letrozole for 3-5 y. We have measured BMI, calcium ionized (Ca++), 25(OH)D values, lumbar spine (LS) and total hip BMD values were obtained using DXA. All patients received 60 mg denosumab injections + elemental calcium 1000 mg/d (calcium carbonate) + Vit D 800-1000 IU/d for 24 months. BMD was measured at the baseline and after 2 y from the initiating treatment.
**Results:** After 2 y of commencing treatment majority of patients (78%) revealed significant increase of BMD with mean value of 4.3% at LS and 3.6% at PF.
**Conclusion:** Administration of 60 mg denosumab injections every 6 months effectively increases BMD at LS and PF in patients with ER+ breast cancer patients with aromatase inhibitor induced bone loss.

## P236
## POTENTIAL EFFECTS OF REACTIVE OXYGEN SPECIES

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**Objective:** Reactive oxygen species (ROS) or free radicals are one of the major offenders to provide oxidative damage to biological macromolecules. These unstable ROS are known to cause or aggravate a variety of chronic diseases such as cancer, cardiovascular diseases, arthritis, neurodegenerative diseases as well as aging, diabetes, obesity, and also other less known pathologies.
**Methods:** ROS correspond to a type of unstable molecules that contains oxygen and that easily reacts with other molecules in a cell. A significant increase of ROS in cells may cause damage to DNA, RNA, and proteins, and may cause cell death. Most ROS are generated as byproducts during mitochondrial electron transport. The sequential reduction of oxygen through the addition of electrons leads to the formation of a number of ROS including superoxide, hydrogen peroxide, hydroxyl radical, hydroxyl ion, and nitric oxide.
**Results:** Tumor cells of another kind of activated cells can also express increased levels of antioxidant proteins to detoxify from ROS, suggesting that a delicate balance of intracellular ROS level is required for cancer cell function, in this pathological process. As such a number of defense mechanisms have evolved to meet this need and provide a balance between production and removal of ROS. An imbalance toward the prooxidative state is often referred to as oxidative stress. Cells have a variety of defense mechanisms to improve the harmful effects of ROS. Superoxide dismutase (SOD) catalyzes the conversion of two superoxide anions into a molecule of hydrogen peroxide and oxygen. In the peroxisomes of eukaryotic cells, the enzyme catalase converts hydrogen peroxide to water and oxygen, and thus completes the detoxification initiated by SOD. Glutathione peroxidase is a group of enzymes containing selenium, which also catalyse the degradation of hydrogen peroxide, as well as organic peroxides to alcohols.
**Conclusion:** There are a number of nonenzymatic small molecule antioxidants that play a role in detoxification. Glutathione may be the most important intracellular defense against the deleterious effects of ROS.

## P237
## FINDINGS OF THE TRABECULAR ANALYSIS BONE SCORE (TBS) OF BONE DENSITOMETRY (DXA) OF WOMEN AFTER 65 YEARS WITHOUT OSTEOPOROSIS DIAGNOSIS

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**Objective:** To analyze DXA exams of women aged 65 y and older, without diagnosis of osteoporosis using the categorization of the TBS and the correlation with the femoral neck T-score.
**Method:** A retrospective cross-sectional study of 139 DXA lumbar spine and proximal femur examinations performed between January and June 2014 of postmenopausal women with a mean age of 69.6 y (65-86 y), without a diagnosis of osteoporosis, using equipment GE Prodigy Primo, enCORE version 13.60 software, and TBS iNsight® software version 2.2.0.0.
**Results:** Of the 139 women analyzed, 81 had normal TBS (≥1,350) with 76.6% (n=62) with a diagnosis of low bone mass, 16.2% (n=10) of this group with T-score of colo ≤ -2.0DP. Among the osteopenic women with a neck T-score >-2.0 DP (n=52) 19.2% presented lumbar spine T-score <-2.0 DP. Of the 52 women in the partially degraded TBS group (1,200 <TBS <1,350), 76.9% (n=40) had low bone mass and among them 30% (n=12) the T-score of the neck was ≤-2.0 DP. Out of the 6 women in the degraded TBS group (TBS ≤1,200) only one had T-score <-2.0 DP and 50% (n=3) presented lumbar spine T-score <-2.0 DP.
**Conclusion:** Additional TBS analysis may help by adding information that reflects bone microarchitecture not accessible to DXA, which may aid in predicting fracture risk and therapeutic decision making. In patients with low bone mass where the lowest T-score is >-2.0 DP, the associated findings of partially degraded or degraded TBS may improve the therapeutic approach and influence monitoring.

## P238
## OSTEOARTHRITIS AND CARDIOVASCULAR DISEASE IN POSTMENOPAUSAL PATIENTS: THE VICIOUS CYCLE

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**Objective:** Cardiovascular disease (CVD) and osteoarthritis (OA) are two common diseases in the postmenopausal period and they may be associated in many ways. Both share common risk factors including age, obesity, hypertension, cholesterol, diabetes, exercise, smoking and diets. Studies have shown that the metabolic syndrome (MetS) causes systemic inflammation, increasing the risk of CVD and OA. Drop of oestrogen after menopause causes vessel stiffness, dyslipidemia and change in joint homeostasis. Physical inactivity due to joint pain and muscle weakness and use of NSAIDs for treating pain may increase CVD risk. The objective of this report is to determine the relationship between OA and CVD in our group of patients.
**Methods:** 142 postmenopausal female patients with OA, aged 50-88 y were recruited. BMI was calculated (25-30 kg/m$^2$ for overweight and >30 kg/m$^2$ for obesity) and presence of diabetes type 2 (T2D), dyslipidemia, hypertension,

myocardial infarction (MI), angina, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), therapy with NSAIDs and smoking status were observed. MetS was defined by the sum of metabolic factors ≥3.

**Results:** The mean age of OA female patients was 69 y, postmenopausal and with BMI >25 kg/m$^2$ (overweight and obese). Hypertension was present in 129 (91%), T2D in 43 (30%), angina in 14 (9.8%), MI in 7 (4.9%), CHF in 17 (12%), dyslipidemia in 71 (50%), MetS in 67 (47%), COPD in 20 (14%), NSAIDS were regularly used in 70 (49%) and 19 (13%) patients were smokers.

**Conclusion:** Our findings suggest that OA may be positively associated with any heart disease in postmenopausal women. Reducing the common risk factors will be beneficial for both conditions.

## P239
## METABOLIC SYNDROME IN HAND AND KNEE OSTEOARTHRITIS

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**Objective:** Osteoarthritis (OA) is a progressive disease, characterized by breakdown, inflammation and loss of cartilage in the joints. Obesity causes cartilage degeneration through mechanical overloading in weight-bearing joints. White adipose tissue has been identified as the source of factors (cytokines, adipokines, etc.) creating a state of chronic low-grade inflammation and having a direct systemic effect on joints. This is especially characteristic for obese, older individuals and postmenopausal women, the populations at high risk for both metabolic syndrome (MetS) and OA. The MetS is a cluster of factors such as: dyslipidemia, type 2 diabetes (T2D), central obesity and hypertension. Growing evidence have been linking hand and knee OA to the MetS. The aim of this report is to show how these facts apply to our group of patients.

**Methods:** 142 female patients with OA, aged 50-88 y were recruited. Cases of interest were those with hand and knee OA. BMI >30 kg/m$^2$, presence of T2D, dyslipidemia and hypertension were observed. MetS was defined by the sum of metabolic factors ≥3.

**Results:** From the total number of 142 patients, 73 (51.4%) had knee OA, 16 (11.3%) had hand OA and 13 (9.1%) had both forms. In 45 patients (60%) 3 or more risk factors were identified. 25 patients (33%) had T2D, dyslipidemia was found in 36 (47%). Obese patients with knee OA were 57 (78%), and with hand OA, 15 (93.7%). Hypertension was present in 64 (87.7%) or 45% of the total number of OA patients.

**Conclusion:** Our results suggest that the systemic effect of MetS plays a very important role in the development of hand and knee OA in obese postmenopausal women.

## P240
## A PROSPECTIVE, RANDOMIZED MULTICENTER STUDY COMPARING RIGID- AND SOFT-BRACE TREATMENT FOR ACUTE OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE

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**Objectives:** Bracing is the standard conservative treatment for acute osteoporotic compression fracture; however, the efficacy of different brace treatments has not been extensively studied. We aimed to clarify and compare the preventive effect of the different brace treatments on the deformity of the vertebral body and other clinical results in this patient cohort.

**Methods:** This multicenter nationwide prospective randomized study included female patients aged 65-85 y with acute one-level osteoporotic compression fractures. We assigned patients within 4 weeks of injury to either a rigid- or soft-brace treatment. Main outcome measure was the anterior vertebral body compression percentage (range 0 [completely collapsed] to 100% [not collapsed]) at 48 weeks. Secondary outcome measures included scores on the European Quality of Life-5 Dimensions (EQ-5D-3L, range -0.111 [worst possible] to 1 [best possible]), visual analog scale for low back pain (range 0 to 100 with higher scores indicating severe pain), and Japanese Orthopaedic Association Back Pain Evaluation Questionnaire at 12-month follow-up duration.

**Results:** In total, 141 patients were assigned to the rigid-brace and 143 patients were assigned to the soft-brace groups. There were no statistically significant differences in the primary outcome and secondary outcome measures between groups.

**Conclusion:** Among patients with fresh vertebral compression fractures, the 12-week rigid-brace treatment did not result in statistically greater prevention of spinal deformity, better quality of life, and lesser back pain than the soft-brace treatment. Therefore, the routine use of custom-made rigid-brace for acute vertebral compression fractures is not justified.

## P241
## BONE COLLAPSE IN OSTEOPOROTIC PATIENTS WITH RADIUS DISTAL FRACTURES

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**Objective:** Describe the importance of osteoporosis in radius distal fractures and the posterior collapse. Radius distal

fractures are 1/6 of all body´s fractures. 90% are Colles´ fracture. There are three peaks of age where these fractures occur more frequently, although where more find them are in patients older than 70 years through a mechanism of low energy. They tend to be extraarticular fractures, with dorsal and radial displacement of the distal radius fragment. They require a closed reduction by traction and an immobilization with plaster ferula or plater orthopedic. It is imperative the realization of control x-rays after fracture´s reduction for the evaluation of treatment options. If the final treatment is orthopedic, we must follow the patient exhaustively in consultation and we consider that the secondary displacement can appear in this patient.

**Methods:** We present the case of a radius distal fracture in a female patient aged 75 treated orthopedically. The subsequent follow-up showed the displacement and collapse of the fracture.

**Results:** We decided to review in the literature and the authors found that the initial dorsal angulation, radial length, and patient age were predictors of malunion and displacement. Authors ported the following as predictors of fracture instability: age (>60 y), dorsal angulation (>20°), dorsal comminution, intra-articular fracture (radiocarpal joint surface), and associated ulnar fracture.

**Conclusion:** Patient age is predictor of late instability, as there were increased number of patients with late fracture collapse who were over 70 years old. Osteoporosis leading to bone comminution is the main factor of this collapse. With aging, the solid cortical segments of bone become brittle, and the porous trabecular bone takes a significant role in load transmission.

## P242

## ASSOCIATION OF MUSCLE STRENGTH AND FAT TO MUSCLE RATIO WITH GLUCOSE TOLERANCE TEST DURING SECOND TRIMESTER OF PREGNANCY

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**Objective:** To evaluate the association of fat to muscle ratio, and muscle strength with glucose response during a glucose tolerance test in pregnant women participating in a screening program of gestational diabetes.

**Methods:** It was performed an observational prospective cross sectional study. We evaluate pregnant women between 24-28 weeks of gestation. All patients were evaluated through a physical medical history and physical exam. Corporal composition were measured using (BC-533; Tanita, Tokyo, Japan). Hand grip strength was measured by a dynamometer Takei Scientific Instruments C., Ltd. (Niigata-City, Japan). A 75-g oral glucose tolerance test (OGTT) was performed, plasma glucose were measured before and at 60 and 120 min after the ingestion of 75 g of glucose. The diagnosis of gestational diabetes was made using the criteria outlined by the American Diabetes Association. Statistical tests were performed using SPSS version 14 for Windows, Chicago, IL, USA

**Results:** A total of 231 patients were included. The mean age was 26.09±6.8 y. The prevalence of gestational diabetes were 12.1%. In the hand grip test patients with gestational diabetes (GD) seems to have more muscle strength compared with normal glucose tolerance test women (NGTTW) (23.14 ±5.05 vs. 25±4.9) (P<0.010). To evaluate body composition and the impact of muscle mass in oral glucose tolerance test we calculate the fat to muscle ratio (FTMR). Patients with a positive test to GD has a statistical difference FTMR compared with NGTT (0.753±0.16 vs. 0.568±0.168) (p<0.005) When we evaluate the prevalence of a positive test to gestational diabetes in the different tertiles of FTMR we found that prevalence is higher in tertile 3 compared with tertiles 1 and 2. (tertile 1: 2.6%, tertile 2: 9.1%, tertile 3: 24.6%) (p<0.005). When we evaluate the glucose response FTMR tertile 3 patients has lower tolerance to glucose during the OGTT (Figure 1).

**Conclusion:** Fat to muscle ratio is associated with glucose tolerance test response in pregnant women and higher prevalence of gestational diabetes diagnostic

## P243

## EFFECT OF DENOSUMAB OR TERIPARATIDE ON CIRCULATING NOGGIN LEVELS IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS

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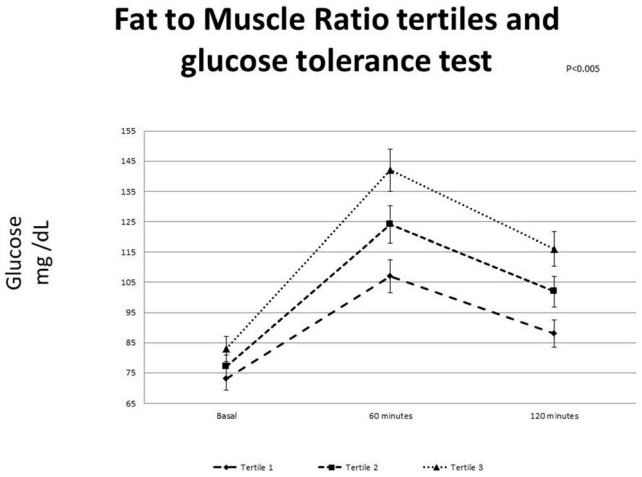
**Objective:** Noggin inactivates bone morphogenetic proteins (BMPs), possibly exerting negative effects on the skeleton. We aimed to compare the effect of agents with opposite impact on bone turnover (denosumab vs. teriparatide) on noggin circulating levels.

**Methods:** This was an observational, open label, non-randomized clinical study. Postmenopausal women with low bone mass were treated with either denosumab

(n=30) or teriparatide (n=30). Noggin, BMP-2, BMP-4, procollagen type I N-terminal propeptide (PINP) and C-terminal crosslinking telopeptide of type I collagen (CTx) were measured in serum samples obtained at baseline, three and twelve months after treatment initiation. Prevalent fractures were recorded at baseline and lumbar spine BMD (LS BMD) was measured at baseline and twelve months.

**Results:** Noggin levels remained unchanged after either denosumab or teriparatide treatment. Baseline noggin levels were not different between women with vs. without previous antiosteoporotic treatment, or between those with vs. without vertebral or nonvertebral fractures and were not correlated with age or LS BMD. At 12 months, noggin levels were positively correlated with PINP within the denosumab ($r_s$=0.47; p=0.014), whereas negatively within the teriparatide group ($r_s$=-0.43; p=0.019).




**Conclusions:** In postmenopausal women with low bone mass noggin levels were not correlated with bone parameters at any time point, except with PINP at 12 months, and remained stable with both denosumab and teriparatide treatment.

## P244
## MONTHLY IBANDRONATE TREATMENTS RAPIDLY SUPPRESS BONE RESORPTION MARKERS WITHOUT EXCESS

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**Objective:** We previously reported the efficacy of monthly oral ibandronate (IBN) 100 mg in a phase II dose-finding study [1], and the noninferior efficacy of oral IBN 100 mg to monthly intravenous (IV) bolus IBN 1mg in the randomized, double-blind, phase III MOVEST study [2]. However, oversuppression of bone metabolism is a common concern with IV bolus bisphosphonates. Here, we describe the efficacy of the two IBN formulations with respect to the suppression of bone resorption markers.

**Methods:** Ambulatory Japanese patients aged ≥55 y with primary osteoporosis were randomized to receive monthly oral IBN 100 mg plus monthly IV placebo, or monthly IV IBN 1mg plus monthly oral placebo in the MOVEST study. The primary endpoint was noninferiority of oral vs. IV IBN with respect to BMD gains at the lumbar spine after 12 months. Changes in the bone resorption markers urinary CTX (uCTX), serum TRACP-5b, and urinary NTX (uNTX) were examined at baseline, 1, 3, 6, and 12 months. In the dose-finding study, relative changes in uCTX were measured throughout the dosing period.

**Results:** The mean relative changes from baseline in uCTX, serum TRACP-5b, and uNTX were similar with both IBN formulations. Suppression of uCTX occurred rapidly, with maximum suppression reached within approximately 1 week [1]. Levels of the three bone resorption markers remained above the lower end of the reference value ranges (defined in healthy Japanese women). In the dose-finding study, uCTX values appeared to return to baseline levels prior to each monthly drug administration. These results suggest that IBN treatment did not result in oversuppression of bone turnover.

**Conclusions:** Monthly IBN treatments resulted in the suppression of bone resorption markers without excess. These data highlight to clinicians the potential benefits of this agent.

**References:**

1. J Bone Miner Res 2007;22(Suppl.1):S333
2. Osteoporos Int 2015;26:2685.

## P245
## SARCOPENIA AND OSTEOPOROSIS IN ECUADORIAN PATIENTS

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**Objective:** Sarcopenia is defined as an abnormal loss of muscle mass associated with aging. It has been validated that sarcopenia can predict functional deterioration. The objective of this study is to determine the diagnosis of sarcopenia by conventional methods and gold standard in patients who have undergone a densitometric study.

**Methods:** Prospective observational study of patients with a densitometric study who visited a rheumatology center, to whom anthropometric and densitometric measurements were taken in order to determine sarcopenia.

**Results:** 93 patients were studied, of which 78 had a bone densitometry study (BMD). According to the BMD study, 19% were normal, 26% osteopenia and 55% osteoporosis. The mean age was 62.8±7.2, 88% women and 12% men. 67% presented sarcopenia according to the gold standard. 12% of the normal group, 23% of osteopenia and 65% of osteoporosis. Anthropometric measures were determined, the mean BMI of the normal group, osteopenia and osteoporosis was 26.54±4.69, 28±4, 24±5, respectively. Three tests were performed in addition to the gold standard (Figure 1). The mean of 4m walk test in the normal group, osteopenia and osteoporosis was 0.78±0.22, 0.74±0.34, 0.91±1.29, respectively. 53%, 35% and 42% presented sarcopenia. The mean of the muscle strength test (dynamometer) in the groups was 20.23±7, 24.23±16.69, 18±7.16 mmHg, of which 33%, 55% and 70% had sarcopenia. The mean of the SARC-F screening questionnaire in the groups was 3.3±3.2, 4±2.4, 2.7±1.8, respectively, of which 20%, 33% and 16% presented sarcopenia. According to the measurement of muscle mass by DXA (Figure 2), the mean MMAE in the groups was 17.96 ±3.74, 16.63±4.15, 15.28±3.29 kg, respectively. IMMAE 7.31±1.04, 6.72±1.16, 6.63±1.13 kg/m$^3$. Total skeletal muscle mass was 23.89±4.98, 22.12±5.52, 20.33±4.33 kg. A statistically significant relationship was found between sarcopenia and bone loss [0.004].

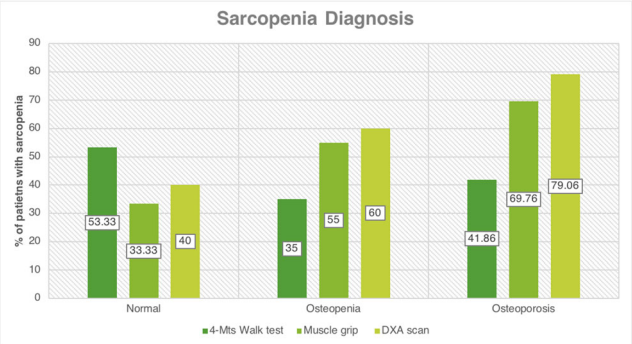


**Figure 1.** Diagnosis of sarcopenia according to the 4m walk test, muscle grip and DXA scan tests.

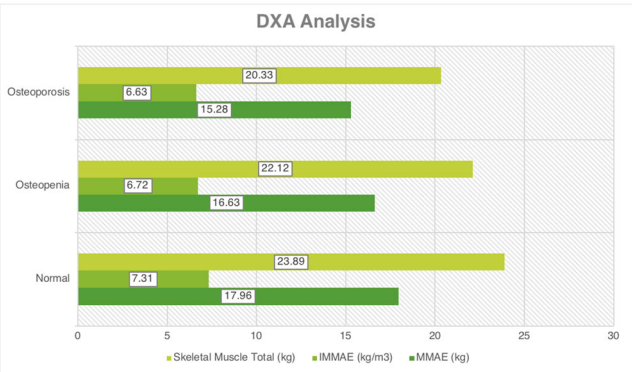


**Figure 2.** Diagnosis of sarcopenia according to densitometric scales.

**Conclusions:** 67% of the studied population presented sarcopenia, it is evident that the prevalence of sarcopenia is higher in patients with greater loss of bone mass. Because they are two prevalent entities in older populations, protocols that include the management of them are required.

## P246
## EFFICACY OF A PROTOCOL IMPLANTATION FOR THE PREVENTION OF A NEW FRAGILITY FRACTURE: EFFECTS ON VITAMIN D IN HIP FRACTURED PATIENTS

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**Objectives:** To compare the vitamin D levels in patients with fragility hip fracture before and after implantation of the secondary prevention protocol of a new fragility fracture

**Methods:** A retrospective analysis of patients with hip fragility fractured after the implantation of the new protocol between June 2016 and November 2017 is performed. With the new protocol implantation all fragility fractured patients start treatment with calcium and vitamin D at discharge. Control group were patients treated for consecutive hip fracture in 2012, when the protocol was not been established yet. Inclusion criteria were: age over 65 y and fracture of the hip due to fragility excluding metastatic fractures The following variables were analyzed: age, gender, side, history of previous fragility fractures, previous treatment, new fractures, mortality, vitamin D level at admission and at 3 months.

**Results:** Results regarding sex side and gender were comparable in both groups. Protocol group included 196 patients, with a mean age of 85.4 y. 30.61% had a previous fracture, 11.22% being hip. 11.74% had previous treatment for osteoporosis. The adherence to treatment was 58.16%. Mean vitamin D level on admission was 14.4 µg/l, only 5,3% of patients showed normal vitamin D level and with 30.61% being severe. Mean vitamin D at three months was 36.48 µg/l. At 3 months in 50% of patients vitamin D levels were normalized. 5.1% of patients suffered a new fragility fracture. Mortality was 18.88%. In the control group,186 patients were included. Mean age was 85.78 y. Mean vitamin D level on admission was 14.1 µg/l, only 5,1% of patients showed normal vitamin D level and with 32.27% being severe deficit. Mean vitamin D at 3 months was 21.66 µg/l. At three months only 25 patients vitamin D levels were normalized. 29.33% had previous fractures, being 22.66% hip fractures. 2.67% had previous treatment for osteoporosis. 16% suffered new fragility fractures during

the follow-up and mortality was 27.34% in the same period of time as the protocol group.
**Conclusions:** The establishment of a treatment protocol in patients with hip fracture, including vitamin D, could reduce the appearance of new fragility fractures and could have an effect on mortality in the medium term.

## P247
## MALNUTRITION IN CLUBFOOT PATIENT CAN EFFECT ON PONSETI TECHNIQUE AND ITS OUTCOME?

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**Objective:** Worldwide malnutrition is crucial health problem chiefly in undeveloped and developing countries. The commonest form of congenital orthopedic abnormality is club foot affecting approximately one to two infants per thousand live births. Over the past 20 y, the widely used and acquired method for treatment of clubfoot is Ponseti method. Our aim was to determine the effects of nutritional status of clubfoot patient in outcome of Ponseti technique.
**Method:** Since Jan 2016 to Dec 2016, 153 clubfoot patients were treated and the WHO classification of weight-for-age index was used to assess the nutritional status of patients.
**Results:** Out of 153 patients, 112 (79.73) were included in good nutrition group and 42 (20.6%) were malnourished. 15 (36.58%) out of 41 patients with malnutrition had first degree, 14 (34.14%) had second degree and 12 (29.26%) had third degree malnutrition. The average number of casts per patient and 8+ casts given in undernutrition group was higher than the number of 6+ casts given to good nutrition group. The number of Achilles tenotomy performed in undernutrition group was also high.
**Conclusion:** A significant correlation between patient nutritional status and outcome of Ponseti technique is found, as it influences the number of casts, relapse and possible failure of treatment.

## P248
## COMPARING PATIENTS COMPLIANCE TO TERIPARATIDE DAILY INJECTION ACCORDING TO THE MODE OF TREATING THE FRAGILITY FRACTURES

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**Objectives:** Comparing the compliance of the patients with fragility fractures to daily teriparatide injection according to the mode of treatment of the fracture; either surgical or non-surgical treatment.
**Methods:** A prospective study for 28 months (from June 2016 to October 2018) in King Faisal Medical Complex in Taif which is a referral hospital serving a population of about 2 million citizens. 104 patients included in the study, were suffering from established osteoporosis (BMD <-3.5) and all of them had one or more fragility fracture(s). These patients were stratified into two groups according to the mode of treatment from the orthopedic side; the first group (78 patients) their fragility fractures were treated conservatively (nonsurgically) with splints or supports, while the second group (26 patients) needed surgical intervention for the treatment of their fragility fractures. Teriparatide daily injection with calcium and vitamin D supplements were prescribed for all patients in the study for a period of 24 months. Outpatients visits were scheduled to all patients on regular basis for fracture follow-up and for represcription of the treatment medications. BMD measure was done for all patients yearly.
**Results:** Patients who continue with the Teriparatide acid injection for more than 12 consecutive months were consider compliant to the treatment. In this series; 85 patients (81.7%) continue to use the teriparatide injection for more than 12 months, 61 of them are from the first group, and 24 patients from the second group (surgical). Hence, compliance in the first group was 78.2%, while in the second group was 92.3%. All patients who were compliant to the treatment showed an increase in BMD after the first year with mean increase in BMD of +1.7.
**Conclusion:** Surgically treated patients for fragility fractures showed more compliance to the daily injection of teriparatide than those who were treated conservatively. This conclude that hospitalization and undergoing surgery lead to more awareness of the patients to the nature and dangerous of osteoporosis, the importance of anabolic treatment and of the adherence to the treatment regime.

## P249
## COMBINING FRAILTY AND TRABECULAR BONE SCORE IN PREDICTING RISK OF MAJOR OSTEOPOROTIC FRACTURES

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**Objective:** Findings have shown that 1) trabecular bone score (TBS) as a risk assessment tool is related to osteoporotic fracture risk independently of BMD and age; 2) increased frailty is significantly related to higher risk of fragility fracture; and 3) FRAX (fracture risk assessment tool) in combination with TBS improves predictive accuracy for fracture risk. In this study we aimed to assess the combination of frailty and TBS (with or without adjustment for FRAX) regarding predictive

accuracy for risk of major osteoporotic fracture (MOF; i.e., a fracture of upper arm or shoulder, spine, hip, forearm or wrist).
**Methods:** Data from the Canadian Multicentre Osteoporosis Study (CaMos) were used. TBS values were estimated using lumbar spine (L1 - L4) DXA images. Frailty status was measured by a frailty index (FI) of deficit accumulation; the FI included 30 deficits, ranging from 0 to 1 and with higher scores indicating greater frailty. The outcome was survival time to first incident MOF. Harrell's c-index and AIC were used to assess model performances.
**Results:** We included 2730 participants (70% women) for analyses (mean follow-up: 7.5 y). Their mean age was 69 (SD: 10) y; the baseline TBS and FI were 1.28 (SD: 0.11) and 0.20 (SD: 0.11), respectively. There were 243 (8.90%) MOFs observed during follow-up. Participants with MOF were significantly older, had higher BMI and FRAX scores, and lower BMD values. Significantly higher FI (0.24 vs. 0.20) and lower TBS (1.23 vs. 1.28) were also found in participants with MOF compared to controls. FI and TBS were significantly related with MOF risk in fully adjusted models: HR=1.24 (95%CI: 1.09 - 1.43) for per-SD increase in FI; HR=1.35 (95%CI: 1.16 - 1.57) for per-SD decrease in TBS. No significant differences in C-indices were found between FI-alone, TBS-alone, and combining FI and TBS models, with C-indices ranging from 0.75 to 0.78. The smallest AIC was found in the model combining FI and TBS, followed by FI-based model and TBS-based models.
**Conclusion:** Frailty and TBS are significantly related to MOF risk. Minimal improvement of predictive accuracy in MOF risk is found when combining frailty and TBS vs. frailty and TBS alone.

## P250
## DIABETES MELLITUS ACCELERATES PROGRESSION OF OSTEOARTHRITIS IN STREPTOZOTOCIN-INDUCED DIABETIC MICE BY DETERIORATING BONE MICROARCHITECTURE, BONE MINERAL COMPOSITION AND BONE STRENGTH

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**Objective:** Diabetes mellitus (DM) has been demonstrated to be an independent risk factor of osteoarthritis (OA). This new phenotype "diabetic OA" which associates the two most prevalent diseases worldwide will definitely cause significant functional impairment in activities of daily living and in the quality of life of the elderly people. The OA patients with diabetes are more severe in symptoms and structural damage, and also are younger in age for morbidity compared to the OA patients without diabetes. Additionally, diabetes increases the complications and revision rate of arthroplasty procedures. Nevertheless, there are very few studies directly addressing the potential mechanisms and the severity or progression of OA with diabetes. Recent findings have shown subchondral bone (SB) to be crucial for the initiation and progression of osteoarthritis. SB has been shown to be an important shock absorber and providing supportive functions in joints. Moreover, it plays an important role in articular cartilage metabolism. Any histopathology changes in SB will affect the biomechanical properties of the overlying joint cartilage and their intertwined biological relationship, ultimately becoming a crucial contributor to OA pathogenesis. The purpose of this study was three-fold: 1) to develop a DM-OA mice model which would allow for clinically relevant and biological research; 2) to validate that diabetes aggravates OA pathogenesis *in vivo*; and 3) to evaluate the microarchitecture, chemical composition and biomechanical properties of SB as a consequence of the damaged induced by diabetes OA.
**Methods:** 8 wk old male C57BL/6J mice were randomly divided into three groups: DM-OA group, OA group and Sham group. After acclimatization, the DM-OA group was injected intraperitoneally with 150 mg/kg streptozotocin (STZ) to induce diabetes, while the other two groups were given a PBS vehicle. On the third day after STZ injection, glucose levels were evaluated and mice with a level above 300 mg/dL were considered diabetic. Then, OA was surgically induced in the DM-OA and OA groups by transection of the anterior cruciate ligament (ACL) of the right knee. The sham group was subjected to a similar procedure without the transection of the ACL. Animals were sacrificed at 4, 8, and 12 weeks after the operation. Blood glucose levels, body weight and food intake of all animals were recorded weekly during the entire experimental period. The pancreas was stained with hematoxylin–eosin. The right knee joints from each group at all-time intervals were decalcified and prepared for histological analysis, immunohistochemistry and were scored using a semi-quantitative grading system (OARSI) to grade cartilage and SB degeneration. The undecalcified joints were used to evaluate the properties of trabecular SB using confocal Raman microspectroscopy to measure the chemical composition (mineral-to-collagen ratio), and microindentation to measure biomechanical properties. Additionally, microCT imaging was performed to evaluate microarchitectural parameters, with subsequent mechanical compression of the SB to investigate fracture properties. ANOVA and the Student Newman Keuls post hoc were used for statistical analyses between the groups.
**Results:** Glycemic monitoring and pancreas pathological results indicated stable high blood glucose and massive destruction of pancreas and islet cells in the DM-OA group. The OARSI score of the DM-OA group joint was higher than other two groups at 8 and 12 weeks (Figure 1). The number of osteoclasts in the DM-OA group joint was higher than in the other two groups at 8 and 12 weeks. Conversely, the mineral-to-collagen ratio and microindentation elastic modulus and hardness of the DM-OA group joint was lower than other

two groups at 8 and 12 weeks. Microarchitectural parameters showed bone volume fraction, trabecular thickness and BMD of the DM-OA group joint to be lower than in other two groups at 12 weeks. On the other hand, trabecular spacing and structural model index was higher compared to the other two groups at 12 weeks (Figure 2). Fracture properties, including stiffness and fracture load, of the DM-OA group were also reduced at 12 weeks.

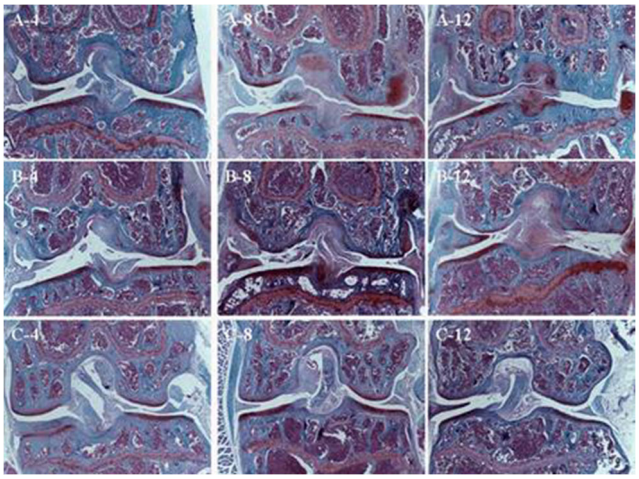


Figure 1. Histology images of knee joint from DM-OA group (A), OA group (B) and Sham group (C) at each time point of sacrifice.

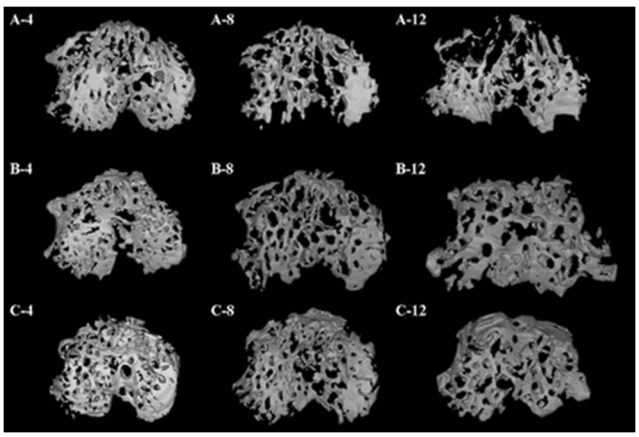


Figure 2. Tibial subchondral bone from DM-OA group (A), OA group (B) and Sham group (C) were imaged with μCT at each time point of sacrifice (4, 8 and 12 weeks after operation).

**Conclusion:** The glycemic and pancreatic pathological results indicated the DM-OA model to be a simple and reliable model induced by STZ and surgery. The pathology results from DM-OA group were worse compared to the other two groups at all-time points, proving diabetes to aggravate OA pathogenesis *in vivo*. Diabetes elevated the number of osteoclasts around trabecular bone and deteriorated the structure of SB. Trabecular biomechanical properties were declined due to a decrease in BMD induced by metabolic derangements in the DM-OA group. All of these histopathology impairments weakened the biomechanical properties of bone and the supportive function of SB, making it more vulnerable to failure. To our knowledge, this work is the first to describe the pathogenesis of diabetic osteoarthritis through diabetes and SB. This work proved that diabetes aggravated OA pathogenesis in a novel DM-OA mice model which could be helpful for clinical and basic science research. More importantly, the results showed the mechanisms in which diabetes accelerates OA by damaging and deteriorating the functions SB including microarchitecture, chemical composition and biomechanical properties.

**Reference:** [1] King KB, Rosenthal AK. Osteoarthritis Cartilage, 2015;23:841.

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## P251

## ANALYSIS ON CURATIVE EFFECT OF PRONATOR QUADRATES PROTECTING MINIMALLY INVASIVE INTERNAL FIXATION IN TREATING DISTAL RADIUS FRACTURE

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**Objective:** To investigate the curative effect of pronator quadrates protecting minimally invasive internal fixation in treating distal radius fracture.

**Methods:** Pronator quadrates protecting minimally invasive internal fixation was applied to treat 43 cases of distal radius fractures, and functions of wrist joints were evaluated by aid of Dienst function evaluation table; functions of wrist joints on the uninjured side and the affected side were compared to analyze the curative effect of minimally invasive internal fixation three months after the surgery.

**Results:** The results of recovery of wrist joint functions evaluated via the Dienst function evaluation table show that there were excellent 38 cases, 4 good cases, 1 qualified case and 0 poor case, with the rate of excellent and good cases reaching 97%. With respect to comparison in the movement of wrist joints on the uninjured side and the affected side (dorsiflexion 70.2°±1.1° *vs.* 68.2°±2.1°; palmar flexion 72.1°±3.6° *vs.* 70.2°±4.7°; radial deviation 20.5°±1.2° *vs.* 19.9°±3.2°; ulnar deviation 33.6°±5.4°*vs.* 31.2°±2.0°; pronation 79.5°±4.6°*vs.* 76.2°±2.7°; supination 78.2°±6.2°*vs.* 75.2°±2.0°), there was no statistical difference ($P<0.05$).

**Conclusion:** Pronator quadrates protecting minimally invasive internal fixation has a positive meaning for the treatment of distal radius fractures. In addition to shortening the operation time and reducing postoperative complications, pronator quadrates protecting minimally invasive internal fixation can also reduce the probability of fracture nonunion, retain the

rotation function of patients' forearms to the largest extent, and help patients do functional exercise in the early phase.

## P252

## A PILOT STUDY ON SEMI-RECUMBENT VIBRATION EXERCISE IN OLDER ADULTS WITH DECREASED PHYSICAL FUNCTION: METHODOLOGY, FEASIBILITY AND SAFETY

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**Objective:** Older adults with decreased physical function are at risk for further decline in part due limited ability to engage in regular exercise. Investigation of effective approaches to exercise in this vulnerable population is needed to improve functional capacity and muscle performance. Our aim was to investigate the feasibility and safety of semi-recumbent vibration exercise in older adults with decreased physical function living in a residential care apartment complex (RCAC).
**Methods:** Thirty-two RCAC residents, age 70 and older, with short physical performance battery (SBBP) score of ≤ 9 or ≤ 2 in any of the three test components were randomly assigned to a crossover-design study investigating the effectiveness of semi-recumbent vibration exercise on muscle outcomes. The study consisted of two 8-week training periods (vibration and control treatments) with a four-week wash-out period in between. The primary outcome measures were retention and adherence rates and adverse events.
**Results:** Seven participants dropped out with a retention rate of 78%. Adherence rate was 79.7% during the vibration sessions and 78.6% during the control sessions. Thirty-eight adverse were reported by the participants. Only mild muscle soreness and knee pain were the only adverse events that were deemed to be related to the vibration treatment. Only one participant dropped out due to worsening knee pain. No severe adverse events were related to the study.
**Conclusion:** Semi-recumbent vibration exercise seems feasible, well tolerated and appeared to be safe in elderly RCAC residents with reduced physical function. Future studies need to examine the effect of this type of exercise on physical/muscle function, mobility, falls and activities of daily living.

## P253

## EPIGENETIC REGULATION OF OSTEOCLAST DIFFERENTIATION

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Osteoclasts are multinucleated bone resorbing cells that differentiate from hematopoietic precursor cells. Particular signaling components are expressed during osteoclast differentiation, and their deregulated expression causes various skeletal diseases. Given that all genes encoding osteoclastogenic factors are expressed in the context of chromatin, a fundamental mechanism underlying osteoclast differentiation should involve chromatin-dependent regulatory pathways. Unexpectedly, our recent studies have revealed that matrix metallopeptidase 9 (MMP-9) moves into the nucleus and mediates histone H3 N-terminal tail (NT) proteolysis to activate osteoclastogenic gene expression [1]. Since histone modification and DNA methylation have been implicated in osteoclast gene regulation, we also investigate their possible roles as modulators of MMP-9-dependent H3NT proteolysis and osteoclast differentiation [2, 3, 4]. We show that distinct patterns of epigenetic marks are established by histone methylation (especially H3K4me3, H3K9me3, H3K27me1 and H3K27me3)/histone acetylation (especially H3K9ac, H3K18ac, and H3K27ac)/DNA methylation and profoundly impact MMP-9 activity toward H3NT during osteoclastogenesis. Additionally, our observation that knockdown or inhibition of SET7/G9a/EZH2 histone methyltransferases, p300/CBP histone acetyltransferases and DNMT3 abrogates the observed epigenetic modifications is supportive of the idea that these histone/DNA modifying enzymes are critical for proper regulation of H3NT proteolysis-mediated gene activation during osteoclast differentiation [2, 3, 4]. Consistent with these results, osteoclastogenesis and osteoporosis are significantly affected following the administration of recombinant forms of SET7/G9a/EZH2/p300/CBP into mice. More interestingly, our mechanistic studies indicate that epigenetic signals generated by SET7/G9a/EZH2/p300/CBP play an essential role in regulating the recruitment and activity of MMP-9 and its functional partners at genes encoding factors that are involved in osteoclast differentiation. Taken together, our data establish combinatorial roles for H3NT proteolysis, histone modification and DNA methylation in dictating osteoclast differentiation and bring new possibilities for developing therapeutic strategies to treat osteolytic bone destruction.
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## P254

## CADMIUM TOXICITY AS A PROBABLE CAUSE OF SMOKING INDUCED BONE LOSS

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**Objective:** Cigarette smoking supposed to be a risk factor for osteoporosis. There is an inverse relationship between smoking and both bone mass and fracture risk. Tobacco smoking is the most important single source of cadmium exposure in the general population. The absorption of cadmium from the lungs is much more effective than that from the gut. This study was designed to evaluate the effect of cigarette smoking on BMD, due to cadmium toxicity.

**Methods:** This study was carried on 100 persons, selected from Al-Azhar university hospital and divided into three groups: group I: included 40 persons with active smokers; group II: included 40 persons with passive smokers and group III included 20 nonsmokers. All persons were submitted to full history taking, thorough clinical examination routine lab tests, serum and urinary cadmium and lead, and BMD was measured by DXA.

**Results:** Serum and urinary cadmium and lead were statistically significantly higher in group I in comparison to groups II or III and in group II in comparison to group III. Also, there was statistically significant decrease of BMD in group I in comparison to either group II or group III and in group II in comparison to group III. There was an inverse statistically significant correlation between serum and urinary cadmium and BMD.

Table (1): Comparison between studied groups as regard serum and urinary cadmium levels

| | | Mean | S. D | Minimum | Maximum | F | P |
|---|---|---|---|---|---|---|---|
| **Serum cadmium (µg/l)** | Group I | 0.449 | 0.287 | 0.18 | 1.80 | 27.92 | <0.001(S) |
| | Group II | 0.232# | 0.040 | 0.16 | 0.32 | | |
| | Group III | 0.094* | 0.047 | 0.01 | 0.16 | | |
| **Urinary cadmium (µg/l)** | Group I | 0.555 | 0.304 | 0.30 | 2.00 | 27.16 | <0.001(S) |
| | Group II | 0.335# | 0.042 | 0.26 | 0.42 | | |
| | Group III | 0.181* | 0.052 | 0.11 | 0.26 | | |

*= statistically significant decrease in comparison to group I or group II
#= statistically significant decrease in comparison to group I

Table (2): Comparison between studied groups as regard serum and urinary lead levels

| | | Mean | S. D | Minimum | Maximum | F | P |
|---|---|---|---|---|---|---|---|
| **Serum lead (µg/l)** | Group I | 22.92 | 7.98 | 10.00 | 50.00 | 34.86 | <0.001(S) |
| | Group II | 17.12# | 3.61 | 12.00 | 25.00 | | |
| | Group III | 10.20* | 2.14 | 6.00 | 14.00 | | |
| **Urinary lead (µg/l)** | Group I | 33.10 | 7.85 | 24.00 | 60.00 | 79.10 | <0.001(S) |
| | Group II | 27.27# | 4.37 | 20.00 | 40.00 | | |
| | Group III | 13.20* | 2.19 | 8.00 | 16.00 | | |

*= statistically significant decrease in comparison to group I or group II
#= statistically significant decrease in comparison to group I

Table (3): Comparison between studied groups as regard bone mineral density (g/cm²)

| | | Mean | S. D | Minimum | Maximum | F | P |
|---|---|---|---|---|---|---|---|
| **Radial shaft** | Group I | 0.686*# | 0.020 | 0.63 | 0.73 | 60.10 | <0.001(S) |
| | Group II | 0.712* | 0.011 | 0.69 | 0.73 | | |
| | Group III | 0.736 | 0.017 | 0.70 | 0.77 | | |
| **Femoral neck** | Group I | 0.811*# | 0.016 | 0.77 | 0.84 | 116.20 | <0.001(S) |
| | Group II | 0.858* | 0.023 | 0.80 | 0.90 | | |
| | Group III | 0.908 | 0.033 | 0.84 | 0.97 | | |
| **Spine (L2-4)** | Group I | 1.249*# | 0.022 | 1.22 | 1.32 | 247.85 | <0.001(S) |
| | Group II | 1.295* | 0.021 | 1.24 | 1.36 | | |
| | Group III | 1.385 | 0.023 | 1.32 | 1.42 | | |

*= statistically significant decrease in comparison to group III.
#= statistically significant decrease in comparison to group II.

Table (4): Correlation between bone mineral density and serum or urinary cadmium and lead in all studied cases

| | | Radial shaft | Femoral neck | Spine |
|---|---|---|---|---|
| Serum cadmium | r | -0.583** | -0.550** | -0.458** |
| | p | <0.001(S) | <0.001(S) | <0.001(S) |
| Urinary cadmium | r | -0.576** | -0.544** | -0.451** |
| | p | <0.001(S) | <0.001(S) | <0.001(S) |
| Serum lead | r | -0.687** | -0.488** | -0.581** |
| | p | <0.001(S) | <0.001(S) | <0.001(S) |
| Urinary lead | r | -0.719** | -0.593** | -0.706** |
| | p | <0.001(S) | <0.001(S) | <0.001(S) |

## P255

## ASSOCIATIONS BETWEEN VITAMIN D SERUM LEVELS AND SELF-REPORTED PHYSICAL ACTIVITY IN ADULTS OVER 20 YEARS

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**Objective:** There is lacking consensus based on self-reported activity levels that physically more active individuals may have higher vitamin D serum levels. The aim of this study was to investigate the association between vitamin D status and self-reported physical activity in adults over 20 y.

**Methods:** Cross-sectional data from 33,366 individuals (13,119 men and 20,247 women) over 20 y in the Korea National Health and Nutrition Examination Surveys (KNHANES) were analyzed. Self-reported physical activities of participants over 20 y were classified into three physical activity levels (low, moderate and high activity group), using International Physical Activity Questionnaire scoring protocol. The serum 25-hydroxyvitamin D (25(OH)D) level was measured by radioimmunoassay and vitamin D deficiency was defined as 25(OH)D <20 ng/mL. The association of physical activities level and stroke status was analyzed using the general linear models adjusted for anthropometric and clinical confounders.

**Results:** The adjusted mean 25(OH)D level of participants was significantly different among three activities levels (18.84±0.25 ng/mL in high activity group vs. 17.81±0.24

ng/mL in medium activity group vs. 17.32±0.22 ng/mL in low activity group) and the adjusted mean 25(OH)D level of high activity group was the highest in high activity group, using post hoc analysis ($P$=0.00). The 25(OH)D level of male (19.12±0.23 ng/mL) was higher than female (16.86±0.23 ng/mL). Nonsmoker, lower educational level, participants without arthritis or cardiovascular diseases had the higher 25(OH)D level ($P$<0.05), but hypertension and diabetes mellitus did not show significant differences ($P$ > 0.05).
**Conclusion:** Vitamin D level in low activity level is the lowest among three activities levels, which may indicate that vitamin D level is associated with physical activity levels. The potential confounding factors such sun exposure, important determinant of vitamin D serum levels, need further investigation.

## P256
## POOR BIOLOGICAL ENVIRONMENT INCREASE THE "CUT OUT" RISK IN HIP FRACTURES

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**Objective: H**ip fracture is one of the XXI century epidemics. The most common treatment for pertrochanteric hip fractures is the intramedullary nailing, although other types of devices are used also like the nail-plate. The objectives of this work are: to identify the type indecency of screw "cut-out" in our series; analyze the potential mechanical or biological origin; and study the functional significance in those patients.
**Method:** We analyzed retrospectively a case series of patients with pertrochanteric hip fracture. In our series are 1349 cases treated between 2009-2017 in our hospital. We selected cases of complications with subsequent reoperation grouped by DRGs. We found 21 cases of "cut out" reoperation. We analyzed demographics data, functional parameters (BARTHEL Index), laboratory parameters (Vit. D), radiological parameters (Tip-Apex Distance (TAD) and Parker Ratio (PR)).
**Results:** With a comparable groups of cases and controls with respect to demographic data. We found a higher rate of BARTHEL in the series of cases (14%). The analytical parameters indicated a clear hypovitaminosis D in patients with pertrochanteric hip fracture, being more marked in our case series. In our cases the radiological parameters analyzed indicated a TAD> 25 in 64% and 36% TAD <25. In 100% the screw was in a middle position as PR. The incidence of screw cut-out was 1.55%. We detected a possible mechanical origin in 64% of cases and biological in the remaining 36%. We detected a reduction in the functional parameters of 21.78% in the BARTHEL Index.
**Conclusion:** Even though we have a low incidence of screw cut-out in our series in comparison to the literature, this has not less importance. This phenomenon has a significant impact on the functional parameters of patients. Two important routes of improvement for reducing the incidence are: improve the surgical technique (TAD <25 mm and PR> 66%) and improve the biological environment, placing great importance to vitamin D.

## P257
## BODY COMPOSITION ANALYSIS AND QUANTITATIVE ULTRASOUND DENSITOMETRY IN SCREENING OF BONE STRUCTURAL ABNORMALITIES IN WOMEN

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**Objective:** Numerous studies have confirmed the obvious relationship between BMD and endocrine status. Peak bone mass is reached in the third decade of life and sustained until the fifth decade when the age-related bone loss begins. Beside the age-related bone loss there is an accelerated bone resorption in women within 5-10 y after menopause related to estrogen deficiency. DXA and ultrasound densitometry are widely used to screen osteoporosis and other bone structural diseases. BIA devices can also estimate bone mineral content (BMC) but it has not been recommended for diagnostic purposes. The main aim of the present study was to analyse how estimates of body composition and bone mineral content can predict bone structure in women.
**Methods:** Healthy premenopausal women (n: 130, 18-45 y) and postmenopausal women (n: 130, 46-75 y) were enrolled to the present analysis. Estrogen level was estimated from saliva samples. Exclusion criteria included history of surgical menopause, hormone replacement therapy, oral contraceptives and chronic metabolic diseases. Menopause was defined as amenorrhea of 12 months duration and was confirmed by measurements of salivary 17-β-estradiol concentrations <4 pg/ml. BMC (kg) was estimated by InBody 720 analyser. Bone structure was measured by ultrasound osteometer (DTU-One Osteometer). Broadband ultrasound attenuation (BUA, dB/MHz), which estimates the structural characteristics of trabecular bone, e.g., porosity, was used to assess bone structure in the analysis. Body mass components, bone and muscle mass (kg), were estimated by Drinkwater-Ross anthropometric method. Relative body components were expressed in the percentage of stature.
**Results:** The age changes of 17-β-salivary estradiol concentrations, BMC, relative bone mass, relative muscle mass and bone structural parameters were analysed in premenopausal and postmenopausal women. BMC (r=0.43, p<0.01), relative muscle mass (r=0.44, p<0.01) and relative bone mass (r=0.38, p<0.01) were strongly correlated (Pearson correlation) with BUA in premenopausal women. In postmenopausal women weaker relationship was identified between BUA and its hypothetical predictive factors.
**Conclusion:** BMC and the other studied body mass components alone do not provide enough information to identify

osteoporosis, but can complete and widen the screening methods for bone structural diseases. The BMD of healthy premenopausal women with low BMC, low bone mass and/or low muscle mass values should be measured. The early monitoring of bone structural ageing and endocrine status in adults is of high importance, especially in premenopausal women.

## P258
## BODY AND BONE STRUCTURAL EXAMINATIONS OF TURNER SYNDROME PATIENTS

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**Objective:** Turner syndrome is characterized by the absence of the entire or the part of second X sex chromosome. The presence of the X chromosome is necessary for the development of ovaries, which produce estrogen. Estrogen plays an important part in the development of bone mineral content and the formation of peak bone mass. Different treatment schemes are known to mitigate the symptoms and compensate the deficiencies in Turner syndrome. The main aim of the presentation to introduce the results of a body structural study of Turner syndrome patients by highlighting the most important relationships between body structure, karyotype and treatment type in the syndrome.
**Methods: 20** girls and women with Turner syndrome, who received or not received hormone replacements, were studied. Bone mass was estimated by the Drinkwater-Ross four component model. Muscle mass, fat mass and visceral fat area were estimated by bioelectrical impedance analysis (InBody 720 device). Bone structure was measured by ultrasound DTU-One osteometer. BMD was measured by XCT 2000 pQCT. The pattern of body and bone structure parameters was analyzed by cluster analysis.
**Results:** The Turner patients' body structure was very inhomogeneous. Based on the results of the cluster analysis of bone and body structural parameters, we could separate the subgroups of the syndrome, bone density and the relative length of the limb segments were the most important separators. The subgroups were: subgroup A – a group of patients who have 45,X0 karyotypes and received or are receiving hormone replacement; subgroup B: patients with 46,XX/45,X0 mosaic karyotypes; subgroup C – patients with isochromosomes (and subgroup D – patients who could not be classified into the other three groups). The length measures and the bone density of the group with isochromosomes differed significantly from the other groups' values. While the width, girth, skinfold thickness, body mass components, bone structural parameters of the subgroup with 45,X0/46,XX mosaic karyotype were also different than in the other subgroups.
**Conclusion:** Regular body and bone structural examinations are of high importance, but the genetic subgroup is also very important in the healthcare of Turner syndrome patients.

## P259
## CHARACTERIZATION OF SARCOPENIA IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Given the frequency of osteosarcopenia in the postmenopause with increased risk of fracture, it is necessary to know the behavior of this entity in our population to perform diagnostic measures in early intervention. Our aim was to describe the prevalence of sarcopenia in patients diagnosed with primary osteoporosis who attended the endocrinology service between June and October 2018.
**Methods:** Cross-sectional study. We included patients with postmenopausal osteoporosis between 50-80 y without contraindications to perform diagnostic tests for sarcopenia (upper limbs grip strength, walking speed, muscle mass index). Descriptive statistics was used to analyze the data.
**Results:** 59 patients were included, 48 met diagnostic criteria (low strength in upper limbs, low muscle mass index, decrease in walking speed). 70.8% presented presarcopenia, 25% sarcopenia and 4.2% severe sarcopenia. 74.1% showed low IMME, 24.1% low grip strength and 12.1% low walking speed. Of the patients with a history of fracture, 44% had presarcopenia, 41.7% sarcopenia and 50% severe sarcopenia. Hypovitaminosis D was found in 32 patients of which 71% had low IMME, 25% decreased grip strength and 18.8% decrease in walking speed.
**Conclusions:** In patients with osteoporosis, sarcopenia prevalence of 25% was found, therefore it is important to perform an active search in this population. In patients in the presarcopenia group, there was a high frequency of falls, fractures, vitamin D deficiency, which is why early intervention measures must be instituted to reduce complications from this phase. When comparing prevalence according to European consensus 2010-2018 an overdiagnosis was observed in 25% of the population with previous parameters. In the presarcopenia and sarcopenia groups, a high frequency of overweight was observed, 88% and 100% respectively, considering that it is not enough to measure BMI for this entity, with which only 3 and 8% are diagnosed.

## P260
## EFFECT OF DENOSUMAB ON CHILDREN WITH OSTEOGENESIS IMPERFECTA: A SYSTEMATIC REVIEW

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**Objectives:** Osteogenesis imperfecta (OI) is a rare inherited disorder characterized by increased bone fragility and reduced bone mass and often short stature. Denosumab may be an effective treatment for children with OI. We aimed to perform a systematic review to summarize the evidence from clinical studies assessing effect of denosumab on children with OI.
**Methods:** We systematically searched the Medline and Embase databases up to August 31, 2017. We included the clinical observational research or intervention studies that provided original data on outcomes of denosumab in children with OI. Primary outcome included BMD and incident fractures. Data were independently extracted by two reviewers.
**Results:** This review included two pilot prospective trials and one case report, which involving a total of 15 children. One trial including four children who were with type VI OI showed a notable improvement in BMD and bone resorption and formation biomarkers with denosumab. Two of the four children later experienced fractures caused by mild trauma. The other trial focused on 10 children and reported that denosumab significantly improved BMD by week 48. By contrast, the case report including one child who was diagnosed with type VI OI found no clinical improvement in BMD or fractures.
**Conclusions:** In this review evaluating the treatment effects of denosumab on children with OI, we found the evidence from clinical research was sparse, limited and inconsistent. Limitations existed for the current evidence including limitations of trial designs, uncertain dosages and administration intervals, and small sample sizes. Further large-scale, well designed and long-term studies are needed to clarify the effect of denosumab on pediatric patients with OI.

## P261
## SERUM TOTAL OSTEOCALCIN LEVEL AND TYPE 2 DIABETES MELLITUS

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**Objective:** Osteocalcin is a noncollagenous, 49 amino acid glutamate-rich polypeptide bone matrix protein produced by osteoblasts and incorporate it into the bone matrix. Osteocalcin levels are related to increased bone turnover so, it has been used clinically to assess the effectiveness of osteoporosis treatments. It has been discovered that osteocalcin also acts as a hormone to control glucose and energy metabolism on pancreatic β-cells and adipose and muscle tissues. Studies on the association between serum total osteocalcin level and type 2 diabetes mellitus (T2DM) had reported controversial results. The aim of this study was to assess this association in female patients with T2DM.
**Methods:** To assess the relationship between serum total osteocalcin and T2DM, we performed a study to determine serum total osteocalcin level on individuals with T2DM. A total of 98 subjects (all women) were selected for this study who voluntarily enrolled for diabetes mellitus checkup including the blood test for serum osteocalcin level and bone density by DXA scan. Multiple regression analysis was used to determine which variables were independently related to osteocalcin levels, osteoporosis and T2DM.
**Results:** A negative correlation was found between serum osteocalcin levels and BMD grading. Multiple regression analysis adjusted for age, sex, menopausal status, BMI, serum alkaline phosphatase, serum calcium and phosphate showed that osteocalcin negatively correlated with serum glucose ($p=0.04$) and homeostasis model assessment of insulin resistance (HOMA-IR) ($p=0.037$) independently.
**Conclusion:** Serum osteocalcin level was inversely associated with fasting glucose level and insulin resistance measured by HOMA-IR, suggesting that osteocalcin is important for glucose metabolism.

## P262
## POTENTIAL HEALTH BENEFITS OF MOLECULAR HYDROGEN (H2)

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**Objective:** Clinical and preclinical studies have identified $H_2$ as being beneficial in the prevention and treatment with a therapeutic effect in a wide range of disease conditions.
**Methods:** It has been reported that $H_2$ exerts a therapeutic effect in acute illness such as ischemia – reperfusion injury, shock, and damage healing to chronic illness as metabolic syndrome, rheumatoid arthritis, diabetes, neurodegenerative diseases, asthma, cancer, cardiovascular diseases (congestive heart failure, coronary heart disease, hypertension, stroke and other cerebrovascular disease), and depression. There are many ways to get your body to start benefiting from all that $H_2$ may offer.
**Results:** In inflammatory processes, $H_2$ suppresses the proteins involved in inflammation while also activating the mechanisms that protect against cell death. Several clinical trials studied patients with rheumatoid arthritis after administration of $H_2$. The preliminary results showed a reduction in DNA damage as well as a reduction in the patient's symptoms, with a great number of patients reaching total remission of their symptoms. Furthermore, it has been demonstrated that taking a hydrogen product may reduce lactic acid accumulation during periods of heavy exercise. $H_2$ have been leveraged to treat or improve the state of oxidative stress pathologies (OSP) either acute or chronic OSP. One of the first orientation witch result by the synthesis of many different studies, is that $H_2$ is an attractive therapy justifying the treatment of many different pathologies, either as an adjunct treatment to the basis treatment or as a therapeutic agent.

**Conclusion:** Efficacy of $H_2$ for various diseases has been shown by basic research. When the clinical efficacy or a significant preventive action is confirmed and regulatory approval is obtained, the indications for the use of $H_2$ will expend over time. However, the clinical efficacy of $H_2$ needs to be verified scientifically and eventually confirmed. $H_2$ has various physiological actions such as antioxidant effect, anti-inflammatory effect and a protective effect against cell death, but the molecular mechanisms involved have not yet been clarified.

## P263
## EFFECTIVE TREATMENT OF A PATIENT WITH PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS: A CASE REPORT AND A REVIEW OF THE LITERATURE

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**Objective:** Osteoporosis associated with pregnancy and lactation is a syndrome that most often affects the spine, but, albeit to a lesser extent, also at the level of the hip, characterized by atraumatic compression fractures. This case report may highlight on this pathology which can manifest itself in the period between the last 3 months of pregnancy, the delivery and the first months of breastfeeding. It is defined in literature as pregnancy and lactation-associated osteoporosis (PLO or sometimes PAO) and transient osteoporosis of the hip (TOH) and it is still today referred to as a rather rare pathology. But it is dramatically miscalculated. Moreover, there is a significant correlation between the number of fractures at time of diagnosis and subsequent fracture risk. The purpose of this case report is to highlight on this underestimated pathology and discuss on a potential unusual therapy.
**Methods:** It will be described one of the cases of PLO that I had the opportunity to treat in my private osteoporosis center. A 24-year-old woman who suffered fractures in the vertebral column 1 month after delivery. In this paper the anamnesis, the previous diagnoses, any previous therapies, the tests performed and the proposed therapy are examined. The published literature is also examined and discussed. Combination therapy of menaquinone 7, magnesium, silicon and vitamin D were used for treatment. The follow-up was performed using Brief Pain Inventory, MRI, blood exams and DXA.
**Results:** After the treatment patient's back pain decreased significantly, the bone metabolic index, BMD improved and she did not experience any recurrence.
**Conclusions:** Early diagnosis as well as the efficacy of PLO intervention monitoring and evaluation are critical for the success of treatment. A mix of phytochemicals, vitamins and supplements can be considered another option in the therapeutic approach to this rare disease.

## P264
## HEMATOPOIETIC AUTOPHAGY DETERIORATION LINKS TO OSTEOPOROSIS

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**Objective:** Disorders of hematopoiesis affect skeletal system. Osteoporosis is a major risk of complications in hematopoiesis disease such as hematopoietic malignancy, anemia, β-thalassemia or hematopoietic stem cell transplantation. We examine the correlation between hematopoietic system autophagy and bone homeostasis.
**Methods:** In clinical research, 4964 samples red blood count (RBC) and BMD were measured for correlation analysis. Femur-derived bone marrow of 30 patients was obtained from young normal BMD (BMD>-1.0, age<40 y) or aged osteoporosis (BMD<-2.5, age>60 y) during total hip replacement surgery. Bone marrow monocytes were stained by CD34 and CD45 antibodies. LC3 expression of bone marrow hematopoietic cells was measured by ImageStream. Autophagy related gene expression was measured in patients bone marrow CD34CD45 positive cells. In animal research, mice were divided into experiment group and control group. In experiment group, Atg7 gene was null in hematopoietic system ($Atg7^{f/f}$;Vav-iCre) by using Vav-iCre transgene; the control group was $Atg7^{f/f}$ mice. Bone marrow hematopoietic cells LC3-I and LC3-II as well as bone tissue Atg 7 expression were measured to confirm autophagy disordered in hematopoietic cells not in bone tissue. Calcein of 30 mg/kg was injected 7 days and 2 days before harvested. Micro-CT of femur was performed for BMD, cortical thickness and trabecular bone quantification. Femora were tested in three-point bending for bone biomechanical properties. Bone trabecular was observed by electron microscopic images. Bone tissues were sectioned for hematoxylin and eosin(H&E), Masson and Collagen1 staining. Phalloidin, mitochondria, γ-H2AX and DAPI staining were performed on tibia for immunofluorescence. CD31 and EMCN were staining to detect type H vessel. Bone tissue ROS level was detected by flow cytometry. Bone homeostasis related RNAs were measured by RT-PCR. Skeleton samples were stained by Alcian blue and Alizarin red S. Bone tissue was collected for TMT labeled proteome analysis.
**Results:** In clinical research, RBC count decreased in aged people. RBC count has positive correlation with femur BMD both in male and female. Human hematopoietic stem progenitor cells (CD34+CD45+) LC3 protein was inhibited in aged osteoporosis patients associated with descending autophagy gene expression, with Atg7, Atg5, Atg12, LC3b, Lam2a, P62 involved. In animal research, bone marrow hematopoietic cells reduced conversion of LC3-I to LC3-II, confirming Atg7

deletion. Deletion of Atg7 in hematopoietic system caused low BMD. MicroCT analysis revealed that trabecular number, bone volume/tissue volume, cortical thickness were decreased. The absence of Atg7 in hematopoietic resulted in weak bone biomechanical strength properties. Scanning electron microscope depicted trabecular microstructure destruction. There is no size difference in skeleton Alcian blue and Alizarin red S staining. The H&E staining showed $Atg7^{f/f}$;Vav-iCre mice trabecular degeneration and more fat tissue. Masson staining showed broken collagenous fiber and elastic fibers. Quantification of calcein labeling showed reduced mineralized surface in $Atg7^{f/f}$;Vav-iCre mice, which resulted in a low bone formation rate. Phalloidin staining revealed abnormal osteocyte size and number in $Atg7^{f/f}$;Vav-iCre mice. γ-H2AX staining revealed loss of Atg7 in hematopoietic system induced osteocyte DNA damage. Osteocyte ROS level increased in $Atg7^{f/f}$;Vav-iCre mice, which was verified by mitochondria staining. Bone homeostasis related gene expression, including SP7, RUNX2, BMP2, BMP6, CTSK, TRAP5, were inhibited in $Atg7^{f/f}$;Vav-iCre mice. Integrative proteomics functional enrichment of differentially quantified proteins showed $Atg7^{f/f}$;Vav-iCre mice bone tissue skeletal system morphogenesis and development were down-regulated. KEGG analysis revealed collagen1 in ECM (extracellular matrix)-Receptor interaction was down-regulated. The collagen1 staining showed less collagen secretion in $Atg7^{f/f}$;Vav-iCre mice. Type H vessels were depressed in $Atg7^{f/f}$;Vav-iCre mice.

**Conclusions:** Deterioration of autophagy in hematopoietic system inhibited osteogenesis in clinical and animal model. This work suggests that hematopoietic autophagy have potential to maintain bone homeostasis, especially collagen1 in extracellular matrix, as well as type H vessels, possibly contributing to osteogenesis.

## P265

## REHABILITATION PROGRAM IN PATIENTS WITH KNEE OSTEOARTHRITIS AND TYPE II DIABETES

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**Objectives:** Knee osteoarthrosis (KOA) is a degenerative disease that affects mainly older people who frequently associate comorbidities such as type 2 diabetes. KOA and type 2 diabetes together, have an increased debilitating potential, leading to significant care costs and a significant decrease in quality of life and functionality. Our study objective is to evaluate the role of a complex rehabilitation program in patients diagnosed with KOA and type 2 diabetes.

**Methods:** Our patients were diagnosed clinically, paraclinical and imagistic with primary KOA and type 2 diabetes. The studied group included 19 patients that received medication and followed a complex rehabilitation program. The control group received only medical treatment and was advised to comply to orthopaedic rules. For the assessment we used 2 parameters: pain by using visual analogue scale (VAS) and functionality with WOMAC. These were measured at the beginning at the study (T1), after the 6 months rehabilitation program (T2), and after 1 y (T3).

**Results:** We included 37 patients in our observational study, age between 57-71 years old, with a mean age of 67.3 y. 21 of the patients were women and 16 men. In all patients included in the first group, we found that for VAS scale there were highly significant values just like for the WOMAC index, in T2 evaluation comparing to T1 assessment. After 6 months (T3), improved functional status and pain level were maintained. As for patients in the control group the mean values in T2 comparing to T1 have improved, but they were not statistically significant, but they have not been maintained to T3 evaluation.

**Conclusions:** An individualised rehabilitation program and drug treatment represents the ideal therapeutic option for patients with knee osteoarthritis and type 2 diabetes for improving pain and functional status.

## P266

## PREVALENCE OF VERTEBRAL FRACTURES SECONDARY TO CORTICOSTEROIDS IN EGYPTIAN SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS

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SLE is a chronic autoimmune disease with a complex clinical presentation and course.

Patients with SLE are at risk of generalized osteoporosis. The etiology of bone loss in SLE is supposed to be multifactorial, including traditional osteoporosis risk factors, inflammation, metabolic factors, hormonal factors, serologic factors, and medication induced adverse effects.

Glucocorticosteroids remain the first choice treatment option for SLE. They possess strong anti-inflammatory and immunosuppressive properties, mainly due to their profound effect on the production of pro-inflammatory cytokines. Our goal was to determine the prevalence of vertebral deformities and the frequency of the risk factors associated with symptomatic vertebral fractures in premenopausal SLE patients treated with corticosteroids (Cs).

We conducted the study on 100 adult patients suffering from SLE and 50 healthy age and sex matched individuals as a control group, form the basis of this study. All patients were attending the outpatient clinics of the Rheumatology and Rehabilitation Department, Kasr El-Aini Hospital, Cairo University. The SLE patients were 94 females and 6 males. Their age ranged between 19-48 y with a mean of 29.26 ±8.844 y. The total GCs dose was equivalent to prednisone 3.6-64.8 g ±11.6296.

Upper endplate deformity was found in 10 (10%) patients, anterior wedge deformity was found in 12 (12%) patients and compression deformity was found in 2 (2%) patients. Wedge deformity was the most frequently observed type of deformity followed by upper endplate deformity then compression deformity. We did not find any consistent relation between the prevalence of vertebral fractures and cumulative glucocorticosteroid dose, i.e., prevalence of vertebral deformity did not increase with the increase in the cumulative glucocorticosteroids dose.
Our results show that a large proportion of SLE patients get vertebral fractures despite normal BMD. Since some SLE patients are at high risk of thrombosis, impaired microcirculation in bone could damage bone cell viability and subsequently the possibility to repair trabecular damage. Mechanisms leading to impaired bone strength could also be initiated by autoantibodies directed against substances necessary for healthy bone remodeling. Despite the known side effects of glucocorticosteroids we did not find any association between vertebral fracture and corticosteroids in our study.

## P267
## BISPHOSPHONATE ATYPICAL FEMORAL FRACTURE IN OSTEOGENESIS IMPERFECTA

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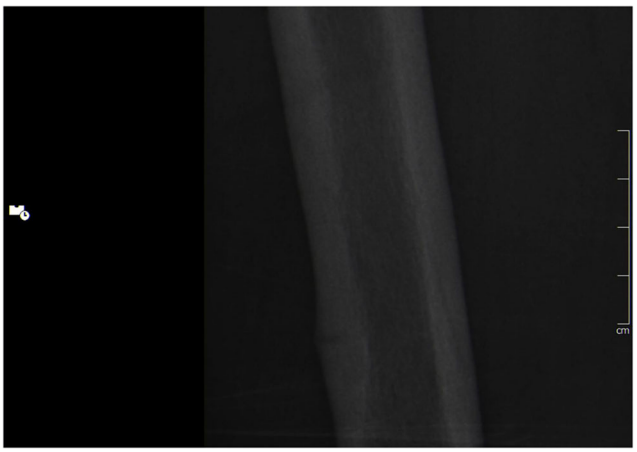
**Case report:** A 66-year-old female, while walking heard a crack from her left thigh and fell on her right side. She experienced severe pain, was unable to weight bear and was hospitalised.
Her past medical history included osteogenesis imperfect (OI). She had left wrist fracture when she was 4 years and fractured her left arm when she was 6. At the age of 9 she fractured her left tibia. Between the ages of 9-12 y, she fractured her femur three times and was unable to go to school for 2 y. Her fractures stopped at the age of 12 until she was 59 when she fractured her tibia. She received alendronic acid and her DXA monitoring and drug holiday period are summarised in the Table.

| | 57 y | 59 y | 62 y | 63/4y | 65 y |
|---|---|---|---|---|---|
| Mean total hip T | -1.1 | -1.8 | -1.7 | | -2.5 |
| Mean total hip Z | -0.3 | -0.9 | -0.7 | | -1.3 |
| Bisphosphonates | BPs started | On BPs for 2 y | On BPs for 5 y | BPs holiday 2y | On BPs for 1 y |

When admitted she had short stature with some chronic bony deformities. There was no scleral discolouration, dental problems or hearing impairment. X-ray showed left transverse subtrochanteric fracture. There was also alinear transverse fracture across the outer cortex of the right femur. The patient's atraumatic subtrochanteric fractures fulfilled the ASBMR definition of atypical femoral fractures (AFFs). Left femoral nailing was performed. Prophylactic intramedullary nailing was considered to reduce the risk of fracture of the right femur but bowing of the femur did not allow this.
Discussion: BPs are widely used in children with OI and are also used in older adults with OI. The evidence base for their use in fracture prevention in adults is not well established. The optimum choice of BPs, duration of therapy, longer-term effects and side effects, including the incidence of AFFs, have not been adequately defined in this rare disease. However it is not unexpected that some patients may develop BPs- related fractures. Our patient had BPs for 6 y and she had chronic bone deformities of OI that may have contributed to biomechanical risk factors. Both factors may have contributed to her apparent BPs-related atypical femoral fracture.



## P268
## VENOUS THROMBOEMBOLISM FOLLOWING DELAYED SURGERY OF A HIP FRACTURE

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**Objective:** Patients with hip fractures are known to be at risk of development of deep vein thrombosis (DVT). Surgical delays may predispose patients to developing

venous thromboembolism (VTE). However, surgical delays may often occur due to preoperative medical evaluation and optimization, lack of operation theaters, and transfer from other hospitals. The goal of this study was to evaluate the incidence of VTE in patients with hip fractures whose surgery was delayed, and the effect of prophylaxis intervention regards to its success in preventing thromboembolic complications.

**Methods:** This study is a single-center, and retrospective cohort study. The medical records of patients who presented with a fracture from Oct 2016 to Oct 2018 were retrospectively obtained. Inclusion criteria were following; 1) Surgically treated patients with hip fracture, 2) Surgical delay >24 h from injury to surgery, 3) aged 50 years old or older, and 4) low energy injury. Exclusion criteria were 1) pathologic fracture, 2) multiple trauma patient. Delayed surgery was defined as surgery 24 h after injury. All patients had DVT prophylaxis postoperatively. Our conventional protocol of prophylaxis for VTE was anti-embolism stocking without screening (group 1, n=59). From Sep 2017, our intensive protocol for VTE was performed with indirect DVT computed tomography (CT) and pulmonary embolism (PE) CT (group 2, n=60). When DVT was detected on screening, inferior vena cava (IVC) filter was applied before the operation. Our prophylaxis protocol was consisted of mechanical prophylaxis with intermittent pneumatic compression device immediately after admission and chemical prophylaxis with subcutaneous injection of low-molecular heparin (>) 20 ul/d or fondaparinux 2.5 mg from admission to postoperative 7 d. Overall postoperative symptomatic VTE incidence were evaluated. The relationship were analyzed between VTE and each age, sex, fracture classification, BMI, time from injury to admission, time from admission to surgery, transfer from other hospital, preoperative infection, medical comorbidity using Charlson comorbidity index (CCI), history of DVT or varicose vein, preoperative anticoagulation agent, preoperative ambulation state using Koval score, operation method (osteosynthesis vs. arthroplasty), operation time, ICU stay, and hospital stay. We compared the incidence of postoperative VTE between the two groups.

**Results:** 111 patients (38 males and 81 females) with a mean age of 78.2 y were enrolled. The percentage of patients transferred from other hospitals was 68.1%. There were 63 cases of femur neck fractures, 49 cases intertrochanteric fractures, and 7 cases of subtrochanteric fractures. The average time from injury to admission was 90.2 h (range, 0.5-2160 h), and the average time from admission to operation was 75.3 h (range, 16-934 h). The average time from injury to operation was 165.5 h (range 25-2250 h). A total 8 patients developed VTE (6.7%), of which 2 had DVT, 3 had PE and 3 patients had both DVT and PE. Four patients (6.7%) were screened on preoperative evaluation in group 2. The other 4 patients developed VTE postoperatively, and they were group 1. In the group 1, postoperative VTE occurred 6.8% (4/59) was higher than that 0% (0/64) in group 2 (p=0.040).

**Conclusion:** The patients with delayed hip fracture surgery showed a high prevalence of preoperative VTE, but our management protocol showed effective successful prevention of symptomatic VTE including PE.

## P269
## BONE MINERAL DENSITY LEVEL IN EARLY MENOPAUSE OF OBESE WOMEN IN ZLATIBOR DISTRICT

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**Objective:** To determine a correlation between T-score level of spine and hip, and BMI we measured BMD in women from Zlatibor district experiencing menopause before the age of 40.

**Methods:** 70 female patients of different age groups were examined in Osteodensitometry Cabinet of Special Hospital for Thyroid Gland and Metabolism Diseases Zlatibor. BMD expressed as a T-score was measured using DXA technology apparatus (Explorer-Hologic). Height, weight, and BMI were subsequently measured.

**Results:** Average age of patients is 50±4.21 y, average age of female entering menopause is 38±2.78 y. 43 women (63%) comprised an overweight group, while 27 female patients (37%) comprised an obese group. A positive correlation between spine T-score and hip T-score (r=0.582667) was identified in a group of patients with BMI<30. A relationship between the T-scores of spine and hip and menopause start year among patients with BMI<30 was found to be immaterial (r<0.3), a correlation matrix was obtained (Pearson). A moderate negative correlation was observed between spine T-score and BMI (r=0.33) and negligible correlation among other variables was found (r<0.3). Further, the correlation between hip T-score and menopause start years was found to be moderate positive (r=0.424356) and immaterial correlation among other variables was observed (r<0.3). Result obtained rxy=0.424356 was tested for 26 patients for which relationship between hip T-score and menopause start year was searched for. Following hypotheses were set in accordance: Ho: Rxy=0 and Ha: Rxy=0. With consideration that obtained t value, t=2.29, is greater than the limit for 24 degrees of freedom and level of significance equals p=0.05, <t(24,0.05)=1.71 and p<0.05, the null hypothesis is rejected and alternative hypothesis is accepted with error p=95%. Having said that we can conclude that there is a high correlation between hip T-score and menopause occurrence onset.

**Conclusion:** Obese women with BMI>30 kg/m$^2$ have a less pronounced BMD decrease on spine and hip. A high correlation between hip T-score and menopause start was proved to exist in the same group of patients.

## P270

## OSTEOPOROSIS IN THALASSEMIA MAJOR PATIENTS: RESULTS FROM A CROSS-SECTIONAL OBSERVATIONAL STUDY

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**Objective**: Thalassemia major (TM) is a hereditary disease caused by defective globin synthesis. Patients with TM have benefited from a significant increase in life expectancy during the last years. However, they may eventually face many comorbid health conditions, including endocrinopathies and low BMD, usually observed in the aging general population. The aim of the present study was to evaluate biomarkers of bone remodeling in TM patients and to compare them with both osteoporotic and healthy population in order to investigate new therapeutic paths.
**Methods**: 64 patients with TM (32 men and 32 women) participated in a cross-sectional study design. The patients were recruited from Aghia Sofia Children's Hospital and evaluated using DXA of the lumbar spine and femoral neck and with markers of bone remodeling including RANKL, osteoprotegerin (OPG), C-terminal telopeptide (CTX), and sclerostin. Results were compared with those from a group of 12 postmenopausal women with osteoporosis and a group of 12 postmenopausal women with normal BMD.
**Results**: The statistical analysis of the biochemical markers of bone metabolism revealed significant differences between the three groups only for RANKL and OPG/RANKL.
**Conclusions**: Patients with TM do not have a higher probability of suffering from osteoporosis as compared to the general population. However, some markers of osteoclast activity differ between patients with TM and osteoporosis indicating possible differences due to the antiosteoporotic treatment. The lack of significant differences among the three groups regarding the levels of CTX and sclerostin may indicate the potential efficacy of the current osteoporotic treatment for TM patients, as well.

## P271

## IMPACT OF ARTERIAL STIFFNESS ON PHYSICAL PERFORMANCE IN ELDERLY PATIENTS

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**Objectives:** Analyzing physical performance in elderly patients and observing changes in vascular and cognitive parameters according to physical performance.
**Method:** We noticed 143 elderly patients from the Geriatrics Clinic and we evaluated Short Physical Performance Battery, 4m walking test, cognitive determinations (MMSE and Clock draw test), and PWV (by arteriograph). All determinations are performed according to the protocol and the results are analyzed with SPSS.
**Results:** Measurement of aortic pulse wave velocity observed a statistically significant difference (Student t-test, p=0.094) in the two groups of analysis: those with low physical activity had a higher average value (10.37±1.89 m/s) vs. those with moderate or good physical activity (9.85±1.73m/s) (Table 1). Mean values of MMSE are significantly lower (21.02±4.68 points) among those with low activity vs. 25.13±4.17 points achieved by those with good physical activity (Student t-test, p<0.001). More than half (51%) of the elderly treated with statins showed good physical activity. Clock draw test 6.63 ±1.33 points, in the group of those with low physical activity, a statistically significantly lower score than the average score of 7.96±1.72 points among those with a better physical performance (Student t-test, p<0.001).

*Table 1* Physical performance and haemodynamic vascular parameters

| Characteristics | Low physical activity | Good and very good physical activity | p |
|---|---|---|---|
| PWV ao | 10.37 ± 1.89 | 9.85 ± 1.73 | 0.094 |
| Aix ao | 39.08 ± 10.65 | 40.36 ± 8.14 | 0.602 |
| PP | 67.06 ± 11.15 | 60.84 ± 10.77 | 0.014 |
| SBPao | 143.95 ± 22.23 | 142.62 ± 23.95 | 0.731 |
| HR | 69.15 ± 12.14 | 65.40 ± 10.25 | 0.047 |
| Systolic blood pressure | 145.70 ± 18.77 | 140.97 ± 20.07 | 0.149 |

**Conclusion:** Arterial stiffness is associated with low physical performance among the elderly. This is in line with the findings of recent interventional studies on young adults on the contribution of physical exercise to arterial stiffness. Physical activity is very important in preventing premature aging, in maintaining functional independence and last but not least, in a healthy mind. The value of the research is the possibility of cardiovascular events prevention through specialized kinetotherapy, even at advanced ages, with monitoring of the vascular profile that causes fragility at this level.

## P272

## MRI EVALUATION OF AVASCULAR NECROSIS OF THE FEMORAL HEAD IN CHILDREN WITH SICKLE CELL DISEASE ON HYDROXYUREA

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**Objective:** There have been concerns about the safety of hydroxyurea (HU) in sickle cell disease (SCD) patients with the Arab/India haplotype because of the potential risk of avascular necrosis of the femoral head (AVNFH), which is a common complication among patients in Kuwait.
**Methods:** The present study documents the baseline and follow-up MRI of the hips among Kuwaiti patients with SCD who have been on hydroxyurea for at least one year. The patients were screened for AVNFH by MRI using a 1.5 Tesla GE unit. Spin echo T1- and T2-weighted images and T2 FATSAT sequences in coronal and axial planes in 4mm-thick sections were obtained. The images were examined independently by two radiologists. AVNFH was graded I (mild), II (moderate), or III (severe).
**Results:** 40 patients, made up of 18 (45%) SS, 19 (47.5%) $S\beta^0$-thal and 3 (7.5%) SD, had pre- and post-HU MRI of the hips for assessment of AVNFH. They were aged 6-20, with a mean of 12.9±4.2 y and had been on HU for 1-15 y. Pre-HU, 29 (72.5%) had normal images while 11 (27.5%) had AVNFH of grade I in 5 and grade II in 3. The mean age of the former was 11.9±4.0 and the latter, 15.3±3.7 y; the difference was statistically significant (p=0.02). Post-HU, of the 29 that were initially normal, 27 (93.1%) remained unchanged, while 2 (6.9%) developed new AVNFH. Of the 11 that had lesions in the initial MRI, 5 (45.5%) remained static while 5 (45.5%) had progressed with more florid lesions and 1 (9%) improved. A previous study from our center showed that, in SCD patients not on HU, AVNFH progressed in 64.7%, while 78% showed new lesions. In the present study, however, of patients on HU, only 6.9% developed new lesions, while 45.5% showed progression.
**Conclusions:** There is no evidence of enhanced progression of AVNFH lesions in children with SCD treated with HU in Kuwait. The drug may, in fact, prevent new lesions. This may be due to the decreased expression of adhesion molecules that has been reported with the use of HU.

## P273
## AN INVESTIGATION OF THE RELATIONSHIP BETWEEN TEMPOROMANDIBULAR DISORDER WITH POSTURE AND PEDOBAROGRAPHIC ANALYSIS

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**Objective:** To evaluate the whole body posture and plantar pressure distributions in individuals with temporomandibular disorder (TMD) and also in people with healthy temporomandibular joints.
**Methods:** A study group aged between 18-35 y, 30 patients, who were diagnosed with Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) who applied us with jaw pain and 30 healthy people at the same age range as a control group were included in the study. Both groups received global postural assessments by using PostureScreen Mobile® (PSM) program which is using four side photographs and the New York Posture Scale (NYPS). Static pedobarographic measurements were taken.
**Results:** There was no statistically significant difference between groups from anterior and posterior posture assessments in using PSM ($p>0.05$). On the right and left lateral sagittal plane, knee translation and angulation were significantly different ($p<0.05$). There was no statistically significant difference between the groups in terms of body regions in NYPS posterior evaluation ($p>0.05$). On the left side, there was difference between the groups in terms of total scores, neck, chest, lower back and trunk posture ($p<0.05$). Pedobarographic measurements of plantar pressure distributions showed no statistically significant difference between the TMD and the control group ($p>0.05$).
**Conclusion:** Postural misalignments may result in development of TMD or as a consequence of TMD. Assessment of postural alignment and giving postural alignment exercises will play an active role in preventing or treating TMD.

## P274
## CASE REPORT: A RARE CAUSE OF PIRIFORMIS SYNDROME, VENOUS VARIX COMPRESSION OF THE SCIATIC NERVE

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**Objectives:** Piriformis syndrome is an infrequent cause of entrapment neuropathy of sciatic nerve at the level of the piriformis muscle. Patients usually reporting pain in the gluteal/buttock region radiating down the back of the leg with or without neurologic deficit.
**Methods:** We introduce a female case with piriformis syndrome caused by venous varix complex. For this case report, we tested X-Ray and MRI of hip and lumbar area and needle EMG.
**Results:** A 78 years old woman presented with right buttock pain radiating down through the posterior thigh and calf for 2 years of history. Sitting on the affected side provoked pain more than walking or standing. Pain was rapidly relieved by standing and walking. Neurologic examination were normal, there were no motor deficit, diminished reflexes or weakness. The supine straight leg raising test and sitting knee extension test were both negative. Bilateral venous varicosities were noted in the patient's leg. The opposite limb examination was normal. Motor NCSs were normal for the peroneal and tibial nerve with normal F-wave latency and persistence. Sural

nerve SNAP decreased bilaterally with a normal NCV. Lumbar nerve root compression was excluded by imaging methods and the clinical history. Coronal and axial MR images demonstrated tubular structure adjacent the sciatic nerve. These were of high signal intensity on T2 fat sat and T2 W STIR, isointense to muscle on T1 WFES images and identified as a varicosities (Figure 1). Patient's pain relief with surgical decompression and ligation of varix. After 3 months of surgery patient reported no recurrence of her pain.

**Conclusions:** The common causes of sciatica are lumbar disc pathologies, spinal stenosis and other spinal pathologies. Less common causes include piriformis syndrome and the other nerve compression diseases like tumor or infections. Especially in the elderly patients, varicotic veins are common. While standing and walking these veins collapse, contrary lying down and sitting leads fill up that cause congestion and nerve compression. This mechanism allows clinicians to consider the vascular cause of sciatica. Because of unusual clinical presentation, this condition can be easily misdiagnosed so the clinician should make a request of pelvis MRI.

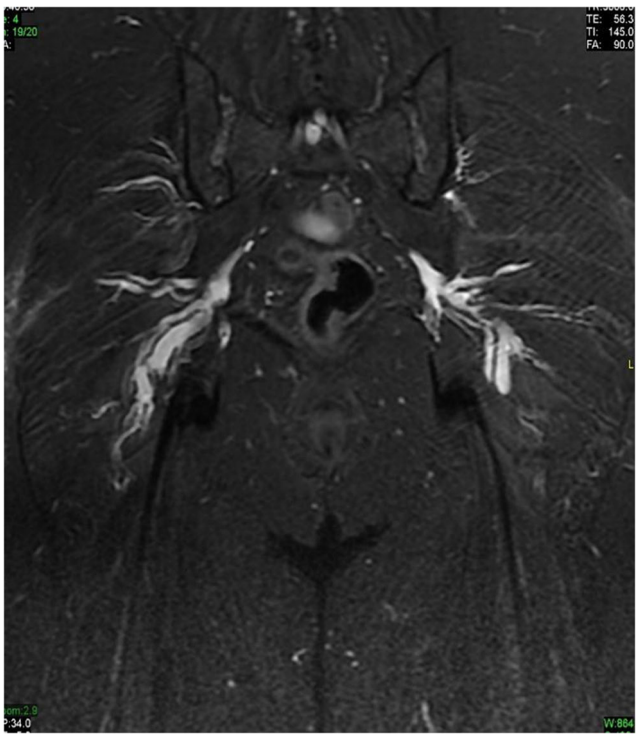

**Figure 1.** Coronal T2 W STIR image of varicosities on the right side.

## P275
## APPLICATION OF CAPSAICIN EXTRACT IN THERAPY OF PAIN SYNDROME IN OSTEOARTHRITIS

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**Objectives:** Osteoarthrosis (OA) is a degenerative disease of the joints, which takes one of the leading positions in rheumatologic pathology among the population. Pain and limitation of movements that accompany this disease significantly reduce the patients quality of life. The aim was to study the efficacy of phytopharmaceutical standardized capsaicin extract in patients with primary generalized OA.

**Methods:** The study involved 60 patients aged 52-68, women – 41 (68%), men – 19 (32%). All patients were divided into two groups. The main group of patients received standard therapy, which included nonsteroidal anti-inflammatory drugs (NSAIDs) and physiotherapy procedures. Subgroup of comparison in addition to basic treatment received a standardized capsaicin extract at a dose of 100 mg in the form of a cream for external use. Treatment efficacy was assessed by visual analogue scale (VAS), WOMAC scale, Leken's functional index.

**Results:** After 14 d of treatment, the following results were obtained: VAS indicators in the main group significantly decreased from 65.71±2.86 mm to 28.13±2.38 mm ($p<0.05$), and in the subgroup of comparison – from 63.53±2.54 mm ($p<0.05$) to 21.62±2.12 mm. The decreasing of Leken's functional index in the main group was less (from 8.1±1.2 to 5.5 ±1.4) ($p<0.05$) in comparison with group of combined treatment (from 8.2±1.4 to 4.2±1.1) ($p<0.05$). The improving of indexes of WOMAC subscales in the main group were the following: pain – from 14.6±0.9 to 10.3±1.2; stiffness – from 5.4±0.6 to 4.1±0.5; physical function 51±2.4 to 40±2.7 ($p<0.05$); in the subgroup of comparison: pain – from 14.3 ±1.1 to 8.4±0.9; stiffness – from 5.2±0.7 to 3.6±0.4; physical function 53±2.1 to 34±2.3 ($p<0.05$).

**Conclusions:** This study proved the efficacy of standardized extract of capsaicin as a treatment for patients with OA. It has also confirmed the possibility to improve treatment results by adding this drug to standard treatment regimen for OA.

## P276
## EXPEDIENCY OF USING GINGER ROOT EXTRACT IN THE TREATMENT OF PATIENTS WITH OSTEOARTHRITIS

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**Objectives:** Pain and movement constraints are the leading complaints in patients with osteoarthritis, which have a negative effect on the quality of life in this cohort of people. That is why the reduction of pain syndrome is one of the main tasks in the treatment of this disease. The aim was to investigate efficacy of treatment with herbal drug of standardized extract of ginger root in patients with osteoarthritis; to study impact of this phytopharmaceutical on the dynamics of inflammation process.

**Methods**: The study involved 45 patients (28 women and 17 men) aged between 54-71 y with primary osteoarthritis. The

treatment was provided using phytopharmaceutical standardized extract of ginger root at dose of 300 mg twice daily per os during two weeks. The efficacy of the ginger root extract was evaluated using visual analogue scale (VAS), WOMAC scale, Leken's functional index. To investigate the effect of this herbal drug on inflammation process it was analyzed such parameters as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR).

**Results:** By the end of the study, in 14 d of the treatment, the VAS parameters had significantly decreased from 65.71±2.86 to 37.65±2.86 ($p<0.05$). The decreasing of Leken's functional index in this patients group was from 8.5±1.32 to 4.4±1.21 ($p<0.05$). The improving of indexes of WOMAC 3 subscales were following: pain – from 14.6±0.93 to 10.3±1.22; stiffness – from 5.6±0.51 to 3.8±0.62; physical function 54±2.14 to 39 ±2.42 ($p<0.05$). CRP by the end of the treatment decreased from 5.78±0.23 to 4.1±0.19 ($p<0.05$); ESR – from 15.67±1.62 to 10.73±0.51 ($p<0.05$).

**Conclusions:** According to the study results it can be concluded that the standardized ginger root extract is effective in the treatment of patients with osteoarthritis. In the course of the treatment, the patients demonstrated reduction in pain intensity by 57%. It was also observed the antiphlogistic effect of ginger root extract exerted by the decreasing of CRP, ESR parameters.

## P277

## STUDY OF VERTEBRAL FRACTURE PREVALENCE AND SCANOGRAPHIC BONE ATTENUATION COEFFICIENT (SBAC-L1) IN PATIENTS WITH RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS VS. CONTROLS

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**Objective:** To identify the prevalence of vertebral fractures (VFs) and to measure the scanographic bone attenuation coefficient of the first lumbar vertebra (SBAC-L1) based on CT-scan examinations of patients with rheumatoid arthritis (RA), patients with ankylosing spondylitis (AS) and in a control group.

**Methods:** This monocentric and retrospective study included patients who were evaluated between 2009-2017 with a diagnosis of RA based on the ACR/EULAR criteria, those with a diagnosis of AS based on the New York criteria, and a RA-matched control group. All of the patients received a CT scan. The osteoporosis risk factors, data from DXA and clinical characteristics were collected. VFs were determined via CT scans according to the Genant classification, and the SBAC-L1 was measured in Hounsfield units (HU). SBAC-L1 ≤145 HU (fracture threshold) defined patients at risk of VFs.

**Results:** A total of 244 patients were included (105 RA, 83 AS, 56 controls). The AS group was younger and primarily consisted of males. Of the 4365 vertebrae studied, 66 osteoporotic VFs were found in 36 patients: 18 (17.1%) patients with RA, 13 (15.7%) patients with AS and 5 (8.9%) controls. The SBAC-L1 was 142.2 (±48.4) HU for the RA group and 142.8 (±48.2) for the AS group, both of which were significantly lower than that of the control group (161.8 (±42.7) HU). Of the 36 patients with VFs and rheumatism, 28% had a T-score ≤ -2.5 SD, and 71.4% had a SBAC-L1 ≤145 HU. A T-score ≤-2.5 SD and a SBAC-L1 ≤145 HU were associated with the presence of a VF (OR=2.35 [CI95%: 1.12-4.92] and 2.06 [CI95%: 1.04-4.10]), respectively.

**Conclusion:** The SBAC-L1 was significantly lower in the RA and AS groups than in the control group. Furthermore, SBAC-L1 ≤145 HU was associated with a higher risk of VFs, with an odds ratio similar to that of a DXA.

## P278

## DESCRIPTIVE ANALYSIS OF PATIENTS WITH OSTEOGENESIS IMPERFECTA IN A TERTIARY HOSPITAL IN MADRID

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**Objective:** Osteogenesis imperfecta (OI) is an inherited connective tissue disorder with an incidence of 1 per 20000 births. It is also called brittle bone disease and is caused by mutations in genes encoding type I collagen. *Clinical* presentation is heterogeneous, varying from only premature osteoporosis to multiple atraumatic fractures. Bisphosphonates are usually used to try to prevent bone fragility, reducing the number of fractures in some patients. Our aim was to analyze both clinical and analytical characteristics of OI patients followed in our hospital and to evaluate the different treatments used in their management.

**Methods:** A retrospective study was conducted including all patients diagnosed with OI seen in the different departments of our hospital. A database was created and both clinical and epidemiological data were analyzed.

**Results:** 25 patients with OI followed up in our hospital were included. 72% were female (18) with a mean age at diagnosis of 17 y (range: 1 month to 67 y). All of them had had fractures before the diagnosis. The number of fractures during follow-up varied according to the different types of OI, with an average of 6 fractures (range 3-24) per patient and at least 4.16 orthopedic surgeries. Only 3 patients had family background of OI. Phenotypically, 14/25 (56%) had short stature and 18/25 (72%) had blue sclerae. Only 4 patients suffered from dentinogenesis imperfecta (16%) and 3 suffered from otosclerosis (12%). Regarding analytical parameters, average uric acid in our OI cohort was 5.1 mg/dL ±1.74 and serum calcium

was 9.34 mg/dL ±0.67. PTH levels were 44.94 pg/mL ±13.37 and vitamin D was 23.1 ng/mL ±11.33. Urinary calcium excretion rate was 114.41±72.39. 60% were on current treatment with calcium and 64% (16/25) with vitamin D supplements but only 15/25 received bisphosphonates (4 risedronate, 7 pamidronate, and 4 both zoledronic and pamidronate).
**Conclusions:** Although a rare disease, OI has an important morbimortality. Severe cases suffer multiple fractures and undergo several orthopedic surgeries during their lives. Treatment for this condition is not standardized and is generally reserved for type III OI patients. Bisphosphonates, calcium and vitamin D are usually used to try to prevent new fragility fractures but fracture rates remain high despite treatment.

## P279
## FREQUENCY OF SECONDARY HYPERPARATHYROIDISM AMONG PATIENTS WITH OSTEONECROSIS OF THE KNEE

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**Objective:** Spontaneous osteonecrosis of the knee (femoral condyle and tibial plateau) is more common in women over 60 y of age, occurs spontaneously and has no significant injury to the knee in history. A special role in the development of the disease has recently been given to bone tissue metabolism, the state of the subchondral bone, and the presence of microfractures in it. At the same time osteoporosis is considered as an important factor in the development of osteonecrosis. Knowing that in patients with osteoporosis, the frequency of secondary hyperparathyroidism reaches 15-20%, it was interesting to know its occurrence in osteonecrosis. Our aim was to identify the frequency of occurrence of secondary hyperparathyroidism in patients with spontaneous osteonecrosis of the knee.
**Methods:** 44 patients were examined - 31 women and 23 men diagnosed with spontaneous osteonecrosis of the knee. The average age of the patients was 59.5 y. Before treatment, all patients underwent instrumental (X-ray, MRI, DXA) and laboratory examination.
**Results:** An analysis of the data revealed that secondary hyperparathyroidism was highly prevalent - 13.6% (3 men and 3 women).
**Conclusion:** The combination of secondary hyperparathyroidism with spontaneous osteonecrosis of the knee, practically in the same ratio as with osteoporosis, can once again confirm the association of these diseases. In this connection, the use of vitamin D/alfacalcidol and calcium/osteogenon supplementation is necessary for correction of bone metabolism and secondary hyperparathyroidism in spontaneous osteonecrosis of the knee.

## P280
## MORTALITY FOLLOWING FRAGILITY HIP FRACTURE: DATA FROM A REGIONAL HIP FRACTURE REGISTRY IN SRI LANKA

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**Objective:** Fragility hip fracture is a serious health concern in developing countries with resource constrains. We assessed the mortality of hip fracture survivors in southern Sri Lanka.
**Methods:** All patients with new hip fracture admitted to Teaching Hospital, Karapitiya, Galle in Sri Lanka during June 2014 to Feb 2015 were included in a regional hip fracture registry. Readmissions and old fractures were excluded and patients were followed up for 24 months postfracture.
**Results:** There were 309 patients (women=211) and mean (SD) age of men and women were 75.1(11.3) and 76.8(8.9) y, respectively. Majority (n=285, 92%) had been physically independent and were able to walk indoors unaided prior to fracture. The crude mortality at 24 months was higher among men (24/98, 24.5%) compared to women (41/211, 19.4%). Most of these deaths (66.6% in men and 73.1% in women) occurred within the first 12months, postfracture. When compared with age and sex matched national mortality rates, at 24 months, the relative risks of death in men and women were 4.9 and 5.5, respectively.
**Conclusions:** An increased risk of death following hip fracture was noted among both men and women. The risk was higher in the first 12 months compared to the next 12 months following the fracture. Men had higher crude mortality compared to women.

## P281
## INFECTIONS AMONG RHEUMATOID ARTHRITIS PATIENTS STARTING OR SWITCHING BIOLOGICAL AGENTS: A SYSTEMATIC LITERATURE REVIEW

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**Objectives:** The increased rate of infections is one of the most relevant issues regarding biological therapies. Hence, we have a large number of studies comparing different biologic agents in order to assess their safety profile. Nevertheless, the main question is whether biologics really increase the risk of infections by themselves. Up to date, different studies tried to clarify the actual role that these drugs have in this potentially serious adverse effect, searching for other predisposing conditions related to patient clinical characteristics such as comorbidities, previous infections, age or RA disease activity.

Among this potential risk factors, we must consider that many patients receive different biologic agents during the course of their disease. This may increase the risk of infections, although there is not strong evidence in the literature to support this statement. Our aim was to analyze systematically and critically the available published evidence, comparing risk of infections between patients starting biologic for first time (*naïve*) and patients with an inadequate response to previous biologic (s*witchers*).

**Methods:** A search following Research Unit of the Spanish Society of Rheumatology designed strategy was performed over Pubmed, Embase and Cochrane Library databases (from January 2008 to February 2018). The studies retrieved by search strategies were included according to pre-stablished criteria fitness: Studies including adult patients (>18 years old) diagnosed with RA treated with biologic agents for the first time (naïve) in monotherapy or in association with synthetic DMARDs compared to patients treated with biologic agents who had inadequate response to previous biologic treatment (switchers). Regarding designs, meta-analysis, systematic reviews of randomized controlled trials (RCT), RCT, clinical trials or cohort studies were selected. Screening of studies, data collection and data analysis was performed by 2 reviewers. Methodological quality of included publications was assessed using electronic FLC platform for critical appraisal tools (Osteba), gathering evidence rates in tables, and "SIGN" was considered to classify the scientific evidence of the selected studies.

**Results:** Eight studies were finally included, with a moderate quality of evidence. Clinical characteristics, regarding to disease activity scores, functional status, age, sex distribution, concomitant antirheumatic therapies, laboratory parameters or comorbidities were quite homogeneous in both groups. Overall infection rate was higher in *switchers* than in *naïve* patients. Looking for potential risk factors related to incidence of overall infections, we found data pointing out mean disease duration, dosage of GC, age, sex, acute phase reactants and severity of comorbidities. The main risk factor identified across all studies was the cumulative dose of GC, which was higher in switcher patients; and more specifically, prednisone >10 mg/d was related to more infectious diseases. No significant differences were found among different drugs, so, regarding to this review we are not able to assign an individual risk to specific antirheumatic agents.

**Conclusion:** Our results show that overall risk of infections is slightly higher in *switchers* patients than in *naïve* patients, specially in those who receive a greater cumulative dose of glucocorticoids. This result may support the fact that biologics and small molecules do not enhance incidence of infections solely. Even in patients who require different therapeutic targets during the course of the disease, were not expected to have more infections attributed to the specific antirheumatic drugs. There are risk factors inherent to the disease and baseline individual patient status that predispose to the development of infections during the course of the disease.

## P282

## EFFECTS OF TSH AND VITAMIN D ON BONE METABOLISM IN RAT MODEL OF OSTEOPOROSIS

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**Objective:** Thyroid-stimulating hormone (TSH) exerts both antiresorptive and anabolic effects on bone remodeling in aged ovariectomized rats and TSH-/- mice, additionally supported by clinical data reporting association between low level of TSH and increased bone loss (1).

**Methods:** To further explore the direct effects of TSH on bone metabolism, without interaction with other calciotropic hormones, we introduced a rat model with removed thyroid and parathyroid glands. Surgery resulted in hypocalcemia, low level of parathyroid and thyroid hormone, and decreased concentrations of active form of vitamin D, calcitonin and C-telopeptide.

**Results:** Intermittent administration of TSH in thyroparathyroidectomized rats resulted in further decrease of serum calcium and C-telopeptide due to the suppression of bone resorption, while osteocalcin was higher indicating an increased bone formation rate. MicroCT analyses of the distal femur and proximal tibia showed that thyroparathyroidectomized rats treated with vitamin D alone or in combination with TSH had an increased trabecular bone volume, and enhanced trabecular bone quality. Biomechanical indentation test of the trabecular bone showed an increased maximal load for 105% and 235%, respectively, in rats treated with vitamin D alone, or in a combination with TSH. Rats treated with TSH had a significantly decreased number of osteoclasts in comparison to control animals. The decline of the osteoclast number was even greater in rats treated with a combination of TSH and vitamin D, despite the fact that vitamin D alone increased the number of osteoclasts. Addition of TSH to osteoblasts increased the production of the bone specific alkaline phosphatase and had a synergistic effect when combined with vitamin D.

**Conclusion:** TSH independently of calciotropic hormones suppressed bone resorption and stimulated bone formation, while in combination with vitamin D acted synergistically on bone formation resulting in gain in bone volume.

**Reference:** (1) Sampath TK et al. J Bone Miner Res 2007;22:849.

## P283

## STUDY DESIGN OF JAPAN OSTEOPOROSIS LIAISON SERVICE (JOLS) STUDY FOR PREVENTION OF SECONDARY FRACTURE: MULTICENTERED HISTORICAL CONTROL STUDY

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**Objectives:** Fracture Liaison Service (FLS) is nowadays well accepted as effective coordinator-based system to prevent secondary fracture. Japan Osteoporosis Society offered Osteoporosis Liaison Service including FLS for both primary and secondary prevention of osteoporotic fracture. In this study, we focus on secondary prevention after clinical vertebral fracture and hip fracture to show the efficacy of FLS in super-aging society as in Japan.
**Methods:** This multicentered historical-control study has been planned to perform in more than 20 hospitals and institutions in Japan. The inclusion criteria are the newly hospitalized patients with fresh clinical vertebral fracture or hip fracture in postmenopausal women or men equal to or above 50 years old. Multidisciplinary team assesses the risk of osteoporosis, and educates the patients and their family, and registers the patients in database center in Fujita health University during 3 months after the first fracture. On discharge, the pharmacist provides guidance how to use the medicine. After 6, 12, 24 and 36 months, the hospital staff will send letter to each patient to check the adherence.
**Results:** As for historical control, retrospective surveillance of secondary fracture after clinical vertebral fracture and hip fracture was done in 2744 patients and tentatively got the information in 1371 patients (66.9%). Among these 1371 patients, 298 patients (21.7%) died and 154 patients (11.2%) had new clinical fracture during 12-24 months after first fracture. According to this data, we calculated the number of patients exposed to intervention is about 1300, when we hypothesize the risk reduction rate by FLS is about 30%. This study was approved by IRB at each institution, and has started in June 2018.
**Conclusion:** This prospective study is expected to provide useful information to improve FLS in super-aging society.

## P284
## OBESITY AND FLAT VERTEBRA

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**Objective:** Spine is a mechanical structure, in a young and healthy individual, under a radiological focus, disposes their vertebral bodies in harmony with their stature, and progressively increasing in magnitude from the cervical to the lumbar spine, in a range of vertical growth that it can exceed the horizontal. It is postulated that the important obesity in the early stages of life, could modify the vertebral parameters by skeletal overloads, but the problem is that the current vertebral indexes do not measure a relation of the person height with his vertebra. Thus, to check whether the childhood obesity could modify the vertebral parameters, or it is accepted that it entails a loss of equivalent stature, and in this case would be necessary a study comparative of average height, or whether the harmony of the individual is accepted, it would be necessary to create an index that combine these variables to objectify if its value is a constant, and thus, eliminate the ambiguity of the observer.
**Method:** We selected a population of obese (BMI≥35), both sex, between 20-55 years old, in bariatric surgery protocol, with a significant obesity in their development. Was excluded any cause that could produce vertebral flattening. Figure 1.

**Figure 1. Aetiopathogenic classification of the flat vertebra.**

**1. Defects in development:**
- 1.1. Secondary to skeletal stress overloads:
  - 1.1.1. Ehlers-Danlos syndrome.
  - 1.1.2. Kyphosis of Scheuermann.
- 1.2. Bone dysplasias:
  - 1.2.1. Spondylar bony dysplasias: Mutations in the type II collagen gene.
  - 1.2.2. Bone dysplasias associated with bone fragility: Imperfect osteogenesis. Hyperphosphatasia.

**2. Non-dysplastic bone fragility:**
- 2.1. Metabolic osteopathies with generalized osteoporosis:
  - 2.1.1. States dependent on age: Senile. Postmenopausal
  - 2.1.2. Other: Drugs and alcohol. Endocrinological
- 2.2. Vertebral infiltrative phenomena:
  - 2.2.1. Non-neoplastic conditions:
    Diseases due to lysosomal storage: Gaucher and Morquio's disease
  - 2.2.2. Neoplastic conditions:
    Benign nature: Eosinophilic granuloma.
    Malignant nature: Lymphoma Ewing's sarcoma. Others.

**3. Exogenous causes of flat vertebrae:**
- 3.1 Post-traumatic
- 3.2 Post radiotherapy.
- 3.3 Infections.

As a control group, was included any patient that went to outpatient visit of rheumatology, and which met the inclusion and exclusion criteria above, except obesity. As variables, sex, age, BMI, and with a chest lateral plate, not rotated, and in the eighth dorsal vertebra, we calculate his length (LVD8) and his height (HVD8), measured in mm. Figure 2.

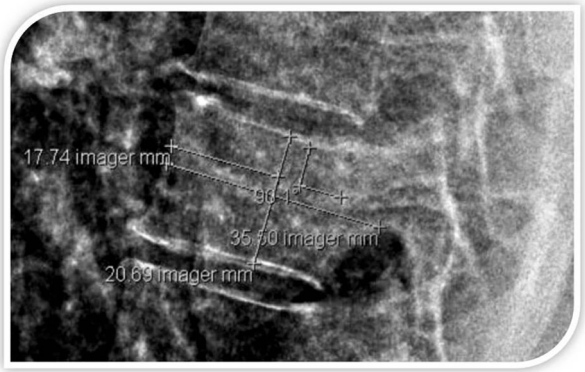


Figure 2. With a chest lateral plate, not rotated, and in the eighth dorsal vertebra, by proximity to the Scheuermann kyphosis, we calculate his length (LVD8) and his height (HVD8), measured in mm. Thus, from the horizontal one of his pedicle, taken at that height and parallel to the vertebral plate with superior disc contact, LVD8 is 35.50mm. Drawing a line perpendicular to the previous one (90.1º), and measured from the most sclerous area of the vertebral plate with disc contact superior to inferior, passing through the midpoint of its length (17.74mm), we obtain a HVD8 of 20.69mm.

Finally, we applied a comparative study of average of height and vertebral index (VI) results: VI=10 x LVD8 / (HVD8 x stature).

**Results:** 90 patients were analyzed. 20 patients in the study group (22.2%): 48.1% female, 48.6 years old, 38.2 BMI, and VI 11.6 Meters $^{-1}$ . And 70 patients in the control group (77.8%): 51.1% females 45.15 years old, 26.2 BMI, and VI 11.2 Meters $^{-1}$. Figure 3

| Control Group | | | | |
|---|---|---|---|---|
| Sex | Age (Years) | Height (m) | BMI | VI (1/m) |
| 73,3% Male | 45,15 | 1,694 | 26,9 | 10,1 |
| 76,1% Female | 44,8 | 1,603 | 25,5 | 10,2 |
| Obese group | | | | |
| Sex | Age (Years) | Height (m) | BMI | IV (1/m) |
| 26,7% Male | 47,6 | 1,687 | 36,6 | 10.2 |
| 23,9% Female | 46.9 | 1,597 | 40 | 10.3 |

Figure 3

**Conclusion:** It is a small study, and according to height or the created index, it does not seem that obesity in development modifies the overall height or the vertebral parameters. In addition, the index gives a stable value regarding the sex of both populations in the eighth dorsal vertebra.

## P285
## POSTOPERATIVE DULOXETINE IMPROVES CHRONIC PAIN AFTER UNILATERAL KNEE ARTHROPLASTY

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**Objective:** Chronic pain following operation is defined as a residual pain continuing more than 3 months after the operation. Chronic pain after the operation is not a rare complication, any operation could be a reason for this kind of pain. In our institute 46 patients out of 523 UKAs (Oxford mobile bearings) had chronic pain continuing more than 3 months after the operation. Central sensitization is known as a major cause of chronic pain. Duloxetine which is selective serotonin and norepinephrine reuptake inhibitor is shown to be effective in treating chronic pain. The objective of this study is to investigate the effect of duloxetine on chronic pain after Oxford UKA.

**Methods:** I have done 523 Oxford UKA between May 2006 and April 2018. The patients were treated under our multimodal pain management protocol, which include epidural catheter, local infiltration, NSAID, tramadol and acetaminophen. After UKA the patients continued NSAID, tramadol and acetaminophen for at least 1 months. The patients who still had pain beyond 1month continued tramadol and acetaminophen at least 2 more months. 20 patients who attended my clinic between Oct 2016 and April 2018 for chronic pain were included in this study. 20 patients were then switched to duloxetine alone. The dose of duloxetine was gradually increased starting 20 mg/d and kept 60mg/d for at least 24 weeks. Numeric Rating Scale (NRS) was used to determine the levels of pain. The NRS was recorded before and after duloxetine administration periodically. The clinical result was determined by patients themselves, they selected either excellent, good or poor.

**Results:** The average NRS before switching to duloxetine was 4.4. NRS significantly decreased 2 weeks after starting duloxetine. The average NRS at 6M was 0.7. Clinical result was excellent in 9 patients(45%), good in 7 patients(35%), poor in 1patient(5%). 3 patients(15%) dropped out due to side effect.

**Conclusions:** Duloxetine significantly reduced chronic pain after Oxford mobile bearing UKA. Central sensitization seemed to be the major cause of chronic pain after Oxford mobile bearing UKA.

## P286
## THE EFFECTIVENESS OF A COMPLEX REHABILITATION PROGRAM IN FEMALES WITH OSTEOPOROSIS AND HIP OSTEOARTHRITIS

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**Objectives:** Osteoporosis and hip osteoarthritis are frequently associated in elderly women. The objective of our study was to assess the role that medication and complex rehabilitation program can have in improving pain perception, functional status and T-score DXA values in female patients diagnosed with both osteoporosis and hip osteoarthritis.

**Methods:** Group I- 12 patients treated with bisphosphonates and vitamin D for 1 y and other means of conservative treatment - hygiene-dietary measures, lifestyle changes, complex

rehabilitation program. Group II 11 patients treated only with medication and advised about hygiene-dietary measures and lifestyle changes. BMD assessment, initially and at the end of the study, was performed using imaging techniques like plain X-rays and DXA. Pain intensity evaluation was performed using the VAS analogue-visual pain scale, and the functionality was evaluated using the Harris hip scale.

**Results:** 23 females, aged 53-77, with an average age of 65.94 y, were diagnosed with primary hip osteoarthritis and primary osteoporosis. Regarding VAS and Harris hip score values, there was no significant difference between the two groups at the initial evaluation, which allowed us to compare the effect of the two treatments. While both groups showed an improvement in VAS values, the decrease for the first group was greater than the second one, which was also emphasized by the decrease of Student p values when comparing the VAS values at the end of the trial (p=0.230> 0.005 - nonsignificant difference). While both groups showed an improvement in the Harris hip score, the incidence for the first group was greater than the second one (p=0.0042 vs. p=0.037). When comparing the T DXA score values we concluded that the improvement was greater for the first group, at the final evaluation.

**Conclusions:** Individualized medical treatment and complex rehabilitation program increases the functionality and reduces pain and also improves the BMD in patients with osteoporosis and hip osteoarthritis.

## P287
## NEUROPATHIC PAIN COMPONENT IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objectives:** To determine the frequency of neuropathic pain (NP) in patients (pts) with knee osteoarthritis (OA) and its association with physical function, degree of OA and symptom duration.

**Methods:** A total 50 pts (15 males, 35 females; mean age 61.8 ±5.1 y, range 45-75 y) diagnosed with knee OA (according to ACR criteria) were examined. Exclusion criteria: diabetes mellitus, polyneuropathy (sensory-motor, alcoholic, post-herpetic), lumbar radiculopathy, fibromyalgia, cancer, central nervous system diseases. Of these 50 patients, 31 had a diagnosed bilateral and 19 pts with unilateral knee OA. The degree of knee OA and disease activity were determined by symptom duration, movements of the knee, examination ultrasound (synovial hypertrophy, joint effusion), Kellgren-Lawrence grade (KL),visual analogue scales (VAS) and WOMAC. NP was determined using the PainDETECT questionnaire.

**Results:** Pain from knee OA revealed that 9.8% are likely NP, and 19.2% are possible NP. NP was found more frequently in patients with bilateral knee OA (bilateral OA in 40.2% pts, unilateral in 21.2% pts, p=0.025), with a higher radiographic degree (KL≥ 2, in 41% pts, KL≤ 2, 29.8%, p=0.046) and with longer symptom duration (<5 y in 25% pts, >5 y in 45% pts, p=0.033). In knee OA patients PainDETECT was in correlation with WOMAC index (p<0.001) and VAS (p<0.001). Compared with the PainDETECT score, there was positive correlation with the KL grade (p=0.048) and symptom duration (p=0.035), but there was no correlation between PainDETECT and ultrasound sign (p=0.587) and movements of the knee (p=0.774).

**Conclusions:** This study has shown that nearly one-third of our patients with knee OA had likely or possible neuropathic component pain of the knee. Patients with NP had more increased severity of pain, severe form of knee OA and longer duration of symptoms. It is important to be aware of consider the existence of NP in the treatment of knee OA pain.

## P288
## DENOSUMAB IN PATIENTS WITH CHRONIC KIDNEY DISEASES

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**Objectives:** Due to the rapidly aging population the number of patients with chronic renal failure and osteoporosis has been increasing annually. Many of the therapeutic agents used to treat osteoporosis are known to be affected by the renal function. Denosumab is not excreted by the kidney. The aim of this report is to study the efficacy and tolerability of denosumab in patients with chronic kidney diseases (CKD).

**Methods:** Patients with CKD who received a single 60 mg subcutaneous dose of denosumab every 6 months for a minimum period of 24 months were included. Data collected included information about the following: CKD stage, fracture history, relevant medications, adverse events, serum creatinine, calcium, phosphorus, magnesium levels and ECG before treatment and every week within the first 8 weeks of treatment and every 3 months after that, vitamin D and PTH levels prior to dosing, BMD before and every year after treatment. Hypocalcaemia or vitamin D deficiency were correct when present. Treatment of hypocalcemia required large doses of oral calcium and calcitriol, and increases in dialysate calcium concentration.

**Results:** 48 patients (44 female, 4 male; 11 patients with CKD stage 1, 12 patients – CKD-2, 11 patients – CKD- 3, 10 patients – CKD-4, 4 patients – CKD-5) were identified. Mean duration of treatment was 2.8 y, average eGFR - 44 ml/min/1.73 $m^2$, mean patient age - 61 y (range 42-86), mean BMI - 26 (range 18-37). The average calcium prior to dosing was 2.41 mmol/l (2.11 to 2.58) falling to 2,01 mmol/l (1.84-2.29) after dosing. Average PTH level prior to dosing was 148 ng/l (38-345) and after was 743 ng/l (154-1642). Hypocalcemia was detected in 18 of the patients studied. 6 patients developed severe hypocalcemia (calcium <194 mmol/l) and 3 of them developed seizure and prolonged QTc.

**Conclusions:** Denosumab cause a small, but not clinically significant reduction in serum calcium in most patients with CKD. Patients with severe renal dysfunction may have an increased risk of developing hypocalcemia. In patients with preexisting hypocalcemia, serum calcium and vitamin D should be monitored more frequently throughout treatment duration.

## P289
## CLINICAL CHARACTERISTICS AND PATHOGENIC GENE MUTATIONS IDENTIFICATION OF PAGET'S DISEASE OF BONE IN CHINESE POPULATION

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**Objective:** Paget's disease of bone (PDB) is characterized by highly localized areas of increased bone resorption and disorganized bone remodeling. It is common in western descent. However, it is rare in Chinese. Genetic factors play an important role in the pathogenesis of the disease [1]. The purpose of the study was to characterize the clinical features and identify genetic mutations in Chinese PDB patients.

**Methods:** 37 clinically diagnosed PDB patients (two were father and son, the rest were sporadic) and 250 healthy donors were recruited. The clinical features were characterized and the whole-exome sequencing (WES) was carried out in patients to detect gene mutation and then confirmed in donors by Sanger sequencing. PolyPhen-2 and CADD analyses were performed to predict the damaging effect of the mutation. Mutant protein structure was constructed as well.

**Results:** The father and son were early-onset (onset age <30 y). The onset age of sporadic PDB patients (53.2±19.1 y) was younger than that of western patients. One of them was PDB combined with giant cell tumor (GC), had even earlier onset age (23 y) with mild symptoms. The most common lesion sites were the pelvis, femur, and skull. Most patients had high serum alkaline phosphatase (ALP) level and intravenous bisphosphonates was effective to relieve bone pain and reduce ALP level. Vitamin D receptor (*VDR*) gene mutation was identified in a 25-year-old male, who harbored a heterozygous G-to-A transversion at position 424 in exon 4 (c.G424A), which resulted in a glutamate-to-lysine (GAG >AAG) substitution at codon 142 (E142K) (Fig. 1). No *SQSTM1* gene mutation was detected in all 37 patients, which was different from the western patients. $VDR^{E142K}$ was predicted to be damaging with PolyPhen-2 score of 1 and CADD score of 37. Meanwhile, the amino acid residues at p.142 is highly conserved across 9 different biological species (Fig. 2). By constructing the mutant protein structure, it was found that the mutation site located in the VDR protein DNA binding region, and which would significantly enhance DNA interaction (Fig. 3).

**Conclusion:** Vitamin D regulates osteoclast function by binding to VDR [2]. Therefore, VDR dysfunction directly affects the osteoclasts status.

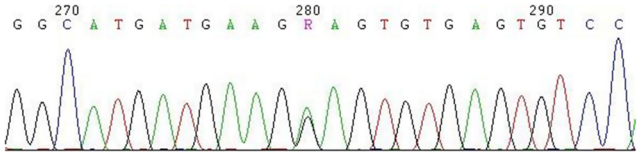


Fig. 1 Genetic analysis of the VDR gene mutation

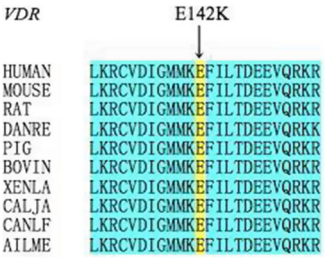


Fig. 2 Conservative structures in 9 different species

Fig.3 A Protein spatial conformation (normal)

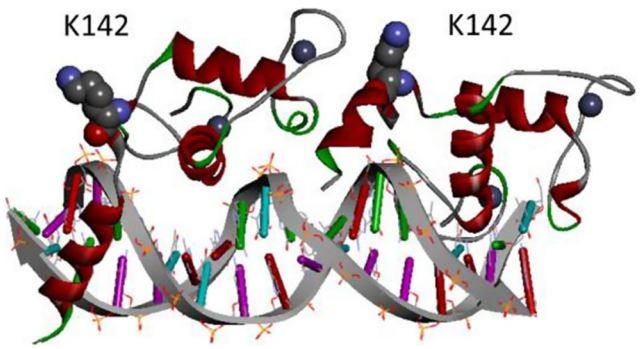


Fig.3 B Protein spatial conformation (mutant)

**Conclusion:** Our study described the clinical features and reported that *VDR* gene mutation contributes to the pathogenesis of PDB in Chinese patients.

**References:**

1. Albagha OM. Bonekey Rep. 2015; doi: 10.1038/bonekey.2015.125
2. Shibata T et al. J Bone Miner Res 2002;17: 622

## P290
## PROGRANULIN IS REQUIRED FOR ESTROGEN EFFECT ON POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Estrogen is known to prevent bone loss during menopausal transition. We reported previously that progranulin (PGRN) also effectively prevented bone loss in inflammatory arthritis (Tang, et al, Science, 2011). Given that both estrogen and PGRN could inhibit osteoclast formation and bone resorption, this study is to determine whether PGRN plays a role in estrogen's protective influence in postmenopausal osteoporosis.
**Methods:** Mice experiments are approved by IACUC of New York University. BMMs were isolated from the femurs by flushing the bone. After 24 h, nonadherent cells were collected and treated with M-CSF (30 ng/ml). After 3 d, adherent cells were cultured in α-MEM containing RANKL and M-CSF. Osteoclast formation was measured by TRAP staining. To analyze pit formation, the special Osteo Assay Surface 24-well plates (Corning) were used. Real-time PCR was performed to determine the mRNA gene expression. BMSCs were obtained from mice femurs by flushing, after 24 h, nonadherent cells were removed and adherent cells were cultured in DMEM media which changed every 3 d for 14 d. For osteogenic induction of BMSCs, osteogenic differentiation medium from R&D systems was used. ALP and ARS staining were performed after 2 and 3 weeks of induction, respectively. PGRN levels of cell culture media were measured by ELISA kit. Immunofluorescence was used to localize the PGRN in both BMMs and RAW 264.7 cells. Genome microarray analysis was performed to identify the difference between bone cells from WT or PGRN-KO mice.
**Results:** Firstly, in both primary BMMs isolated from WT mice and RAW 264.7 macrophages, we found estrogen significantly upregulated PGRN expression. Secondly, in primary BMMs isolated from WT mice, estrogen markedly inhibited osteoclast formation and bone resorption, as well as levels of osteoclast differentiation gene markers. In contrast, estrogen's inhibitory effect on osteoclastogenesis was totally abrogated in PGRN-KO BMMs. Intriguingly, it is noted that pits of cells from PGRN-KO mice were much bigger than those from WT mice, indicating that loss of endogenous PGRN led to increased bone resorption. Thirdly, in BMSCs derived from both WT and PGRN-KO mice, estrogen slightly increased bone mineralization and osteogenic differentiation markers (no significant difference). In addition, bone mineralization of cells from PGRN-KO mice was markedly reduced compared to those from WT mice. Fourthly, estrogen pellets could not reduce the ovariectomy-induced bone loss in PGRN-knockout mice as that in WT mice. Lastly, by genome microarray analysis, it was revealed that estrogen receptor α (ERα) expression in the bone was significantly reduced when PGRN deficiency.
**Conclusions:** Above all, this study indicates that PGRN is required for estrogen's effect on postmenopausal osteoporosis, via its interaction with ERα.
**Acknowledgement:** The work is supported by China Scholarships Council.

## P291
## LOW TRABECULAR BONE SCORE WITH OR WITHOUT OSTEOPOROSIS IS DIFFERENTIALLY LINKED TO DISTINCT CLINICAL CONDITIONS

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**Objective:** Trabecular bone score (TBS) is a bone texture index derived from lumbar spine DXA images. TBS may have a role in the assessment of fracture risk in some causes of secondary osteoporosis. Our aim was to assess which medical conditions are associated with low TBS.
**Methods**: A cross-sectional study conducted in the bone clinic at the Tel-Aviv-Sourasky medical center. BMD was measured by DXA (Lunar Prodigy Primo) and TBS was measured from DXA L1L4. We collected demographic and clinical data from the medical files. To be included in this analysis, subjects had to present with a L1L4 TBS adjusted T-score (aTBS) <-3.
**Results**: We identified 110 subjects (F/M=109:1) whose aTBS was<3, of whom half had osteoporosis by BMD and half were normal/osteopenic. Mean age was 68±12 and mean BMI 28.3±5.8 kg/m$^2$. The most common conditions reported were obesity (35%), diabetes (27%), cancer (20.6%) and chronic inflammatory diseases (9.3%), nearly 30% were proton pump inhibitors users and 20% used selective serotonin reuptake inhibitors . The group with low aTBS without osteoporosis had significantly higher rates of obesity (52% vs. 17%, P<0.01) and diabetes (36% vs. 17%, p=0.003). In contrast, the group with low aTBS and osteoporosis included a higher rate of subjects with inflammatory diseases (15.6% vs. 3.6%, p=0.035), chronic steroid treatment (22% vs. 8%, p<0.01) and cancer [papillary thyroid carcinoma (8% vs. 0%, p=0.025); breast cancer cases (16% vs. 12%, NS); overall rate of cancer (29% vs. 14%; p=0.075)].
**Conclusion:** In our study population, low TBS is significantly linked to distinct medical conditions, in relation to the presence or absence of osteoporosis. Low TBS associated with low BMD segregated with the presence of inflammatory diseases, chronic steroid treatment, and cancer whereas low TBS with normal/osteopenic BMD was associated with obesity and diabetes.

## P292
## THE PERILS OF PROTON PUMP INHIBITORS

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Proton pump inhibitors (PPIs) are the mainstay therapy for all gastric acid related disease and are extremely widely used in current clinical practice. Although widely regarded as safe, PPIs have been associated with a variety of adverse effects, including hypomagnesaemia. The postulated mechanism of PPI-related hypomagnesaemia involves inhibition of intestinal magnesium absorption via transient receptor potential melastin (TRPM) 6 and 7 cation channels. PPI-induced hypomagnesaemia (PPIH) has become a well recognized phenomenon since it first reported in 2006. Clinical concerns arise from growing number of case reports presenting PPIH as a consequence of long-term PPIs use, with more than 30 cases published to date.

In this article, we reported 2 cases of PPIH associated with the use of pantoprazole. Both patients presented with severe hypomagnesaemia and hypocalcaemia. One of them had associated hypokalemia and cardiac arrhythmia. A casual relation with PPIs supported by resolution of electrolytes abnormalities after discontinuation of PPIs.

## P293

## MIXED OSTEOMALACIA AND LOW BONE DENSITY AS A CAUSE OF STRESS FRACTURES IN A YOUNG MALE MILITARY RECRUIT FROM SINGAPORE

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**Background:** Despite being a tropical country, vitamin D deficiency is common in Singapore. All young Singaporean males between the age of 18-21 years old have to undergo 2 y of mandatory military service. Stress fractures among recruits have been reported. risk factors include sudden increase in physical activity and vitamin D deficiency. We report the bone histomorphometry findings from a case of bilateral tibial stress fractures in an 18 years old military recruit.

**Case presentation:** An 18 years old man presented with bilateral leg pain after his first marching session of 200 m. There were no personal or family history of fractures and physical examination was unremarkable except for tenderness on palpation of both proximal tibias. His BMI was 24.6 kg/m$^2$ (weight 73.5 kg, height 1.7 3m). X-ray of bilateral knees and MRI of both calves confirmed periosteal transverse fractures of the bilateral proximal tibial metaphysis. His BMD revealed a low bone density for his age (Z-score -1.5). Apart from a low vitamin D of 10.7 ug/L, other secondary causes of osteoporosis were negative on investigation. Double tetracycline labelled qualitative bone histomorphometry of the iliac crest suggests a mixed picture of loss of trabeculae connectivity as seen in osteoporosis and delayed mineralization as seen in osteomalacia. His vitamin D was replaced to 41.4 ug/L and his BMD showed a significant improvement of 5.4% in lumbar spine and 3.2% of the hip a year later.

**Conclusion:** Vitamin D deficiency and osteomalacia in young male recruits may be a cause of low bone density and may predispose them to higher risk of stress fractures. Adequate vitamin D replacement helps to improve their BMD.

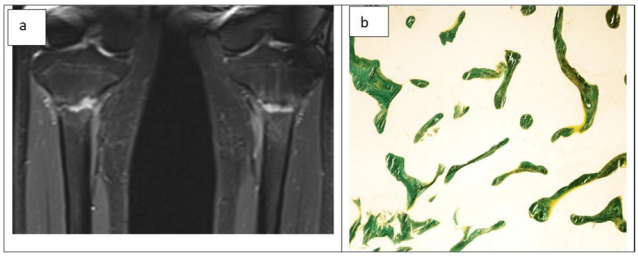


Figure 1a: MRI of the calves of the patient showed increased signal at linear T1RM sequence which suggest fluid clefts at both fracture sites

Figure 1b: Bone biopsy showed irregularity, variability and loss of connectivity of bone trabeculae, with some thinning and scattered bone nubbins

## P294

## THE FIRST RESULTS FROM THE RUSSIAN REGISTRY ON HYPOPARATHYROIDISM AND PSEUDOHYPOPAR-ATHYROIDISM IN ADULTS

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**Objective:** Hypoparathyroidism and pseudohypopa-rathyroidism are rare endocrine disorders characterized by low serum calcium due to inappropriate PTH levels or resistance to the action of PTH. This study aimed to estimate the etiological structure, demographic characteristics and hospital management of the hypoparathyroidism among patients, who were referred to the National Medical Research Centre for Endocrinology in Moscow.

**Methods:** This study adopted the design of the Italian hypoparathyroidism registry database (University of Florence) in order to be able to integrate our data in the future. 132 Russian patients were included (over 1.5 y from 2017-2018) from the National referral endocrine center in Russia. We analyzed the codes corresponding to hypoparathyroidism-related diagnoses: “hypoparathyroidism associated with medical intervention” (E89.2), “hypoparathyroidism” (E20), “idiopathic hypoparathyroidism” (E20.0), “pseudohypoparathyroidism” (E20.1), “other forms of hypoparathyroidism”(E20.8), which included “autoimmune polyglandular syndrome (APS)”, “mitochondrial disorders associated with hypoparathyroidism” [including Kearns–Sayre syndrome and mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes

(MELAS), "DiGeorge syndrome", "isolated hypoparathyroidism" and "hypoparathyroidism resulting from infiltrative, metastatic, ionizing damage". We have excluded pediatric patients (under 18 years old) and patients with the codes: magnesium metabolism disorders (E83.4), calcium metabolism disorders (E83.5), tetany BDU (R29.0).

**Results:** Overall, 132 patients with hypoparathyroidism were identified during the entire period. The patients' mean age was 47 (18;79). The mean age of disease onset was 41 (1;72). Most patients were female - 83% (n=110); male- 17% (n=22). The female-to-male ratio was 4.8:1. The evaluation of the etiology of the disease showed that 82% (n=108) of cases of hypoparathyroidism were associated with a neck surgery procedure. Nonsurgical hypocalcemia was caused by: pseudohypoparathyroidism 3% (n=4), other forms of hypoparathyroidism 3% (n=4): DiGeorge syndrome 1.5%(n=2), autoimmune polyglandular syndrome (APS) 0,75%(n=1), mitochondrial disorders associated with hypoparathyroidism (MELAS) 0.75% (n=1). In the reported cohort the majority of patients 92.4% (n=122) had clinical features of hypoparathyroidism (paresthesia, seizures). Only 7.6% (n=10) of patients did not complain about symptoms of hypocalcemia. All patients received treatment: calcium was prescribed in 92% (n=122) of cases, cholecalciferol - 79% (n=105), alfacalcidol - 81% (n=108.0), magnesium preparations 13.6% (n=18), hypothiazide 10% (n=14), calcitriol 6.8% (n=9.0), teriparatide 6% (n=8). Sufficient control of symptoms and calcium levels was achieved in all hospitalized subjects.

**Conclusion:** The most frequent cause of hypoparathyroidism was neck surgery, which made middle-aged females the most common patients with hypoparathyroidism. Calcium supplement and alfacalcidol were sufficient at maintaining calcium levels in most cases. However the minority of patients needed to receive teriparatide as the only way to maintain calcium levels and to prevent symptoms of hypocalcemia. Consequently the substitution treatment with PTH should be available in certain cases with hypoparathyroidism.

## P295

## EVALUATION OF INSIGHT VET DXA (DUAL-ENERGY X-RAY ABSORPTIOMETRY) FOR ASSESSING BODY COMPOSITION IN OBESE RATS FED WITH HIGH FAT DIET: A FOLLOW-UP STUDY OF DIET-INDUCED OBESITY MODEL FOR 8 WEEKS

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**Objectives:** We examined the precision, accuracy, and capability of detecting changes of DXA for the measurements of total-body weight (TBW), total-body fat weight (TBFW), and total-body lean weight (TBLW) in an 8-week follow-up study of rats.

**Methods:** 20 male rats (4-week) were divided into 2 diet groups. For 8 weeks, we measured body composition (TBW, TBFW, TBLW) by DXA and TBW by an electronic scale once a week. In week 8, we measured body composition 5 times by DXA and TBFW by dissecting experiment (EXP) of euthanized rats (12-week). Total-body fat ratio (TBFR) was defined as TBFW/(TBFW+TBLW). The precision of DXA was evaluated by measuring the coefficient of variation (CV) and accuracy was evaluated by comparing DXA-derived data with EXP data. The capability of detecting changes of DXA in fallow-up study was verified by analyzing the trend of DXA-derived values over the 8 weeks.

**Results:** For TBW, TBFW, TBLW of DXA, CVs were 0.02 ±0.01, 0.10±0.05, 0.03±0.02 and errors were -6.996 ±3.429(p=0.999), +14.729±3.663(p=0.982), -21.725 ±4.223(p=0.991). Prediction models were [EXP TBW=-31.767+1.085(DXA TBW), $r^2$=0.998, root mean square error (RMSE)=1.842] and [EXP TBFR=-0.056+1.177(DXA TBFR), r2=0.948, RMSE=0.007]. Over 8 weeks, DXA TBW and DXA TBLW steadily increased, DXA TBFW steadily increased followed by saturation or declination, difference of DXA TBFW between 2 diet groups steadily increased.

**Conclusions:** Our study verified that DXA (iNSiGHT VET DXA, OsteoSys, Korea) is accurate and precise enough to measure body composition of rats. Additionally, we confirmed the possibility that DXA could be used for the long-term fallow-up studies.

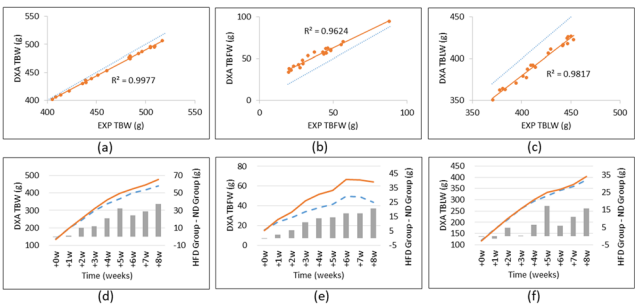


Figure 1. (a)-(c) Scatter plots of the relationship of the values between DXA and EXP in week 8. (d)-(f) The graphs represent the trend of mean DXA values divided into the high fat diet (HFD) group and the normal diet (ND) group for 8 weeks.

## P296

## PREDICTIVE VALUE OF ULTRASOUND IN THE DIAGNOSIS OF OSTEOPOROSIS IN PRE- AND POSTMENOPAUSAL WOMEN

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Compare the efficiency for the diagnosis of osteoporosis (OP) by method of ultrasound (US) in relation to the assessment by DXA. Find US osteoporosis diagnostic cut point equivalent to DXA values (T-score).

Cross-sectional study performed in Madrid with 1078 women aged 42 and 80 who attended for a routine control, derived by their family physician, at the Fundación Jimenez-Díaz.

Mineral density was evaluated according two methods: DXA (lumbar spine (CL, L2-L4) and femoral head (CF)) and US (calcaneus). We obtaining in each case the BMD (g/cm$^2$) and the values of T-score. The classification of osteoporosis pathology was made according the WHO reference of (≥ - 2.5). ROC curve and Youden index were used to obtain osteoporosis cut points (T-score) by ultrasound technique equivalent to those considered with DXA.

There is an important gap in the classification of the disease using the value of CL DXA and US, nevertheless femoral neck values shows most upcoming and promising results related with US. To optimizes the classification of bone pathology, the value of US T-score estimated by ROC curve and Youden analysis in hip (CF) was (-2.35). In fact, this value get a sample screening very similar (not statistically different) that we obtained by DXA (see table). Only 1.3% of the classification of osteoporosis by densitometry escapes the reclassification by the new value of estimated by US. Estimated new qualifier US value of T-score, setting resembles results with the obtained by DXA and therefore enables the effective utilization of the US method in population prevention studies.

| | DXA CL (WHO)% | DXA CF (WHO)% | US (WHO)% | US estimated for CL (-2.85)% | US estimated for CF (-2.35)% |
|---|---|---|---|---|---|
| **Not osteoporosis** | 45.9 | 74,30 | 77.3 | 63.8 | 73,0 |
| **Osteoporosis** | 50.9 | 21.8 | 26.1 | 36.2 | 22.0 |

Bone categories in CL and CF according to DXA T-score and US (who) and the estimated us cutoff point.

## P297

## CORRELATIONS BETWEEN VITAMIN D AND BONE MINERAL DENSITY IN A RANDOMLY SELECTED, HEALTHY, URBAN MALAYSIAN POPULATION

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**Objective**: Vitamin D plays a key role in bone metabolism. 25(OH)D is the best indicator of vitamin D status. The link between 25(OH)D levels and bone health remains unclear and may be dependent on the population studied. This study aimed to examine the correlations between 25(OH)D and BMD in a healthy Malaysian population.

**Methods**: A random sample of the population aged between 44-90 y from 2 districts in the state of Selangor, Malaysia, was invited by post to attend for a free bone health checkup. Patients with diseases known to affect bone metabolism or were on treatment for osteoporosis were excluded. All subjects had their BMD measured with DXA. 25(OH)D was measured on the automated ADVIA 1200 Chemistry Analyser (Siemens Healthcare, Germany).

**Results**: 390 subjects came for assessment. 39% had 25(OH)D levels below 50 nmol/L. Median 25(OH)D levels were significantly lower in females 53 nmol/L compared to males 66 nmol/L (p value?). Chinese subjects had the highest 25(OH)D levels 67 nmol/L, followed by Malays 53 nmol/L and Indians 44 nmol/L. After adjustment for race and gender, 25(OH)D was significantly correlated with femoral neck (FN) (p=0.002) and total hip (TH) (p<0.001) but not lumbar spine (LS) (p=0.386) BMD. Of the 63 patients with osteoporosis, 76.2% were Chinese. In contrast, the majority (48.0%) of 25(OH)D insufficient subjects were of Indian origin. However, both subjects with normal and osteoporotic BMD had 25(OH)D insufficiency in the Indian population (p=0.018) (Table 1), which was not present in the Chinese (p=0.276) or Malays (p=0.850).

Table 1: Proportion of 25(OH)D insufficiency in different BMD categories in the Indian population

| | Normal BMD | Osteopenia | Osteoporosis |
|---|---|---|---|
| Sufficient (>50 nmol/L) | 17 (26.6%) | 21 (51.2%) | 1 (14.3%) |
| Insufficient (<50 nmol/L) | 47 (73.4%) | 20 (48.8%) | 6 (85.7%) |

**Conclusions**: In a healthy Malaysian population, 39% had 25(OH)D levels below 50 nmol/L. Significantly lower levels of 25(OH)D were found in females and Indians. 25(OH)D levels correlated significantly with FN and TH but not LS BMD, after adjusting for race and gender. Thus, 25(OH)D levels need to be interpreted taking into account population characteristics.

**Acknowledgement:** Project funded by FRGS/1/2015/SKK03/UPM/02/1

## P298

## RESULTS OF TREATMENT OF EWING SARCOMA/PNET (PRIMARY NEUROECTODERMAL TUMOR)

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**Objective:** Ewing sarcoma/PNET is a bone marrow tumor, of neuroectodermal nature, with high degree of malignancy. The disease proceeds, as a rule, acute with the appearance of pain in the affected part of the bone and an increase in temperature to 38 ° and higher. The feature of the Ewing/PNET tumor is rapid hematogenous metastases in the lungs. The main and relatively effective methods of

treatment of this nosology are chemotherapy and radiotherapy.

**Methods:** Complex treatment was performed for 12 patients with Ewing sarcoma/PNET in accordance with the Scandinavian protocol of treatment, which includes conducting 13 courses of polychemotherapy, as well as radiation therapy up to 40-60 Gray of total grade dosage for the affected segment of the bone, followed by surgical treatment for operable tumors. Six (50%) patients with Ewing's sarcoma/PNET pelvic bones received chemoradiotherapy; in 4 (33.4%) patients after chemoradiotherapy treatment, resection of the articular segment of the bone and joint replacement were performed, in 2 (16.6%) patients completed bone and plastic surgery using autotransplant.

**Results:** As a result of treatment, relapses of Ewing's sarcoma/PNET were detected in 2 (16.7%) patients. Metastases were observed in 5 (41.7%) patients, of them in 3 (25%) patients in the lungs, 1 (8.3%) in the lung and liver, 1 (8.3%) in the lung and skeletal bones. The 3-y overall survival rate of patients was 52.15±4.5%, and 5-y - 36.7±8.6%.

**Conclusions:**

The prognosis for Ewing's sarcoma/PNET is generally unfavorable, with a standard risk (tumor size <100 $cm^3$, localization in the tubular bones) and a high risk of progression (tumor size >100 $cm^3$, localization in pleural bones, presence of metastases).

The use of integrated treatment of Ewing's sarcoma/PNET allowed reducing the number of relapses and tumor metastases.

## P299

## THE UTILITY OF FRAX SCORES, WITH AND WITHOUT TBS, IN A RANDOMLY SELECTED, HEALTHY, URBAN MALAYSIAN POPULATION

S. S. Yeap[1], S. C. Thambiah[2], I. N. Samsudin[2], S. Y. Zahari-Sham[2], N. Zainuddin[2], S. Mohamad-Ismuddin[2], N. Shahifar[2], S. Md-Said[3], G. Appannah[4], F. L. Hew[1]

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**Objective**: FRAX combines clinical risk factors with or without BMD to assess future fracture risk. The trabecular bone score (TBS) is an indirect index of trabecular microarchitecture. It has been suggested that TBS could be clinically useful for enhancing fracture prediction from FRAX. This study aimed to look at BMD, FRAX scores and TBS in a healthy Malaysian population.

**Methods**: A random sample of the population aged between 44-90 years from 2 districts in the state of Selangor, Malaysia, was invited by post to attend for a free bone health checkup. Patients with diseases known to affect bone metabolism or were on treatment for osteoporosis were excluded. As there was no database available for Malaysia, FRAX scores were calculated using the Singapore database.

**Results**: 390 subjects came for assessment, of which 370 (94.9%) had BMD measured. There were 125 (33.8%) male and 245 (66.2%) female subjects. 155 (41.9%) subjects had normal BMD, 152 (41.1%) had osteopenia (OPe) and 63 (17.0%) had osteoporosis (OP). Median age increased from 57 y in normal BMD, 60 y in OPe and 69 y in OP ($p<0.001$). There were more females with OPe and OP compared to males ($p<0.001$). In OPe patients, after application of FRAX, 27/152 (17.8%) had an increased fracture risk that crossed the treatment threshold. After adjustment of FRAX with TBS, a further 8 (5.3%) subjects would be considered for treatment, while 2 (1.3%) subjects dropped below the treatment threshold. TBS was significantly lower in patients with type 2 diabetes mellitus (T2DM) ($p=0.033$). There was no difference in FRAX major osteoporotic or hip fracture risk, without or with TBS, between those with T2DM and those without ($p>0.05$).

**Conclusions**: In this Malaysian population, 17% were found to have OP. In those with OPe, after the application of FRAX, 17.8% were identified as candidates for treatment. However, the additional use of TBS did not add substantially to those requiring treatment. Therefore, we suggest that the use of FRAX with BMD would identify the majority of subjects with OPe requiring treatment in Malaysia.

**Acknowledgement:** Project funded by FRGS/1/2015/SKK03/UPM/02/1

## P300

## OBESE OSTEOSARCOPENIA WITH IMPAIRMENT OF MOBILITY AND WEAKNESS IN OUTPATIENT OLDER ADULTS

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**Objective:** In clinical practice, osteosarcopenia has been associated with higher vulnerability to adverse health outcomes, but it is unclear whether the presence of obesity modify the physical capacity of subjects with osteosarcopenia. The goal of this study was to evaluate the mobility and the grip strength of outpatient older adults with osteosarcopenia and obesity.

**Methods:** Cross-sectional analysis of data from SARCOS, an observational study of the epidemiology of SARcopenia and OSteoporosis in ambulatory older adults, Sao Paulo, Brazil. SARCOS recruited older adults from 2015-2018. The analytic sample for this study included all older adults who underwent DXA evaluation at baseline, and had available data on muscle and bone mass, as well as, grip strength of dominant hand, mobility tasks by chair stand test (CST) and walking speed (n=384). Osteosarcopenia was diagnosed by the presence of

osteoporosis by WHO criteria plus Sarcopenia defined as low skeleton appendicular muscle mass by BMI (FNIH criteria) adjusted for gender. Obesity was considered if the percentage of total body fat $^{3}$35%. Osteosarcopenia was dived according by the presence of obesity: obese osteosarcopenia (OBOS), and nonobese osteosarcopenia (NOBOS). Loss of mobility was diagnosed if CST (+): Unable to get up and sit in the chair 5 times or low walking speed (LWS) if *v≤ 20% (v=0.90m/s women and v=1.04m/s men), and* severe impairment of mobility (SIM): CST (+) plus LWS. Weakness was diagnosed when the grip strength was *≤16 kg for women and ≤26 kg for men.*

**Results:** Osteosarcopenia occurred in 14.9% (n=57), of them 70.37% (n=41) were OBOS, and 29.62% (n=16) were NOBOS. Among OBOS 80.5% were female and among NOBOS 87.5% were male (*p<0.001*). There is no difference in the mean age between the OBOS and NOBOS (82.2±7.0 vs. 81.3±6.5 yo, respectively). In the adjusted regression analyses, for CST (+) OBOS OR=2.96 (CI:0.34-25.18; p=0.320) vs. NOBOS OR=2.80 (CI:0.30-25.70; p=0.361), for LWS, OBOS OR=3.97 (CI:1.01-15.53; *p=0.047*) vs. NOBOS OR=1.52 (CI:0.15-15.05; p=0.716); for SIM, OSO OR=15.53(CI:3.41-70.60; *p<0.001*) vs. NOBOS OR=8.79 (CI:0.73-106.05; *p=0.087*) and for weakness, OBOS OR=1.91(CI:0.93-3.94; *p=0.078*) vs. NOBOS OR=4.59(CI:1.37-15.33; *p=0.013*).

**Conclusion**: Obese osteosarcopenia and non-obese osteosarcopenia seem to be different syndromes of physical vulnerability. Obese osteosarcopenia is more associated with female gender and impairment of mobility, whereas nonobese osteosarcopenia is associated with male gender and weakness.

## P301

## TSPAN7 LINKS RANK/αVβ3 INTEGRIN COMPLEX AND MODULATES INTEGRIN-MEDIATED BONE RESORPTION SIGNALING

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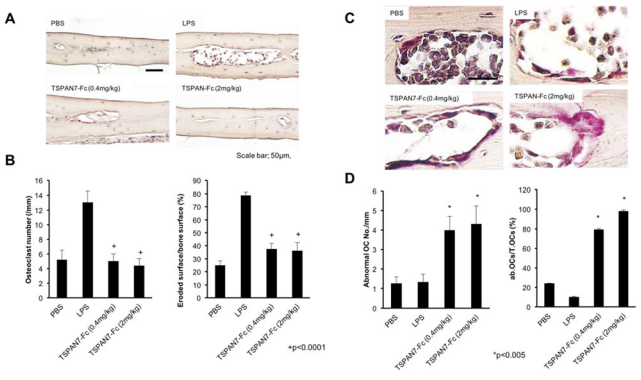
**Objective:** RANK and αvβ3 integrin are essential factors involved in regulating osteoclast formation and function. RANKL, by mechanisms unknown, directly activates osteoclasts to resorb bone. Here I identify Tspan7, a member of tetraspanin superfamily proteins, is expressed in a specific membrane microdomain, called "TEM", and is crucial for pre-osteoclast fusion and mature osteoclast function. Tspan7 expression can be upregulated by RANKL signaling in the late stage of osteoclastogenesis. Overexpression or knockdown of Tspan7 in BMMs did not affect RANKL-mediated osteoclastogenesis but attenuated mature osteoclast fusion and morphology which suggest a guess in Tspan7 that act as an osteoclast function regulator. The Tspan7-CT is related to pososome belt composed actin ring structure formation. Inhibition of Tspan7 C-terminal by Tspan7-CT peptide inhibitor successfully blocked the c-Src and Syk activation in response to β3 integrin ligand vitronectin stimuli, and controlled β3 integrin mediated bone resorption. Furthermore density gradient study clearly established that Tspan7 is localized in TEM in mature osteoclast where Tspan7 can organize RANK and αvβ3integrin complex. These data suggest that function of Tspan7 and its expression in TEM are crucial for mature osteoclast function. Because αvβ3integrin and its associated proteins are therapeutic targets in the context of pathological bone resorption, specific inhibition of Tspan7 could serve as a new therapeutic strategy for treating bone diseases.

**Methods:** Recombinant TSPAN7-Fc: 293F cells transfected with a gene encoding dimeric form of the large extracellular loop (EC2; aa 113-214) of the TSPAN7 with the Fc region of human IgG1 cloned in pVITRO1-Fc. The secreted purified protein (TSPAN7-Fc) was loaded the protein G sepharose beads column (Thermo Scientific™ Pierce) and eluted with elution buffer (100 mM glycine, PH 2.0, Duchefa Biochemie) contained 1 M Tris-Cl (PH 7.0, Duchefa Biochemie) to immediately neutralize the protein. Collect the tubes containing high concentration of proteins and dialyze over PBS extensively and kept frozen at -80°C. LPS-induced bone loss in calvarial model: 5 to 6-week-old C57/BL6 male mice were administered a local calvarial injection of LPS (12.5 mg/kg body weight) two times at intervals of 48 h. After the final LPS injection, TSPAN7-Fc (0.4 mg/kg or 2 mg/kg body weight) or hIgG1 was injected three times over 5 days. On day 6, mice were sacrificed and subjected to histological analysis by hematoxylin and TRAP staining (Sigma). The number of osteoclasts and surface erosion were measured with the OsteoMeasureXP software (OsteoMetrics, Inc.). Ovariectomy: Models of osteoporosis induced by ovariectomy (OVX) have been described previously. 8-week-old C57/BL6 female mice were ovariectomized or subjected to sham operation. Four days later, mice were intramuscular injected TSPAN7-Fc (0.4 mg/kg and 2 mg/kg body weight in PBS) or hIgG1 2 times for 4weeks. The experiment was completed at day 31, at which time the histology and μCT were analysed as described above.

**Results:**




TSPAN7-Fc suppresses LPS-induced OC formation and bone destruction in calvarial model: Inhibition of LPS-induced (12.5 mg/kg body weight) bone destruction after injection of

TSPAN7-Fc (0.4 mg and 2 mg/kg body weight) and hIgG1. (A) TRAP and hematoxylin staining was performed on histological sections of calvaria bone. The scale bar indicates 50 μm. (B) The number of osteoclasts (left) and eroded surface (right) were analyzed. (C) Increased number of osteoclasts with abnormal morphology on the TSPAN7-Fc treated mice. Scale bar indicates 20 μm. (D) Representative osteoclasts on the trabecular bone. Data represent the means±SD. n=5. *P<0.005, +P<0.0001

**Conclusion:** The results of this study demonstrated that blocking the TSPAN7 using TSPAN7-fc fusion protein inhibits OC maturation and function *in vitro*. The resultant inhibition of bone resorption occurs through blocking of forming normal morphology of osteoclast *in vivo*. Furthermore, function of Tspan7 and its expression in TEM are crucial for mature osteoclast function. Because avb3 integrin and its associated proteins are therapeutic targets in the context of pathological bone resorption, specific inhibition of Tspan7 could serve as a new therapeutic strategy for treating bone diseases.

## P302

## HYPERBARIC OXYGEN FOR THE TREATMENT OF BONE MARROW OEDEMA OF THE CARPAL BONES: A RETROSPECTIVE 4-YEAR STUDY

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**Objective:** Very few small case series exist regarding the use of hyperbaric oxygen for the treatment of clinical entities resulting in bone marrow oedema of the carpal bones. Post-traumatic carpal bone marrow oedema, Kienbock and Preiser disease are usually treated in the early stages with cast immobilization and nonsteroid anti-inflammatory drugs. The purpose of this study was to investigate the effectiveness of hyperbaric oxygen in the treatment of such cases.

**Methods:** From 2013 until 2017 the medical records of all patients treated with post-traumatic carpal bone marrow oedema, Kienbock and Preiser disease were studied. Radiological, as well as clinical findings were evaluated. Complications and total time for clinical improvement were recorded.

**Results:** A total of 21 patients (15 males- 6 females), with a mean age of 32 y of age were recorded. Nine patients (7 suffering from post-traumatic wrist bone marrow oedema and 2 from Kienbock's disease) received the standard care (group A), including NSAIDs and cast-immobilization, while the remaining 12 (9 suffering from post-traumatic wrist bone marrow oedema, 2 from Kienbock's and 1 from Preiser disease) received additionally 20 sessions of hyperbaric oxygen therapy (group B). In both group of patients time of wrist immobilization was the same (6-8 weeks). Mean follow-up was 9 months. No complications or recurrence were observed among the study population. Mean time for recovery in group A was 5.8 months, compared to 4.3 months of group B (p-value<0.05).

**Conclusion:** The present study has shown that patients treated with the addition of hyperbaric oxygen had a statistically significant decrease to the recovery time, when compared to those receiving the standard care. Therefore, it seems that hyperbaric oxygen in such cases may have an important role as part of the treatment.

## P303

## THE MEASUREMENT OF THE DISTAL FOREARM BONE MINERAL DENSITY PRESENTS GREATER SENSITIVITY FOR THE DIAGNOSIS OF OSTEOPOROSIS IN THE ELDERLY THAN THE LUMBAR SPINE

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**Objective:** Osteoporosis in elderly is very frequent and strongly associated with fractures and disability. The aortic calcification and vertebral osteophytes may overestimate the measurement of BMD of the lumbar spine (LS). In these subjects the ISCD recommends to evaluate the distal forearm (DF) BMD. However, it is very difficult in clinical practice, to differentiate all individuals with these changes in the LS, which may lead to underestimation of osteoporosis in the elderly. Our aim was to evaluate the sensibility and specificity of DFBMD or LSBMD, with proximal femur BMD for the diagnosis of osteoporosis in older adults.

**Method:** Cross-sectional analyses of 401 patients from SARCOS study, an observational study of the epidemiology of sarcopenia and osteoporosis in older outpatients from Cardiology Division of Federal University of Sao Paulo-Brazil. Patients were recruited from outpatient clinic setting. All patients underwent DXA of all bone sites (lumbar spine, femoral neck total femur, and distal forearm-33) and osteoporosis was diagnosed if BMD ≤-2.5SD. Very old was classified individual aged ≥80 yo. We classified osteoporosis by three criterions: general osteoporosis (GOP), if BMD ≤ -2.5SD at any bone site, osteoporosis at lumbar spine and or proximal femur (OPLS) and osteoporosis at distal forearm and or proximal femur (OPDF). Chi-square test and ROC area curve (AC) and sensitivity/ specificity.

**Results:** The mean age 78.22 (7.16) yo, and 56.2% were women. GOP occurred in 45.6% (183), OPDF 40.1% (161) and OPLS 33.9% (136). OPLS criterion identified 74.3% (p<0.001) of the all individuals with GOP while OPDF identified 88% (p<0.001) of them. In ROC analyses with GOP, OPLS AC=0.872 (0.83-0.91) sensitivity 0.743 and OPDF AC=0.940 (0.91-0.96), sensitivity 0.882. Among very old, OPDF presented AC=0.971 (0.94-0.99), sensitivity of 0.942, and OPLS AC=0.86(0.80-0.91) and sensitivity 0.721.

**Conclusion:** Osteoporosis diagnosed with DF BMD presents greater sensitivity for the general osteoporosis than LS BMD, in older adults, especially in very old people.

## P304
## THE IMPORTANCE OF DETERMINING TRABECULAR BONE SCORE IN POSTMENOPAUSAL WOMEN

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**Objective:** Osteoporosis is a disease characterized by low BMD and impaired microarchitecture of bone tissue, leading to increased bone fragility and a consequent increase in fracture risk. Conceptual description of the disease puts into focus two important characteristics of bone: BMD and quality, especially bone microarchitecture. Our aim was to investigate the trabecular bone score (TBS) values in relation to fractures.
**Methods:** Cross-sectional study was conducted in Railway Healthcare Center, Belgrade, in period Jan 1 - April 31, 2018. 275 postmenopausal women, aged 45-83 y, were included. Study included only those who were first time on BMD testing and never had treatment therapy for osteoporosis before. BMD was measured on Hologic Discovery C device, on lumbar spine and hip region. The vertebral fracture assessment was performed, and Th4-L4 region was analysed in aim to detect vertebral fractures on the same device. The lumbar spine scans were reanalysed in TBS iNsight® software (V1.9.2, Med-Imaps, France) and TBS was calculated. All the participants were previously tested using an epidemiological questionnaire.
**Results:** In relation to the existence of a small trauma fracture, the subjects are divided into two groups: with no previous fracture-134 (48.7%) and group with fracture-141 (51.3%). Postmenopausal women with fractures have a higher percentage of osteoporosis measured on the lumbar spine (48.4% vs. 33.8%; $\chi 2=4.894$, df=2, p=0.08)) according to DXA findings. There is a difference in TBS values between women with and without fractures (TBS<1.200: 86,8% vs. 47.2%; 1.200<TBS>1.250: 10.5% vs. 42.8%; TBS>1.350: 2.7% vs. 10%; $\chi^2=43.10$, df=2, p=*0.000*). According to tercile approach, totally degraded microarchitecture is present in 78,8% of women with one fracture, in 90.3% with two fractures and in 92% in those with three or more fractures ($\chi^2=43,67$, df=6, p=*0.000*). 78,5% of women with nonvertebral fractures, 94.5% with vertebral, and 91.3% with both localisation of fractures have lowest TBS values ($\chi^2=49,51$, df=6, p=*0.000).*
**Conclusion:** TBS is a useful tool in the evaluation of fracture risk. Combining the normal and osteopenic BMD values with the lowest range of TBS can help in defining a significant subset of non-osteoporotic women at higher risk of fracture which is useful in clinical practice and patient management.

## P305
## EPIDEMIOLOGY OF HIP FRACTURE IN KAZAKHSTAN ACCORDING TO THE POPULATION-BASED LONGITUDINAL STUDY IN A LARGE INDUSTRIAL CITY

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**Objective:** Osteoporosis (OP) and its consequence of low trauma fracture are a significant cause of morbidity and mortality, which represent a major health burden in aging population. The number of hip fractures (HF) worldwide will nearly triple by 2050. The aim of this study was to assess the incidence and trends of osteoporotic hip fracture in women and men aged 50 y and over in Kazakh population based on population-based data.
**Methods:** The investigation was the part of the international multicenter "Epidemiology of osteoporotic fractures in Eurasian counties" study (EVA). Its methodology provides precise definition of all major non-vertebral osteoporotic fractures quantity. The epidemiologic survey was carried out in Taldykorgan city that representative to all Republic ethnically, by gender and age characteristics. In the first, retrospective phase of the investigation (January 1, 2015 to December 31, 2016) we evaluated the fracture rate based only on official hospital records and data of traumatologic centers; beside this we assess the all potential sources of missed information on OP fracture patients. Then we organized a prospective survey (March 1, 2017 to February 28, 2018) that suggested an active search of fragile fractures patients with ICD-10 codes S72,0, S72,1 and S72,2 (femoral neck, intertrochanteric, subtrochanteric, inter- and subtrochanteric fracture) not only from hospital records, but also from outpatient registers and primary care (PC) sources with a mandatory subsequent clinical verification.
**Results:** In 3 y we revealed 320 low energetic HF in patients older than 50 y, 241 (75%) of these patients were hospitalized, and 181 patients underwent a surgical intervention. According to retrospective survey data, in 2016 the hip fracture incidence was 270 and 231 per 100,000 for women and men acc. In 2017, when we took into account the data from PC sources its incidence increased to 338 and 255 per 100,000 for women and men acc. The HF incidence in men under 70 y was slightly higher than in women, but among the most elderly residents of Taldykorgan, the incidence increased exponentially in both sexes and became 2 times higher among women than among men. Assuming that the fracture rates in Taldykorgan were representative for the whole country, we estimated that the annual number of hip fractures in population of 50 y and older in Kazakhstan in 2018 were 12,256 and it is predicted to increase to 27,595 in 2050.
**Conclusion:** These epidemiological data allows attributing Kazakhstan to high rank countries of osteoporotic hip fractures rate for men and women and to predict the 2 times increasing of

hip fractures quantity in 2050 that requires the wide national programs aimed the osteoporosis prevention, early detection and treatment.

## P306
## OSTEOSARCOPENIA PHENOTYPE AND FRAILTY STATUS BY CHS AND SOF CRITERIA

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**Objective:** There is a robust physiological interaction between muscle and bone. Sarcopenia and osteoporosis are risk factors for fracture and frailty. Different concepts of frailty have substantial heterogeneity in the physical phenotype. We hypothesized that osteosarcopenia is musculoskeletal manifestations of frailty. To test our hypothesis we evaluate the association among osteosarcopenia (OSP), osteoporosis only (OPON) and sarcopenia only (SARCON) with frailty by Fried criteria and SOF criteria.

**Method:** Cross-sectional analyses of 386 patients from SARCOS study, an observational study of the epidemiology of sarcopenia and osteoporosis in older outpatients from Federal University of Sao Paulo-Brazil. All patients underwent DXA of total body and bone sites. Frailty was defined by the SOF criterion (2-3 frailty, 1 pre frailty and 0 robust): weight loss, chair stand test; low energy; and by CHS criterion (≥3 frailty, 1-2 prefrailty and 0 robust): weight loss, low walking speed, weakness, low energy (adapted), exhaustion. Osteoporosis was diagnosed if BMD ≤-2.5 SD at any bone site. Sarcopenia was diagnosed only by low muscle mass according to FNIH criterion (appendicular muscle mass/BMI <0.567 women; <0.723 men). OSP was diagnosed if osteoporosis and sarcopenia were present.

**Results:** The mean age was 78.22 (7.16) yo, and 56.2% were women. OSP occurred in 14.8%, SARCON in 39.8% and OPON in 19.2% (p<0.001). Frailty was diagnosed in 17.8% by CHS, and 20.2% by SOF. OSP occurred in 25.8%, SARCON in 41.9%, and OPON in 22.6% of frailty subjects classified by CHS criterion (p=0.005). In the SOF Frailty phenotype, OSP occurred in 16.7%, SARCON in 38.5% and OPON in 21.8% (p=0.937). In the regression analysis for frailty by CHS, OSP presented OR: 19.01 (CI:3.84-93.95; p<0.001), SARCON OR: 4.78 (CI:1.25-18.20;p=0.022), and OPON OR: 3.35 (CI:0.79-14.21; p=0.101). For frailty by SOF criterion, OSP OR: 1.22 (CI:0.54-2.79; p=0.624), SARCON OR: 1.19 (CI:0.61-2.30; p=0.597) and OPON: 1.25 (CI:0.59-2.67, p=0.552).

**Conclusion:** There are significant differences in the musculoskeletal manifestations of fragility phenotypes, according to the chosen criterion. OSP and sarcopenia are associated only with the frailty by CHS, however, Osteosarcopenia seems to be more specific of the frailty status than other musculoskeletal phenotypes.

## P307
## ATYPICAL FEMORAL FRACTURE (AFF) IN A PATIENT RECEIVING SEQUENTIAL ANTIRESORPTIVE TREATMENTS IN THE FORM OF HIGH-DOSE DENOSUMAB FOLLOWING PREVIOUS BISPHOSPHONATES

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**Case report:** An 84-year-old female developed right thigh pain which started following a stumble going up stairs. Three weeks later the pain became so severe that she fell while shopping and had to be admitted to hospital. Her medical history included carcinoma of the breast diagnosed six years earlier and treated with mastectomy and 6 of adjuvant aromatase inhibitors. She commenced on alendronic acid when the breast cancer was diagnosed and continued this for 5 y. 18 months ago, a solitary bone metastasis in the right ilium was diagnosed and she received single fraction palliative radiotherapy and she was switched to subcutaneous denosumab 120 mg monthly and was compliant for the 18 months till her admission. Pelvis x-ray showed a transverse fracture of the proximal shaft of the right femur (Figure). The criteria of the fracture strongly suggested an antiresorptive-related AFF. The patient underwent right locked intramedullary nailing with gradual uneventful recovery. No neoplasia was demonstrated in bone histology from the fracture site.

The patient had AFF after 18 doses of denosumab 120 mg monthly. The direct cause/effect relationship between her denosumab treatment and AFF is difficult to confirm. However Denosumab contribution to the AFF cannot be ignored especially with the high dose (12 times that used in the treatment of osteoporosis). Sequential use of antiresorptives – including alendronic acid for 5 y previously confounds the picture. In a literature review in 2018 of AFF in denosumab treated patients, 9 case reports were identified; in 8 of which the patient had received bisphosphonates before denosumab treatment. Results from the 7 y open-label extension of the

denosumab FREEDOM trial showed that for the 2626 patients who completed the trial there were two AFFs. The incidence of AFFs in patients on either bisphosphonates or denosumab therapy is about 1/10000 to 1/1000 patients (BNF). Long duration of therapy, higher dose and multiple antiresorptive medications are risk factors to develop AFF. The etiology is likely to be prolonged suppression of bone turnover in genetically susceptible patients. Hip and lower limb geometry may be a contributing factor. Patients who develop thigh pain while on antiresorptive treatment should have XR of both femurs. Patients who sustain AFF should not receive further antiresorptive medication.

## P308

## RAPAMYCIN AFFECTS PALMITATE-INDUCED LIPOTOXICITY IN OSTEOBLASTS BY MODULATING APOPTOSIS AND AUTOPHAGY

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Bone marrow fat infiltration is one of the hallmarks of aging and osteoporotic bones. Marrow adipocytes produce substantial amounts of fatty acids; particularly excessive palmitic acid (PA). PA is toxic to bone-forming osteoblasts in vitro, impacting their differentiation, function, and survival. The mammalian target of rapamycin complex 1 (mTORC1) signaling plays a role in the pathogenesis of osteoporosis via inhibition of autophagy. Since rapamycin (RAP)-induced inhibition of mTORC1 activates autophagy and prevents apoptosis, we therefore hypothesized that RAP may preserve osteoblast viability and reduce PA-induced lipotoxicity. Normal human osteoblasts (NHO) were incubated with RAP in the presence of a lipotoxic dose of PA or vehicle for 24 and 48 hrs. Expression of LC3 protein levels and the phosphorylation of the direct mTORC1 target were quantified by Western blot. Lysosomes and autophagosomes were studied using confocal fluorescence imaging, lysotracker and live-cell imaging. RAP reduced PA-induced apoptosis. In addition, PA-induced autophagosome formation increased substantially over the time-course in the study, an effect that was significantly regulated by the presence of RAP in the media. In summary, this study highlights the role of the RAP-sensitive mTORC1 pathway in NHO under lipotoxic conditions. RAP-associated therapies could, potentially, be targeted for specific roles in osteoporosis and aging bone.

## P309

## FRAGILITY FRACTURES IN PATIENTS ADMITTED TO ASSAF HAROFEH MEDICAL CENTER: CLINICAL CHARACTERISTICS AND PREFRACTURE RISK ASSESSMENT

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**Objectives:** To investigate the characteristics of patients with fragility fractures and the fracture risk assessed by non-BMD FRAX as a tool to improve primary and secondary osteoporosis (OP) prevention.
**Methods:** Retrospective and prospective analysis of patients with new fragility fracture admitted to the orthopedic ward at Assaf Harofeh Medical Center from March 2016 to November 2018.
**Results:** 423 patients were registered, 326 (77.1%) female, mean age 78, DMII 33.8%, steroids use 5.2%, smoking 11%, intact cognition 86%, and 8.7% fully disabled. Cohort previous fracture rates 42% (female rate 48.1%, Male 22.7%). Fracture site: hip 79.4% (F=72.5%, M=83.3%), spine 11.1%, humerus 4%, and tibia + radius 3.3% each. Surgery was performed in 86%, followed by rehabilitation in 77.6%, for average 36 days. Previous BMD was done for 52.1% (F=60.3%, M=25%), previous OP diagnosis 40% (F=46.1%, M=18.8%) and previous and current OP treatment 15.3% and 16.3% respectively. The most common drug for past or current treatment was oral bisphosphonates. Excluding patients on treatment at admission (n=69), the preadmission fracture-risk hip was ≥3% in 80% (F/M, no diff) and MOF ≥20% for 39%, (F=54%, M=3.5%). Compared to 251 naïve patients, the 166 OP-known group had fewer hip fractures, less surgery, and fewer males. There were 26 (6.4%) new fractures and 72 deaths (F=14.7%, M=24.7%), with a median time to death of 140 d.
**Conclusions:** As part of an institutional program to improve OP treatment our study suggests wider use of FRAX risk assessment independently of BMD data as a screening tool for primary prevention. Male population and past fracture history were often ignored as future fracture risk. DMII was common in our study and stress the need for better fracture risk assessment among those patients. The impact of fracturing is reflected with high surgery and rehabilitation rates along with meaningful death rates. The use of the non-BMD FRAX score can be easily implemented, along with weight, height, BMI, HR and BP in subjects over 50 y of age.

## P310

## ELDERLY PATIENT SATISFACTION TOWARD SERVICES OF COUNTY EMERGENCY CLINICAL HOSPITAL

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**Objective:** At the Oradea County Emergency Clinical Hospital a patient satisfaction questionnaire is implemented, which contains thirty-two questions. Grouping of questions can be done in five main categories. The aim of this study was to see if satisfaction with hospital conditions in elderly patients differs from that of patients un- der sixty years of age.
**Methods:** In 2018, 2279 questionnaires were collected. For this analysis, 50 questionnaires were randomly selected from each quarter. A total of 200 satisfaction questionnaires were analyzed, 99 of patients under 60 y of age (group A) and 101 of patients aged 60 and over (group B). Patient satisfaction with hospital conditions (one of the five main categories) is analyzed in seven questions. These questions are: number 24: hospital food?; number 25: food amount?; number 26: compliance of food delivery schedule?; number 27: how many times/d the salon is cleaned?; number 28: cleanliness in the salon? number 29: the quality of bed linen?; number 30: accommodation conditions? Question No. 27 has four variants of answer and the rest of the questions have three possible answers. Significance was assessed with chi-square and Fisher's Exact test with the help of the R program.
**Results:** The mean age of the two patients groups was 46.35 y and 67.66 y, respectively. They were 54 women and 45 men in group A and 57 women and 44 men in group B. Regarding hospital food (question No. 24) in group A 52.57% said is was good, 36.08% said is was very good and 11.34% said is was not good. In group B the responses were 62%, 33% and respectively 5%. There is no statistically significant difference ($p$=0.18, β=0.094). To question No. 25, 5.26% said is was too much, 92.63% said is was enough and 2.1% too little in group A and 6.06%, 91.91% and respectively 2.02% in group B. Group A said it received food in time (question No. 26) 94.89% and group B in 92.85% ($p$=0.62). To question No. 27 the answers were: 2.04% once a day, 27.55% twice a day, 26.53% three times a day and 43.87% several times a day in group A and 5%, 28%, 18% and respectively 49% in group B ($p$=0.39). Group A appreciates the level of cleanliness (question No. 28) in the salon as good in 42.85% and very good in 57.15% and group B in 50.49% and respectively 48.51% ($p$=0.31, β=0.38). The quality of bed linen was appreciated as good in 50.51% and very good in 46.39% by group A and 64.35% and respectively 31.68% by group 1. The $\chi 2$ square test gives us a $p$=0.05133 and β=0.02. Group A rated the accommodation as very good in 37.5%, as satisfactory in 59.37%, as bad in 3.12% and group B 26.26%, 72.72%, respectively 1.01%. There was no statistically significant difference ($p$=0.1, β=0.025). In terms of distribution by sex of patient responses over sixty years there was no statistically significant difference to any of the analyzed questions.
**Conclusion:** This analysis shows that there is no difference in satisfaction with Oradea County Emergency Clinical Hospital in terms of the conditions offered to elderly patients compared to patients under sixty years of age. However, some more specific questions would be needed. Questions like: Did you need an attendant?; Did you need help for your usual activities?; If so, who helped you?, could have significantly different answers for the elderly.

## P311
## ELDERLY DONORS AND ORGAN DONATION PATTERNS

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**Objective:** Organ transplantation has become the best treatment for patients with end of stage organ failure. With continued progress in organ transplantation, the demand for organ transplants has increased markedly and led to progressive increases of waiting lists. Current shortage of organs for transplantation has caused changes in patterns of organ donation. The gap between the demand and the supply of human organs for transplantation is on the rise all over the world, as a result there has been a major increase in the number of patients on transplant waiting lists, also in the number of patients dying while on the waiting list. There are several procedures and pathways which can provide practical and effective solutions to this crisis, such as increasingly accepted as organ donors of elderly individuals. Special attention is paid to the retrieval of multiple organs from individual donors and to the acceptance of organs from donors who would previously have been considered too old. The acceptance of organs from elderly donors is clearly attributable to the shortage of donor organs and gradually donor acceptance criteria changed.
**Methods:** Univariate statistical analysis was performed on data provided by Oradea Organ Procurement Center over the 5 y, between 2013-2017.
**Results:** From 2013-2017 the total number of patients included in the national transplant program was 301 patients, from which the number of patients 60 years and older was 155 (51.49%). From 301 patients with brain death diagnosis, 89 became real organ donors (29.56%) and of those, over 60 years old, were 28 patients (31.46%). Elderly donors (60 y and older) represented the majority age group of potential donors 127 (59.90% from total of 212 potential donors).
**Conclusion:** In light of the continuing organ shortage, it is time to re-examine our strategies to encourage organ donation even among the elderly population. Due to risk and complications in donors 60 y and older, kidneys, liver and cornea were suitable for organ donation.

## P312
## ANTIBIOTIC CONSUMPTION IN THE INTENSIVE CARE UNIT AMONG ELDERLY PATIENTS

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**Objective:** Intensive care units are generally hospitals departments were the consumption of antibiotics is significantly higher compared to medical or surgical wards. The increased use of broad spectrum antibiotics or reserve antibiotics has led to selection of multidrug resistant pathogens. Elderly patients because of the increased number of comorbidities are more susceptible to nosocomial infections.
**Methods:** The study is a retrospective, observational study conducted in the Clinical County Emergency Hospital of Oradea. The purpose of the study was to analyze the antibiotic consumption in the Intensive Care Unit of the hospital in 2016 and 2017 in patients over 60 y of age. Data was collected using the IT system of the hospital.
**Results:** In both years, 2016 and 2017, elderly patients (>60 years old) represented the majority of the total number of patients treated in the Intensive Care Unit of the Clinical County Emergency Hospital of Oradea. They represented 67.56% (1493 patients) of the total number of patients treated in 2016 (2210 patients) and 69.36% (1449) of the total number of patients treated in 2017 (2089 patients). Average hospitalization time was 4.05 d in 2016 and 4.37 d in 2017. The costs related to antibiotics consumption for the healthcare of elderly in the Intensive Care Unit increased from 2016, 501.495 RON, to 2017, 660.963 RON. While the number of treated patients decreased from 2016 to 2017 by 2.95% the antibiotic consumption increased with 31.80%, the average antibiotic prescription cost/patient was 333RON in 2016 and 456 RON in 2017. Concerning the antibiotic classes, the fallowing modifications occurred from 2016 to 2017. Tetracycline's consumption increased 6.8 times, from 3.32% in 2016 of the total antibiotic prescription to 25.98% of the total antibiotic prescription in 2017. Second-generation cephalosporin's consumption increased with 51.93%, third-generation cephalosporin's consumption increased with 34.70% while carbapenems were prescribed 21.72% more frequently in 2017 than in 2016. A significant increase was registered among aminoglycosides, 20.20%, and quinolones, 32.76%. In contrary there were classes of antibiotics that were prescribed less frequently in 2017 than in 2016 among elderly patients, macrolides and lincosamides antibiotics, with a frequency reduced by 34.25% and other antibiotics, 18.27% less frequently prescribed in 2017.
**Conclusion**: Elderly patients represent the majority of patients treated in the Intensive Care Unit. Antibiotic consumption in this category increased significantly from 2016 to 2017. The antibiotic classes responsible for the increase were in the fallowing order according to the magnitude of increase in consumption: tetracyclines, second generation and third generation cephalosporins, quinolones, carbapenemes and aminoglycosides. Given the substantial increase of 31.80% in antibiotics consumption in the Intensive Care Unit during a very short interval, 1 y, we believe that are necessary immediate measures to optimize rational antibiotic use in this hospital department.

## P313
## PREVALENCE OF OSTEOPOROSIS IN PATIENTS WITH ARTHROPLASTIES THROUGH THE NATIONAL ENDOPROSTHESIS PROGRAM

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**Objective:** The National Orthopaedic Program in Romania is responsible for ensuring specific sanitary materials for the treatment through endoprostheses of patients with articular afflictions, including primary and revision prostheses. In order to be admitted to the program, patients need to be of elderly age and suffer from either degenerative joint diseases or femoral neck, humeral or elbow fractures. A diagnostic study of patients with prostheses was undertaken in order to evaluate the number of people that presented with osteoporosis as a secondary diagnosis.
**Method:** The study has as a base the patients which went through arthroplasties within the Orthopaedics Ward (63 beds) of the Clinical Emergency County Hospital in Oradea, Bihor, Romania. The analysis was undertaken between the years 2013-2017, utilizing the statistical database of the hospital, specifically the following indicators: total number of treated patients, total number of patients that have endoprostheses, patients with hip arthroplasties, total number of patients with osteoporosis as a secondary diagnosis, median cost per patient treated through endoprosthesis. This study includes all patients who went through the prosthesis procedure aged between 40-80.
**Results:** In the analysed period a number of 13.955 patients were treated in total, 12.14% (1731 patients) of which underwent an endoprosthetic procedure. Of these patients, more than 70% (1225 patients) suffered hip arthroplasty and over 95% of them (1173 patients) have osteoporosis as a secondary diagnosis, in various stages and of various types. In a time-based evolution, the number of patients with prostheses grew from 245 in 2013 to 506 in 2017. Also, the number of patients with hip arthroplasty grew from 164 patients in 2013 to 371 patients in 2017. This increase is mainly due to the increase in financing of this program, but today there is still a considerable waiting list because of an even higher number of eligible patients. The number of reported patients with a secondary diagnosis of osteoporosis decreased in the analysed period from 399 patients in 2013 to 126 patients in 2017. The median cost per patient treated through this procedure varied between 831 EUR in 2017 and 1185 EUR in 2015 (an average of 1011 EUR).
**Conclusions:** From the analysis presented above we can conclude that out of the 1731 patient that underwent endoprosthesis procedures more than 70% underwent hip arthroplasty and over 95% presented with osteoporosis as a secondary diagnosis, in various stages and of different types. The number of patients with a secondary diagnosis of osteoporosis decreased in the analysed period. Because of the advanced age of patients that underwent the procedures and the decrease in time in the number of patients with osteoporosis,

in order to have a correct evaluation, there is a need for much more precise diagnostic methods.

## P314
## SEVERE OSTEOPOROSIS IN A FEMALE WITH TYPE 1 DIABETES MELLITUS AND CELIAC DISEASE: CASE REPORT

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The prevalence and severity of osteoporosis in type 1 diabetes patients is increased compared to nondiabetic patients mainly because of the insulin deficiency characteristic for these patients, being known that insulin stimulates osteoblasts proliferation and increases collagen formation. Epidemiological data demonstrated that type 1 diabetes mellitus patients have a 6.5-fold increase in risk of hip fractures compared with healthy controls. The association of type 1 diabetes with celiac disease is not rare, celiac disease being also an autoimmune disorder characterised by gluten intolerance, chronic diarrhoea and malabsorption.

We report the case of a 43 years old female of Caucasian origin suffering from type 1 diabetes mellitus for 30 y. She presented in the Internal Medicine-Diabetes Clinic of Emergency Hospital from Oradea for frequent episodes of hypoglycaemia, generalized fatigue, weight loss, abdominal discomfort in the epigastric region, diarrhoea. The gastric symptoms were present for 6 months in the moment of admission. The patient was underweight, BMI was 17.8 kg/m$^2$. Upper gastrointestinal tract endoscopy was performed in order to explore the weight loss. The investigation did not reveal any macroscopic modification; fortunately biopsies were taken from the stomach and duodenum. Microscopic examination of biopsies prelevated from the duodenum revealed modifications of the duodenal mucosa: atrophy of the mucosa villi, crypt hyperplasia and increased intraepithelial lymphocytes. Based on the clinical aspect and the endoscopy a diagnosis of celiac disease was established, stage B1, and the patient was given adequate recommendations about a gluten-free diet that she will have to respect. We sent the patient to DXA examination in order to assess the bone fragility of the patient because we suspected an abnormality given the fact that she was underweight and had a chronic malabsorption disease. The investigation revealed low bone mass and severe osteoporosis. T-score was -4.1 in the region of the right femur, -3.9 in the region of the left femur and -4.5 in the lumbar spine. Laboratory exam revealed mild anaemia (Hb=9.8g/dL) and hypocalcaemia, low total calcium ($Ca^{2+}$=7.6 mg/dL) most probable in the context of malabsorption. The patient was referred to an endocrinologist for osteoporosis treatment.

In the presented case we believe that both diseases contributed to the severity of osteoporosis in a relatively young patient. Type 1 diabetes mellitus had a long history and celiac disease was advanced considering the microscopic aspect of the duodenum. The presence of celiac disease should be investigated in type 1 diabetes patients and if the two diseases coexist bone density should be assessed for an early diagnosis of osteoporosis.

## P315
## ANALYSIS OF OPERATING SUITE ACTIVITY IN A COUNTY EMERGENCY HOSPITAL

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**Objective:** The implementation of a continuing development strategy for the quality of health services is an important component of the health system improvement processes. In 2014, the hospital operating suite was renovated and re-equipped within the Romania-Hungary Crossborder Cooperation Program. Providing advanced medical equipment to the operating suite was made in order to improve the quality of medical services. Through the study, we analyzed the medical activity carried out in the operating suite serving the surgical departments of a county emergency hospital.

**Methods:** A retrospective study was carried out, analyzing the statistical database of the County Clinical Emergency Hospital Oradea in the period 2014-2017. The number of surgical interventions was analyzed in the 11 operating theaters of the operating suite (general surgery - 2 operating rooms, orthopedics and traumatology - 2 operating rooms, thoracic surgery, vascular surgery, neurosurgery, ophthalmology, otorhinolaryngology, buccomaxillofacial surgery, plastic surgery).

**Results:** During the analyzed period, the number of beds in the hospital decreased from 917 beds in 2014 to 885 beds in 2017. Also, the number of cases contracted with the National Health Insurance House decreased during the analyzed period. In this context, the number of cases discharged from the hospital slightly decreased from 42,646 cases in 2014 to 41,581 cases in 2017. The number of patients admitted to surgical departments did not change significantly from one year to another (average 14,443 patients/y). The average length of hospitalization on surgical departments decreased from 5.22 d to 3.17 d in 2014-2017. The number of surgical interventions has increased from 9524 patients operated in 2014 to 9875 patients operated in 2017, with the operability index rising from 65% in 2014 to 68% in 2017. The share of surgical interventions in the operating suite related to specialties is in line with the number of beds, so most interventions were performed by general surgery (42.5%), orthopedics and traumatology (22%) and plastic surgery (14%). Surgical interventions done in 1 day of hospitalization was relatively constant (average of 625 cases/y). Mortality per year was relatively constant at 2.3% and deaths within 48 h from surgery decreased from 2.7% to 1.4% in the 2014-2017 period.

**Conclusion:** The surgical activity in the operating suite after acquiring new equipment and renovation, shows continuous improvement, pointed by the number of patients and the quality

indicators. The average length of stay of the patients undergoing surgery and the deaths recorded within 48 h after surgery were reduced. The refurbishment of the operating suite has increased the degree of operability, performing safe surgical interventions. Is required a continuous monitoring of the activity within the operating suite, overseeing the functional circuits and a correct sterilization of the surgical instruments.

## P316
## SURVEY ON OSTEOPOROSIS IN THE ORTHOPEDICS AND TRAUMATOLOGY DEPARTMENTS OF A COUNTY EMERGENCY HOSPITAL

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**Objective:** Osteoporosis is one of the most common diseases in elderly people, with increased costs for the health system and possible development of disability in case of bone fracture. Through the study we analyzed the frequency of osteoporosis in patients admitted to the Orthopedics and Traumatology departments of an emergency county hospital. It is important to raise awareness among medical professionals about the importance of diagnosing this condition associated with bone fracture at admission.
**Methods:** A retrospective study was carried out, analyzing the statistical data on the number of patients hospitalized in the Orthopedic and Traumatology Departments of the County Clinical Emergency Hospital Oradea during 2013-2017. Patients over 60 y of age who were diagnosed with osteoporosis at the time of admission were included in the study.
**Results:** In the study period 13836 patients were admitted, 5.69% (788 patients) were diagnosed with Osteoporosis when they were hospitalized. Patients over 60 y diagnosed with osteoporosis reported the total number of patients diagnosed with osteoporosis was 89.59% (706 patients), 82.36% were women and 67.28% had admission fractures. Hip fractures scored the highest incidence (47.89%), and vertebral compressions were present in 14.73% of the cases. The total number of hospitalized cases with hip fracture diagnosis in the reported period without secondary diagnosis of osteoporosis was 2319 vs. 218 cases with secondary diagnosis of osteoporosis. The highest number of cases of osteoporosis in admitted patients was in the age group 70-80 y (42%), patients presenting comorbidities such as hypertension, ischemic cardiopathy, cerebral atrophy or senile dementia, which resulted in decreased compliance to the treatment of osteoporosis.
**Conclusion:** About 6% of patients hospitalized in the traumatology orthopedic emergency departments had a diagnosis of osteoporosis. This condition is prevalent in women, and in the 70-80 age group. 67% of patients hospitalized with osteoporosis had fractures at admission. Only 9.5% patients had secondary diagnosis of osteoporosis. Considering the increased frequency of hip fractures in the number of cases of osteoporosis, there is a subdiagnosis of osteoporosis as pathology. Thus, for a correct diagnosis, it is necessary to develop a guideline for a proper diagnosis and appropriate therapeutic conduct for the elderly patients with fractures at admission.

## P317
## DENTAL HEALTH OF THE ELDERLY PATIENT WITH OSTEOPOROSIS

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**Objective:** Ageing determines at the level of the components of the masticatory apparatus, structural and functional modifications that fallow the same trait as in the other tissues and organs; their variety is influenced by individual genetics, rhythm of ageing and lifestyle. Osteoporosis can have a direct connection with dental diseases. It can manifest directly at the dental and oral level by affecting the maxilla and the mandible and indirectly by reducing the sustaining of dentition. We effectuated an epidemiologic study regarding the dental health of the elderly patients with osteoporosis that benefits by dental healthcare services.
**Method**: An epidemiological study was realized in 12 clinics of dental medicine from urban and rural environment (Oradea City – 6 clinics and Oradea Metropolitan Area – 6 clinics), between October-December 2018. In the study were included 134 patients aged 65 or older, that had the diagnosis of osteoporosis specified in their medical records. During the medical examination were analysed the risk factors for dental pathology, the dental pathology and comorbidities.
**Results:** From the 134 included patients, 74% (99 patients) were women and 55% came from urban environment. The most frequent dental diseases were: tooth loss (90%), tooth decay (85%), dental sensibility (84%), dry mouth sensation (72%), periodontal disease (53%) and gingivitis (52%). The comorbidities were: heart failure (53%), arterial hypertension (42%), osteoporosis (44%), senile insomnia (39%), eye disease (90%), cancer with different locations (27%), other diseases under 20% (genital-urinary diseases, chronic bronchitis, depression, deafness, hematologic diseases, Parkinson disease). The identified risk factors were psychical stress (61%), alcohol consumption (39%), sedentary lifestyle (31%), and smoking (27%).
**Conclusion:** A great proportion of elderly patients present at least to dental diseases, the most frequent being tooth loss and tooth decay, but also periodontal disease and gingivitis that are present in more than half of the patients. Analysis of the health of the elderly patients reveals an increased morbidity of the examined patients. There were identified multiple risk factors, psychical stress had the greatest proportion. During their lifetime the patients did not address to dental health services for preventive dental checkups.

## P318
## EVALUATION OF ANTIBIOTIC PRESCRIPTION PATTERNS IN ROMANIAN DENTISTRY

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**Objective:** Given the alarming increase of multidrug resistant microorganisms incidence, antibiotic overuse must be suppressed or at least limited in all medical fields, including dentistry. The objective of the current research was to evaluate the patterns of antibiotic prescription among dentists in Romania in order to identify possible antibiotic abuse and develop optimal fighting solutions.
**Methods:** A questionnaire consisting of 11 items was administered to 183 dentists working in private practices in Romania, both in urban and rural environments between September-November 2018.
**Results:** Regarding first choice of treatment, 72.1% of dentists used amoxicillin (either associated with clavulanate - 51.9%, or without - 20.2%), 12% ampicillin, 8.7% cephalosporines, 4.3% clindamycin and 2.7% doxycycline. The main reason for prescribing antibiotics was postextractionally (53%), followed by periapical conditions (35.5%) and periodontal disease (11.4%). 81.4% of responders recognised patient's age as a criterion influencing their decision to prescribe antibiotics (main threshold reported at 60 years old by 73.7%), whereas 59% of dentists do not adjust the antibiotic posology in relation to the patient's comorbidities (24% will always adjust, 16.9% will occasionally adjust). As far as the treatment duration is concerned, 56.2% of responders claimed a 7 d median period, 37.1% - 5 d, 3.8% - 10 d and 2.7% - 3 d. Although 55.7% of the interviewed dentists admit the existence of antibiotic overuse in their private practices (the main reasons being the faulty recall adhesion of the elderly patients secondary to the difficult access to dentistry services, followed by the necessity of continuing a self-initiated antibiotic course), only 42.6% of the respondents regard these clinical situations as decisive contributors to the development of multidrug resistant microorganisms.
**Conclusions:** The variability of the data from this investigation and its irregular distribution advocate for editing and implementing a national antibiotherapy guide in dentistry adjusted to the medical and socioeconomic aspects of the population. Also, a similar research done on a greater scale is needed in order to get a more accurate picture of antibiotic abuse in Romanian dentistry.

## P319
## IMPACT OF POPULATION-BASED OR TARGETED INTERVENTIONS ON FRACTURE INCIDENCE

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**Objective:** To investigate the impact of population level or targeted alterations to BMD on the incidence of fractures.
**Methods:** We used a simulated cohort of 50,633 women with UK age and BMI distribution, and prevalence of other clinical risk factors based on FRAX cohorts. We used FRAX probability of major osteoporotic fracture (MOF: hip, clinical vertebral, wrist, proximal humerus) and hip fracture, (with femoral neck BMD) to calculate the expected number of fractures per 1000 person-years (py), stratified by 10 year age band from 50 y. We then investigated the effect of i: bringing all individuals with T-score below -2.5 to be exactly -2.5 (targeted intervention); ii: increasing the entire BMD distribution by 0.5SD (population intervention).
**Results:** In the base model, the number of expected MOF ranged from 6.9 to 24.6, and hip fracture from 1.1 to 13.6, per 1000py from the lowest (50-59 y) to highest (90-99 y) age band. The targeted intervention led to between a 4.2 and 15.4% relative reduction in the number of MOF and between a 21.3 and 24.5% relative reduction in the number of hip fractures. Percent change for MOF, but less so hip fracture, rose with age. Increasing the population BMD distribution by 0.5SD led to an 13-16% relative reduction in the number of MOF from 50-89 y (10.6% reduction 90-99 y), and a 45.2% relative reduction in hip fracture at 50-59 y, reducing with age to a 14.6% relative reduction in the oldest age band. Accounting for the cohort age structure, the total MOF (hip fracture) saved were 625 (506) with -2.5 as minimum T-score, and 1010 (667) when increasing population BMD by 0.5 SD.
**Conclusions:** Both population-based and targeted strategies reduced the numbers of expected incident fractures, with contrasting relative impacts by age. These findings support the investigation of both population level interventions and those targeted at high fracture risk groups, for the prevention of osteoporosis-related fractures.
**Acknowledgement:** HJ and EM are joint senior author

## P320
## APPENDICULAR LEAN MASS DOES NOT PREDICT INCIDENT FRACTURES INDEPENDENTLY OF BMD: RESULTS FROM THE WOMEN'S HEALTH INITIATIVE (WHI) COHORT

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**Objective:** To investigate the predictive value of appendicular lean mass (ALM) for fracture outcomes amongst older postmenopausal women in the Women's Health Initiative (WHI), independent of BMD, prior falls and FRAX probability.
**Methods:** The WHI is a long-term US national health study focused on strategies for preventing heart disease, breast and colorectal cancer, and osteoporotic fractures in postmenopausal women. We used an extension of Poisson regression to investigate the relationship between baseline ALM (measured using DXA and corrected for height) and incident major osteoporotic fracture [MOF (hip, clinical vertebral, wrist or proximal humerus)], and hip fracture. All associations were adjusted for age, time since baseline and randomization group, or additionally for femoral neck BMD T-score, prior falls or FRAX probability (MOF without BMD) and are reported as hazard ratio (HR) for first incident fracture per SD increment in ALM/height$^2$.
**Results:** Complete data were available for 11,187 women (mean (SD) age: 63.3(7.4) years. Mean (SD) ALM was 37.8(5.4) kg. In the base models (adjusted for age and follow-up time), greater ALM/height$^2$ was associated with lower risk of incident MOF (HR/SD:0.87; 95%CI:0.82,0.93) and hip fracture (HR/SD:0.81; 95%CI:0.72,0.92). The associations appeared independent of prior falls and marginally attenuated by FRAX probability [MOF (HR/SD:0.94; 95%CI:0.88,1.01); hip (HR/SD:0.87; 95%CI:0.77,0.99)], but were attenuated to null after adjustment for femoral neck T-score: MOF (HR/SD:0.96; 95%CI:0.90,1.03); hip (HR/SD:0.91; 95%CI:0.80,1.03).
**Conclusion:** In the WHI, and consistent with our findings in older men (MrOS cohorts), DXA-ALM was not predictive of future fracture after adjustment for femoral neck T-score. Other measures of lean mass, such as creatine dilution and pQCT, may offer greater utility than DXA-derived indices in the assessment of sarcopenia.
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## P321
## CORRELATION OF DXA WITH DISEASE DURATION, CHANGES IN SACROILIAC JOINTS ON MAGNETIC RESONANCE IMAGING, DISEASE ACTIVITY AND SERUM LEVELS OF SCLEROSTIN AND DICKKOPF-1 IN PATIENTS WITH SPONDYLOARTHRITIS

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**Objectives:** To reveal the presence of osteopenia/osteoporosis in patients (pts) with spondyloarthritis (SpA) and to determine its correlation with disease duration, disease activity, active changes in sacroiliac joints (SIJ) on MRI, serum level of bone turnover markers - sclerostin (Scl) and dickkopf-1 (Dkk-1).
**Methods:** DXA was performed for 30 pts with SpA (mean age 39.57±10.67, mean disease duration – 8.24±7.71 y). Active inflammatory lesions in SIJ were evaluated with Spondyloarthritis Research Consortium of Canada (SPARCC) MRI SIJ score (0-72). Disease activity was measured by Ankylosing Spondylitis Disease Activity Score (ASDAS), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI, mm), C-reactive protein (CRP, mg/l) and erythrocyte sedimentation rate (ESR, mm/h). Scl and Dkk-1 serum levels (pmol/l) were conducted by ELISA.
**Results:** Mean value of DXA parameters were BMD – 0.76 ±0.09, T-score – -0.09±0.90, Z-score – 0.28±0.89 (forearm); BMD – 0.94±0.15, T-score – -1.28±1.28, Z-score – -1.03±1.27 (spine); BMD – 0.84±0.16, T-score – -0.92±0.94, Z-score – -0.65 ±1.07 (hip). Mean value of biomarkers were: Scl – 33.0±14.8, Dkk-1 – 96.2±27.2. Osteoporosis was present in 4 (13.3%), osteopenia - in 20 (66.7%) SpA pts. Scl showed significantly correlation with Z-score (r=0.624, p=0.013) and T-score for spine (r=0.557, p=0.031). Dkk-1 correlated with BASDAI (r=0.725, p=0.002), ASDAS-CRP (r=0.636, p=0.011), ASDAS-ESR (r=0.745, p=0.001) and SPARCC score (r=0.552, p=0.033). Disease duration negatively correlated with total T-score (r=-0.411, p=0.024). BMD at hip showed negative correlation with CRP (r=-0.365, p=0.048). There were no other correlations.
**Conclusion:** Bone density in pts with SpA shows negative correlation with disease duration and CRP, and positive correlation with Scl. Dkk-1 significantly positively correlated with disease activity scores and SPARCC SIJ.

## P322
## EFFECTS OF TESTOSTERONE THERAPY ON BONE MINERAL DENSITY AND BONE TURNOVER MARKERS IN OBESE DIABETIC HYPOGONADAL MALES: RESULTS OF TWO-YEAR CLINICAL TRIAL

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**Objective:** Both hypogonadism and type 2 diabetes mellitus negatively affect BMD. We evaluated changes in bone remodeling parameters due to testosterone replacement therapy (TRT).
**Methods:** 55 obese diabetic hypogonadal males participated in a 2-y, double-blind, placebo-controlled study. Bone turnover markers (BTM) C-telopeptide of type I collagen (CTX) and procollagen I N-terminal propeptide (PINP), estradiol, 25-hydroxyvitamin D, total, calculated free and calculated bioavailable testosterone levels were assessed at baseline, 12 and 24 months. BMD changes were evaluated after 24 months

using DXA. T-test and Wilcoxon's signed rank were used to detect changes from baseline. Normality of distribution of data was assessed with Shapiro-Wilk test.

**Results:** Participants were randomized into two groups. Group T (n=28) received 1000 mg testosterone undecanoate (TU) both years of the study while group P (n=27) received placebo first year and TU second year. Results show decrease in median CTX from baseline of 1055 (676 to 1344) pmol/l to 911 (556 to 1152) pmol/l after one year of placebo (p=0.012), then to 453 (365 to 665) pmol/l after one year of TRT (p<0.001) in group P and from 887 (648 to 1496) pmol/l to 504 (262 to 804) pmol/l after first year of TRT (p<0.001), then to 372 (165 to 599) after second year of TRT (p<0.001) in group T. Median PINP did not change from 31.4 (27.1 to 40.3) μg/l baseline at statistically significant level after one year of placebo (p=0.469) in group P but decreased to 28.0 (23.6 to 32.0) μg/l after one year of TRT (p=0.009); in group T a decrease from 30.9 (21.9 to 35.3) μg/l to 26.2 (18.6 to 32.1) μg/l was observed after first year of TRT (p=0.005), then to 20.1 (17.8 to 26.5) μg/l after second year of TRT (p<0.001). There were no changes in levels of estradiol. DXA showed no changes in femoral neck BMD in 32 patients from both groups P (n=16) or T (n=16) while a statistically significant increase in lumbar spine BMD by 0.075±.114 g/cm$^2$ (95%CI: 0.014 to 0.136; p=0.019) has been observed in group T following two years of TRT with no change observed in group P. TRT normalized testosterone levels in both groups within 12 months.

**Conclusions:** BTM decreased significantly after TRT and improvement of lumbar spine BMD was observed after 2 y of TRT.

## P323
## COMMERCIAL LABORATORY REPRODUCIBILITY OF SERUM CTX IN CLINICAL PRACTICE

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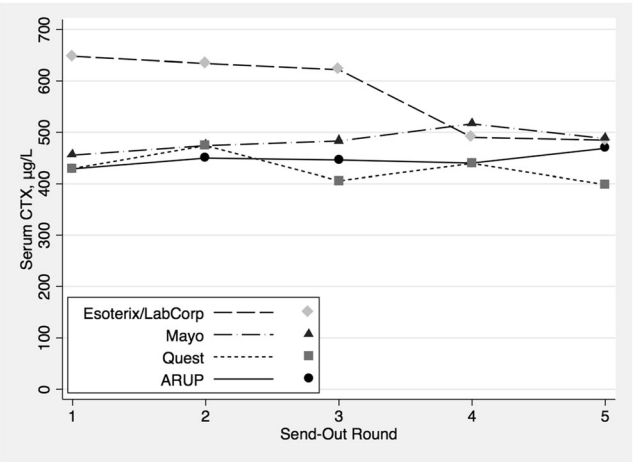
**Objective:** The use of bone turnover markers (BTM) in clinical practice has been limited by several factors, including assay heterogeneity. In 2011, the IOF/IFCC selected serum collagen type I crosslinked C-peptide (s-CTX) as the reference standard for bone resorption. This study aims to determine the within- and between- laboratory reproducibility for s-CTX assays performed under routine clinical conditions.

**Methods:** To create standardized pools, serum was collected from ten premenopausal women and ten postmenopausal women. Premenopausal sera were pooled to approximate a population with low bone-turnover; postmenopausal sera were pooled to approximate a population with high bone-turnover; and a third pool was created by evenly mixing sera from pre- and postmenopausal women. Multiple identical aliquots from each pool were created and frozen; all were labeled as routine clinical specimens with factitious patient identifiers. To evaluate longitudinal reproducibility, an aliquot from each of the 3 pools was sent to 4 US commercial laboratories on 5 dates over a 6-month period. To evaluate within-run reproducibility, on the 5th date, each lab received 5 aliquots from each pool. Three labs (Mayo, ARUP, and Quest) used the Roche Diagnostics Elecsys assay, and one (Esoterix/LabCorp) used the IDS-iSYS assay. Reproducibility was assessed using the coefficient of variation (CV) with 95%CI. Labs were unaware of the investigation.

**Results:** Across labs, mean s-CTX values were 423, 533, and 480 for the premenopausal, postmenopausal, and mixed pools, respectively. The premenopausal pool longitudinal CVs ranged from 5.0% to 18.8%; postmenopausal pool CVs ranged from 3.4% to 19.3%; and mixed-pool CVs ranged from 3.3% to 16.0%. Between-lab patterns were similar for each pool, so results from all 3 pools are combined for this analysis. The longitudinal reproducibility for Esoterix/LabCorp (IDS assay) was higher (CV=18.0%, CI: 13.0-28.9) than for the other labs (Roche assay) (Figure). Within-run reproducibility was also highest for Esoterix/LabCorp (CV=16.3%, CI: 11.9-26.2) compared to the other labs (CVs 9.2-12.3%).




**Conclusion:** Longitudinal and within-run reproducibility of s-CTX varies across US commercial labs. Reproducibility was poorer for Esoterix/LabCorp, which uses the IDS assay, compared to the other 3 labs, which use the Roche assay. Our results indicate that better commercial lab s-CTX assay calibration is needed.

## P324
## NICOTINE TREATMENT INDUCES PROLIFERATION VIA β-CATENIN-MEDIATED BCL-XL EXPRESSION IN OSTEOCLAST PRECURSOR CELLS

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Osteoporosis results in a great deal of disability and increases the risk of death especially when hip fracture occurs. Smoking is one of the risk factors related to osteoporosis. Although smoking has been proved to directly lower the BMD which may cause osteoporosis and fracture, the underlying mechanism has not been well investigated. Little has been reported that nicotine has indirect effect in regulating osteoclast growth and altering RANK-RANKL-OPG system. In our study, we found that nicotine induced cell proliferation via ILK/Akt regulated ERK activation, followed by b-catenin-medicated Bcl-xL expression. Pharmacological inhibition of ERK and is upstream molecule results in inhibition of Bcl-xL expression. This results provides a new evidence of how cigarette smoking causes osteoporosis and a possible target in treating osteoclast associated bone disorder.

## P325
## KUWAIT OSTEOPOROSIS GUIDELINES FOR MANAGEMENT OF GLUCOCORTICOID INDUCED OSTEOPOROSIS IN ADULT WOMEN AND MEN

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**Objective:** Identifying and treating women and men at age ≥18 with high risk for glucocorticoid induced osteoporotic fractures.
**Methods:** Duration of systemic glucocorticoid therapy of ≥3 months selected as an indication to screen for increased risk for osteoporotic fractures. FRAX-based intervention threshold (IT) models used in the UK, USA, Canada and Lebanon were evaluated. A proportion of subjects considered for therapy were based on IT that was set at a 10-y probability of a major osteoporotic fracture (MOF) equivalent to a woman with a prior fragility fracture and a BMI equal to 30.0 kg/m$^2$ without BMD or other clinical risk factors. The lower assessment threshold (LAT) was set at a 10-y probability of a MOF in women with BMI equal to 30.0 kg/m$^2$, no previous fracture and no clinical risk factors. The upper assessment threshold (UAT) was set at 1.2 times the IT. Other populations consideration for therapy was based on Z-scores (age <40) and on history of a fragility fracture.
**Results:** Presence of fragility fracture, regardless of glucocorticoid duration, age and BMD, is an indication for osteoporosis therapy. Subjects age <40 with Z-score <-3 at hip or spine, >10%/y BMD loss at hip or spine, or on very high glucocorticoid dose (prednisone >30 mg/d and a cumulative dose of >5 g in the past year) are recommended to receive osteoporosis therapy. In subjects age ≥40, the risk for MOF has to be higher than the age-specific IT which varied from 2.3 to 23% at the age of 40 and 90 y, respectively (Figure). Patients also require therapy if MOF risk is higher than the UAT when BMD is unknown.

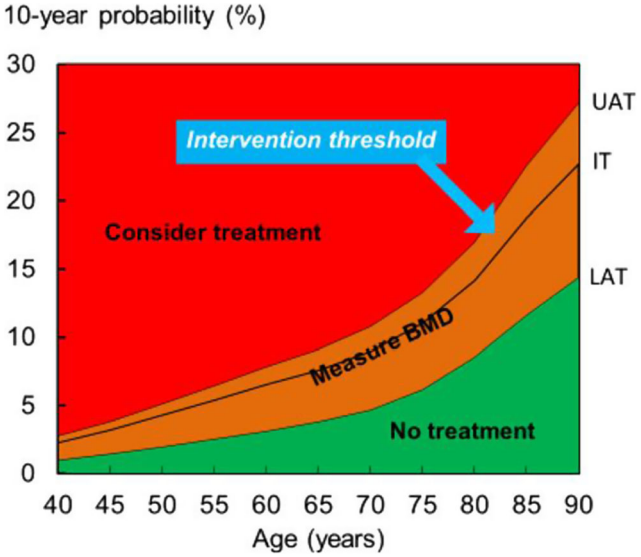


Figure: Intervention thresholds for Kuwait as set by FRAX-based 10-year probabilities (%) of a major osteoporotic fracture[1]

**Conclusion:** FRAX-based IT based on fracture probabilities in subjects age ≥40 and Z-score intervention threshold in subjects age <40, offers a practical method for the detection of subjects at high fracture risk. Subjects with history of fragility fractures should be treated regardless of BMD measurements.
**Reference:** 1. Johansson H et al. Osteoporos Int 2017;28:3099.
**Disclosures:** consultant/speaker's bureau/advisory activities

## P326
## VITAMIN D STATUS IN SLE PATIENTS AND ITS ASSOCIATION WITH CLINICAL AND LABORATORY PARAMETERS

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**Objective:** The relationship between vitamin D and systemic lupus erythematosus (SLE) is controversial. We, therefore, planned this study to comparatively determine vitamin D level in SLE patients and control subjects.
**Methods:** This study was carried out at Al-Hussein University Hospital during the period from January 2013 to March 2014. This study was carried out on 60 persons that age from 25 y to 50 y and divided in to two groups: Group A: 30 patients with SLE fulfilling at least 4 of the American College of Rheumatology of SLE

taken from outpatient clinic of Physical Medicine and Rheumatology Department. There were 27 female and 3 male. Group B: 30 healthy volunteers who participated in the study as a control group. Patients were subjected to the following procedures:

- Clinical: Careful history and general clinical examination as well as musculoskeletal examination.
- Laboratory investigations: Serum concentrations of 25(OH) Vit D, CBC, ESR, liver function tests (ALT, AST and bilirubin), kidney function tests (urea and creatinine), random blood glucose, serum calcium (Ca), & PTH.
- Statistical analysis.

**Results:**

- In our study, patients with SLE had significantly lower serum 25(OH) Vit D level than controls.
- We found that 90% of patients had low vitamin D, (26.7%) of the patients had deficient of vitamin D and (63.3%) of the patients had insufficient of vitamin D.
- We found that 25(OH) Vit D level had a statistically significant inverse correlation with arthritis, photosensitivity and proteinuria.
- We found that 25(OH) vit D level had a statistically significant inverse correlation with the level of anti-dsDNA titer.
- In our study, we did not find any statistical association between vitamin D insufficiency or deficiency with disease duration.
- In our study, we found that no significant correlation was observed between vitamin D levels and SLEDAI scores.

## P327
## EVALUATION OF IRON ACCUMULATION IN POSTMENOPAUSAL WOMEN AND THEIR AGE-RELATED CORRELATION TO BONE MINERAL DENSITY: A CROSS-SECTIONAL STUDY

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**Objectives:** To establish normal reference values for serum ferritin and evaluate iron accumulation in healthy Chinese subjects and investigate age-related relationships between body iron stores and BMD.
**Methods:** This cross-sectional study included 11,037 healthy Chinese subjects aged 20-90 y. Serum ferritin concentrations were measured by electrochemiluminescence immunoassay, and the reference values were calculated with respect to sex and age. BMDs of the lumbar spines and femur necks of 4979 subjects were measured by DXA. The patterns of age-related BMD changes were visualized and correlations between serum ferritin levels and BMD were statistically analyzed in different age-stratified groups.
**Results:** The concentrations of serum ferritin remained relatively stable in men and premenopausal women, while a dramatic change occurred in postmenopausal women. Based on the age-related trend of changes in serum ferritin concentrations in women, we categorized the subjects into three groups, namely ≤50 y, 51-75 y, and ≥76 y, for each sex and then analyzed the correlation between ferritin concentrations and BMD. Serum ferritin level was negatively correlated with BMD of the lumbar spines and femoral neck only in women in aged 51-75 y (r=-0.276 and -0.227, respectively; P<0.001). Furthermore, when we divided serum ferritin into quartiles, the odds for prevalent osteopenia and osteoporosis were 2.35-fold (95% CI=1.44–3.84) and 3.16-fold (95% CI=1.34–7.49) higher in women in the highest quartile, respectively, compared with those in the lowest quartile.
**Conclusions:** This study has identified the association between iron accumulation and bone weakening. Therefore, our findings bring up a clinical awareness that it is important to measure serum ferritin in postmenopausal women aged 51-75 y, and interrupt the process of iron accumulation in body may considered as a noticeably efficient intervention for iron overload-associated bone disease.
**Acknowledgement:** ClinicalTrials.gov Identifier: NCT03512743, Registered May 1, 2018-Retrospectively registered, https://clinicaltrials.gov/ct2/show/NCT03512743

## P328
## INFLUENCING FACTORS ASSOCIATED WITH LUMBAR SPINE AND FEMORAL NECK BONE MINERAL DENSITY IN POPULATION AGED 50 YEARS AND OLDER IN SUZHOU

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**Objective:** To investigate the correlations between the gender- and body-site-specific factors and BMD at the lumbar spine and femoral neck in population aged ≥50 y and older in Suzhou.
**Methods:** A total of 2602 subjects who had undergone comprehensive routine health examinations in our hospital from January 2015 to December 2017 were enrolled in this study. The data of age, height, weight, waist circumference and blood pressure were collected, the BMD of lumbar spine and femoral neck was measured, and other

biochemical markers and serum tumor markers were assayed.

**Results:** Multiple linear regression analysis showed that age, waist circumference and ALP were the risk factors for the decline of bone mass in lumbar spine or femoral neck, while height, BMI and systolic blood pressure were protective factors. In addition, serum ferritin is an important risk factor for the decline of BMD in women over 50 y of age. Further logistics regression analysis showed that older age, low height, low BMI and high ALP level may increase the risk of osteopenia or osteoporosis in both men and women. Among women, high serum ferritin level was another important factor for osteoporosis.

**Conclusion:** This study revealed the relationship between gender- and body-site-specific factors and BMD in people over 50 years old. The older age and high ALP are the risk factors of bone loss in both two genders, while height and BMI have certain protective effect on bone mass. At the same time, iron accumulation in postmenopausal women will further increase the risk of osteoporosis.

Table 1 Baseline characteristics of the study population

| | Men(n=1587) | Women(n=1015) |
|---|---|---|
| Anthropometric indicators | | |
| age (year) | 59.6 ± 8.4 | 59.2 ± 7.4 |
| height (cm) | 169.8 ± 6.0 | 158.1 ± 5.5 |
| weight (kg) | 72.4 ± 9.6 | 60.4 ± 8.4 |
| BMI (kg/m$^2$) | 25.1 ± 2.9 | 24.2 ± 3.1 |
| waist circumference (cm) | 85.7 ± 7.9 | 79.4 ± 8.1 |
| systolic blood pressure (mmHg) | 131.5 ± 17.2 | 131.4 ± 18.8 |
| diastolic blood pressure (mmHg) | 82.9 ± 11.1 | 77.7 ± 11.3 |
| BMD | | |
| lumbar spine BMD (g/cm$^2$) | 1.103 ± 0.159 | 1.023 ± 0.169 |
| femoral neck BMD (g/cm$^2$) | 0.941 ± 0.128 | 0.884 ± 0.133 |
| normal (n/%) | 1116(70.3%) | 507(50.0%) |
| osteopenia (n/%) | 442(27.9%) | 384(37.8%) |
| osteoporosis (n/%) | 29(1.8%) | 124(12.2%) |
| Serum biochemical markers | | |
| TBIL (μmol/L) | 13.3 ± 5.0 | 11.5 ± 4.3 |
| TP (g/L) | 73.0 ± 4.1 | 74.1 ± 4.3 |
| AG | 1.6 ± 0.3 | 1.5 ± 0.2 |
| ALT (U/L) | 22.0 ( 16.0- 31.0) | 17.0 ( 13.0- 23.0) |
| AST (U/L) | 22.0 ( 18.0- 26.0) | 20.0 ( 17.0- 24.0) |
| ALP (U/L) | 73.0 ( 62.0- 86.0) | 77.0 ( 64.0- 92.0) |
| γGGT (U/L) | 30.0 ( 20.0- 48.0) | 18.0 ( 14.0- 27.0) |
| LDH (U/L) | 164.1 ± 32.6 | 171.5 ± 32.7 |
| TC (mmol/L) | 5.10 ± 0.90 | 5.42 ± 0.96 |
| TG (mmol/L) | 1.5 ( 1.0- 2.3) | 1.4 ( 1.0- 2.0) |
| HDL (mmol/L) | 1.20 ± 0.29 | 1.39 ± 0.33 |
| LDL (mmol/L) | 3.08 ± 0.763 | 3.24 ± 0.82 |
| UREA (mmol/L) | 5.32 ± 1.28 | 4.96 ± 1.209 |
| CREA (μmol/L) | 73.9 ± 11.6 | 53.8 ± 9.2 |
| URCA (μmol/L) | 352.0 (305.0-403.0) | 268.0 (227.0-310.0) |
| GLU (mmol/L) | 5.4 ± 1.4 | 5.2 ± 1.2 |
| HbA1c (%) | 5.9 ± 0.9 | 5.8 ± 0.8 |
| Serum tumor markers | | |
| CA19-9 (kU/L) | 6.570 ( 4.620- 10.030) | 6.910 ( 4.855- 10.320) |
| NSE (ng/ml) | 2.040 ( 1.700- 2.560) | 2.000 ( 1.652- 2.490) |
| CEA (ng/ml) | 1.340 ( 0.890- 2.020) | 0.985 ( 0.690- 1.508) |
| CA242 (IU/ml) | 2.530 ( 1.840- 3.850) | 2.610 ( 1.950- 4.130) |
| SF (μg/L) | 110.1 ( 70.1-174.2) | 57.8 ( 28.1-103.6) |
| β-HCG (mIU/ml) | 0.200 ( 0.130- 0.300) | 0.180 ( 0.110- 0.270) |
| AFP (μg/L) | 1.090 ( 0.760- 1.640) | 1.000 ( 0.670- 1.600) |
| CA125 (ng/ml) | 7.670 ( 5.590- 10.438) | 6.580 ( 4.840- 9.450) |
| CA153 (ng/ml) | 4.370 ( 2.875- 7.605) | 4.160 ( 2.780- 7.188) |
| HGH (ng/ml) | 0.140 ( 0.070- 0.330) | 0.130 ( 0.060- 0.310) |
| fPSA (ng/ml) | 0.200 ( 0.120- 0.350) | 0.030 ( 0.020- 0.040) |

Table 2 Correlation analysis of BMD and body composition influencing factors

| Variables | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | lumbar spine BMD | | femoral neck BMD | | lumbar spine BMD | | femoral neck BMD | |
| | r | p | r | p | r | p | r | p |
| Anthropometric indicators | | | | | | | | |
| age | 0.018 | 0.482 | *-0.144*** | *0.000* | *-0.560*** | *0.000* | *-0.474*** | *0.000* |
| height | *0.180*** | *0.000* | *0.210*** | *0.000* | *0.295*** | *0.000* | *0.299*** | *0.000* |
| weight | *0.232*** | *0.000* | *0.334*** | *0.000* | *0.278*** | *0.000* | *0.406*** | *0.000* |
| BMI | *0.167*** | *0.000* | *0.265*** | *0.000* | *0.128*** | *0.000* | *0.265*** | *0.000* |
| waist circumference | *0.132*** | *0.000* | *0.241*** | *0.000* | 0.041 | 0.201 | *0.153*** | *0.000* |
| systolic blood pressure | *0.089*** | *0.000* | 0.025 | 0.321 | *-0.081** | *0.011* | -0.06 | 0.058 |
| diastolic blood pressure | *0.058** | *0.022* | *0.068*** | *0.008* | 0.046 | 0.149 | *0.066** | *0.039* |
| Serum biochemical markers | | | | | | | | |
| TBIL | -0.004 | 0.863 | 0.018 | 0.484 | -0.057 | 0.067 | -0.013 | 0.671 |
| TP | -0.013 | 0.603 | 0.031 | 0.215 | -0.040 | 0.206 | 0.001 | 0.981 |
| AG | -0.016 | 0.520 | 0.047 | 0.060 | -0.014 | 0.646 | 0.007 | 0.812 |
| ALT | 0.031 | 0.221 | *0.082*** | *0.001* | 0.020 | 0.530 | 0.049 | 0.117 |
| AST | -0.018 | 0.466 | -0.015 | 0.538 | -0.051 | 0.106 | -0.044 | 0.163 |
| ALP | *-0.159*** | *0.000* | *-0.186*** | *0.000* | *-0.360*** | *0.000* | *-0.235*** | *0.000* |
| γGGT | 0.027 | 0.284 | *0.078*** | *0.002* | -0.003 | 0.913 | *0.064** | *0.043* |
| LDH | 0.025 | 0.315 | -0.005 | 0.842 | *-0.156*** | *0.000* | *-0.130*** | *0.000* |
| TC | -0.005 | 0.850 | 0.020 | 0.438 | *-0.095*** | *0.002* | *-0.095*** | *0.002* |
| TG | 0.046 | 0.066 | *0.154*** | *0.000* | -0.003 | 0.924 | 0.012 | 0.707 |
| HDL | -0.034 | 0.190 | *-0.091*** | *0.000* | -0.027 | 0.407 | -0.056 | 0.082 |
| LDL | -0.011 | 0.660 | -0.008 | 0.756 | *-0.088*** | *0.006* | *-0.095*** | *0.003* |
| UREA | 0.013 | 0.595 | -0.007 | 0.781 | *-0.091*** | *0.004* | *-0.073** | *0.020* |
| CREA | *0.074*** | *0.003* | 0.002 | 0.943 | 0.012 | 0.706 | -0.029 | 0.352 |
| URCA | *0.077*** | *0.002* | *0.118*** | *0.000* | 0.038 | 0.230 | 0.046 | 0.145 |
| GLU | *0.077*** | *0.002* | *0.091*** | *0.000* | *-0.086*** | *0.006* | -0.030 | 0.342 |
| HbA1c | *0.093*** | *0.001* | *0.064** | *0.016* | *-0.067** | *0.041* | -0.046 | 0.166 |
| Serum tumor markers | | | | | | | | |
| CA19-9 | *0.074*** | *0.004* | 0.010 | 0.684 | -0.050 | 0.114 | -0.055 | 0.087 |
| NSE | 0.028 | 0.260 | 0.042 | 0.095 | -0.026 | 0.410 | -0.017 | 0.598 |
| CEA | -0.029 | 0.250 | -0.047 | 0.063 | *-0.107*** | *0.001* | *-0.113*** | *0.000* |
| CA242 | 0.020 | 0.435 | 0.023 | 0.378 | 0.011 | 0.732 | -0.011 | 0.735 |
| SF | 0.022 | 0.386 | 0.050* | 0.048 | *-0.286*** | *0.000* | *-0.241*** | *0.000* |
| β-HCG | 0.029 | 0.263 | 0.038 | 0.142 | *-0.082** | *0.011* | *-0.106*** | *0.001* |
| AFP | -0.017 | 0.501 | -0.034 | 0.194 | 0.002 | 0.940 | 0.008 | 0.813 |
| CA125 | -0.005 | 0.834 | 0.029 | 0.255 | 0.051 | 0.103 | 0.013 | 0.684 |
| CA153 | 0.026 | 0.304 | 0.024 | 0.331 | -0.032 | 0.313 | -0.033 | 0.297 |
| HGH | -0.022 | 0.448 | -0.049 | 0.089 | 0.000 | 0.997 | 0.041 | 0.280 |
| fPSA | 0.028 | 0.283 | *-0.074*** | *0.004* | -0.072 | 0.107 | -0.067 | 0.129 |

R is the correlation coefficient,*P < 0.05, **P < 0.001。

Table 3 Multiple regression analysis to identify significant determinants of BMD in men

| Variables | lumbar spine BMD | | | femoral neck BMD | | |
|---|---|---|---|---|---|---|
| | β | SE | p | β | SE | p |
| age | | | | -0.001 | 0.000 | 0.012 |
| height | 0.006 | 0.001 | 0.000 | 0.005 | 0.001 | 0.000 |
| BMI | 0.018 | 0.003 | 0.000 | 0.016 | 0.002 | 0.000 |
| waist circumference | -0.005 | 0.001 | 0.000 | -0.003 | 0.001 | 0.004 |
| systolic blood pressure | 0.001 | 0.000 | 0.002 | | | |
| ALP | -0.001 | 0.000 | 0.000 | -0.001 | 0.000 | 0.000 |
| HbA1c | 0.022 | 0.008 | 0.007 | | | |

Table 4 Multiple regression analysis to identify significant determinants of BMD in women

| Variables | lumbar spine BMD | | | femoral neck BMD | | |
|---|---|---|---|---|---|---|
| | β | SE | p | β | SE | p |
| age | -0.010 | 0.001 | 0.000 | -0.007 | 0.001 | 0.000 |
| height | 0.006 | 0.001 | 0.000 | 0.005 | 0.001 | 0.000 |
| BMI | 0.010 | 0.002 | 0.000 | 0.018 | 0.002 | 0.000 |
| waist circumference | | | | -0.002 | 0.001 | 0.009 |
| systolic blood pressure | 0.001 | 0.000 | 0.017 | | | |
| ALP | -0.002 | 0.000 | 0.000 | -0.001 | 0.000 | 0.000 |
| SF | -0.000220 | 0.000 | 0.004 | -0.000162 | 0.000 | 0.005 |

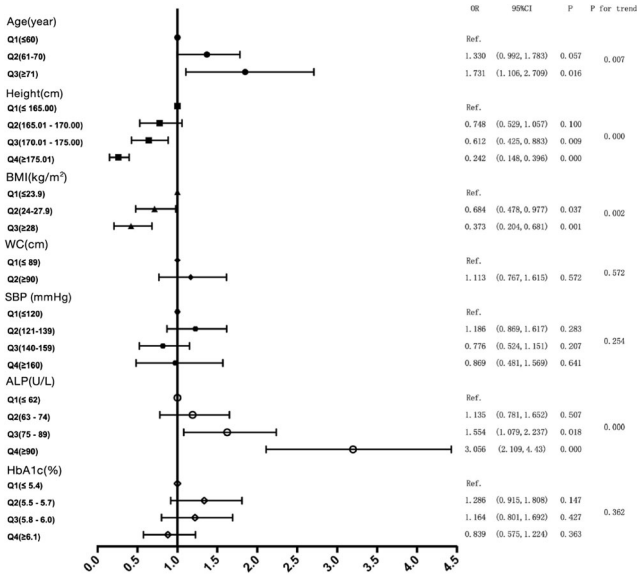


Fig. 1 The risk of osteopenia or osteoporosis in men with different risk factors

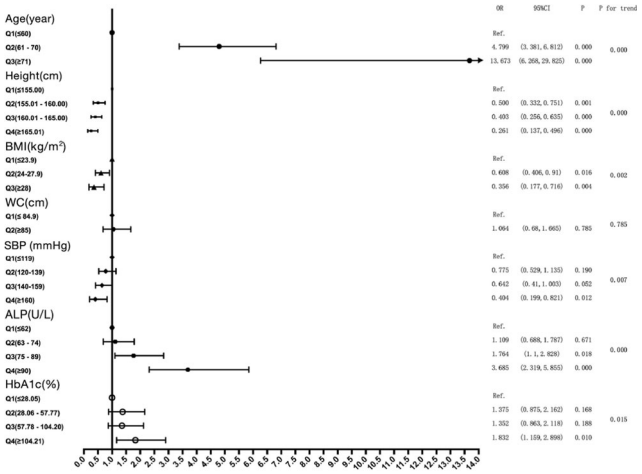


Fig. 2 The risk of osteopenia or osteoporosis in women with different risk factors

## P329

## DRUGS THAT MAY HARM BONE: ASSUAGE THE RISK

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**Objective:** Glucocorticoid, proton pump inhibitors, selective serotonin reuptake inhibitors (SSRIs), certain antiepileptic drugs, and aromatase inhibitors have significant adverse effects on bone. Healthcare providers should monitor the bone health of patients on these agents, supplement their intake of calcium and vitamin D, encourage weight bearing exercise, and initiate osteoporosis-prevention treatment as indicated.
**Methods:** We updated our statistics among osteoporosis therapies users that reported fracture and BMD among oral GC users. We restricted the analysis to GC initiators (≤6 months) and chronic GC users (>6 months). We estimated the annual probability of vertebral fracture (primary), nonvertebral fracture and percentage change in lumbar spine and femoral neck BMD. Baseline bone mineral testing was obtained when starting treatment with any of those drugs inducing osteoporosis. We started therapy if the patient's T-score is <–2.0 or if she has any of at least two of the following fracture risk factors score, <–1.5, age over 65, family history of hip fracture, personal history of fragility fracture after age 50, low BMI (<20 kg/m$^2$), Current or prior history of tobacco use, oral glucocorticoid use for longer than 6 months. Patients with a T-score ≥–2.0 and no risk factors should have BMD reassessed after 1-2 y. Antiresorptive therapy with denosumab 60 mg and evaluation for other secondary causes of bone loss was initiated.
**Results:** The annual incidence of vertebral and nonvertebral fracture was 4% (93% CrI = 2.8-8.2) and 2.6% (95% CrI = 1.2-4.2) among GC initiators, and 3.2% (95% CrI = 1.8-5.0) and 3.0% (95% CrI = 0.8-5.9) among chronic GC users. There was a nonsignificant effect of group-level variables (mean age, mean BMD, mean GC daily dose, patients with previous vertebral fractures, proportion of women and adjuvant used) on vertebral fracture rate.
**Conclusion:** Vertebral fracture incidence among GC initiators at Alnoor Specialist hospital is high. Our findings suggest that fracture incidence among oral GC users may be more common than previously estimated. Optimizing GC-induced osteoporosis management during early exposure to GC is essential to prevent fractures.

## P330

## RELATIONSHIP BETWEEN VITAMIN D SERUM STATUS AND INSULIN RESISTANCE, CARDIOVASCULAR RISK FACTORS AND HYPERTRIGLYCERIDEMIC WAIST PHENOTYPE

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**Objective:** Recent studies have shown that Vitamin D deficiency is very common in around the world especially in Iranian. Vitamin D deficiency are associated with lipid metabolism. Relationship between vitamin D levels and waist circumference (WC) has been found. Purpose of this study is detecting relationship between vitamin D status and cardiovascular risk factors and hypertriglyceridemic waist phenotype (HTGWP).
**Methods:** This cross-sectional study was conducted on 265 Tehrani healthy adults. HTGWP was described as serum triacylglycerol concentrations 150 mg/dL and concurrent WC 88 cm (women) and 102 cm (men). Serum glucose, lipids profile, liver enzymes, hs-Crp and body composition were measured in a fasting state.

**Results:** The mean age (±SD) of the participants was 35 ±8.78, and the mean BMI was 25.93±4.8. Vitamin D mean was 22.9±20.8 and waist mean was 88.8±12.5.the association of vitamin D status and cholesterol and LDL was significant (p=0.03) and (p=0.018). considering the association between vitamin D status and phenotype in adjusted model was significant for phenotype 3 (TG >150 and WC<102 in men and WC<88 in women), OR(95%CI) was 20.53(1.34-313.21) and phenotype4 (TG <150 and WC<102 in men and WC<88 in women) OR(95%CI) was 9.21(1.60-52.98), p for trend (p=0.006) and (p=0.04). We saw the significance of vitamin D in regression models among phenotypes 3 and 4.

**Conclusions:** We founded significant association between vitamin D status and phenotypes of hypertriglyceridemic waste. Also, there was a relationship between vitamin D and lipid profiles. There is a direct correlation between TG and waist circumference in insulin resistance, in Tehrani healthy adults. Our suggestion for further studies is to do more sampling or to do either RCT or experimental studies, check the status of vitamin D.

## P331

## VASCULAR RISK AND SERUM TNF A LEVELS IN PATIENTS WITH ACUTE CORONARY SYNDROME AND RHEUMATOID ARTHRITIS

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**Objective:** Systemic inflammation and cytokine synthesis from activated proinflammatory cells leads to higher vascular risk in patients with seropositive RA. Local and systemic mechanisms of TNFα synthesis have been identified, which is related to early and more severe manifestations of ACS.

**Methods:** 46 patients with seropositive RA were studied, 23 of whom had ACS and 23 were non-ACS. The serum level was taken at 24 and 48 h. TNFα ELISA Kit (TNF) Detection Kit AA 77-233 Kit No. ABIN625441, by RayBiotech, hs CRP-kit of AMP Diagnostics BR-5420-S. The cardiovascular risk of new ACS incidents is assessed through GRACE Scale.

**Results:** In the RA and ACS group, there was a significantly higher serum level of TNFα at both 24 h (9.77 ng/ml p<0.001) and 48 h (9.98 ng/ml p<0.001) vs. group without ACS (5.07 ng/ml/24h and 5.24 ng/ml/48h, p 0.001) hour, higher levels of hs CRP (28.82 g/ml vs. 23.67g/ml p<0.001) and the GRACE score (140.45 vs. 125.5 p<0.001).

**Conclusion:** Patients with ACS and RA have significantly higher levels of TNFα associated with a higher level of pro-inflammatory response and a higher risk of subsequent ACS

## P332

## PERNICIOUS ANEMIA PRESENTING WITH SYMPTOMATIC VERTEBRAL COMPRESSION FRACTURES

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**Objective:** Pernicious anemia (PA) has been associated with both low spine BMD and increased fracture risk in retrospective cohort studies. The cause of these observations is obscure. The purpose of this study is to describe and compare the clinical details of a cohort of PA patients who presented with subacute vertebral compression fractures (SVCF) to one without PA.

**Methods:** A retrospective cohort study was conducted from a population of 159 patients presenting with SVCF to an outpatient fracture clinic. 24 patients with PA diagnosed at the time of presentation, based on low vitamin B12 levels and the presence of either intrinsic factor (IF) or anti parietal cell antibodies (APCA), were compared to the remaining 135 patients without PA. A complete history and physical exam including review of past medical records, and current and past radiographs was performed. CBC, sedimentation rate, chemistry profile, TSH, urinalysis, vitamin B12, PTH, 25-OH vitamin D, and serum protein electrophoresis was done in all patients.

**Results:** There were 17 female and 7 male PA patients, ranging in age from 67-92 (mean 79.0 y) and with a BMI of 15-35 (mean 25.2). 13 patients were taking thyroid hormone and 7 were on protein pump inhibitors (PPI). 12 patients had previous fractures. Fractures occurred after falling in 17, lifting in 2, and were spontaneous in 5. The location of the fracture was between T-11 and L-2 in 65% of the cases and 8 patients had multiple fractures. 20 out of the 24 patients with PA had evidence of peripheral neuropathy. IF was present in 14 patients, APCA in 5, and 5 had both. Vitamin D was <20 ng/mL in 7 patients, and serum PTH was >65 pg/mL in 2. There was an increased incidence of peripheral neuropathy (p=0.0007), vitamin D <20 ng/dL (p=0.002), use of PPI (p=0.026), and thyroid disease (p=0.009) in the PA cohort. Age, gender, diabetes, previous fracture, BMI, fracture location, occurrence of multiple fractures, fractures occurring with falling, spontaneous fractures, and the presence of MGUS did not differ between the two cohorts.

**Conclusions:** This cohort of SVCF patients with PA had a higher incidence of peripheral neuropathy, vitamin D deficiency, PPI use and thyroid disease than SVCF patients without PA. These observations may explain in part the higher incidence of fractures and low BMD found in previous studies of PA patients.

## P333

## PNEUMOTHORAX SECONDARY TO PROLONG PNEUMONIA AFTER DENOSUMAB INJECTION IN GRAFT VS. HOST DISEASE PATIENT

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**Objective:** Prolong use of bisphosphonates may increase the risk of adverse events that results in discontinuation of therapy. Sequential therapy with nonbisphosphonate agents such as denosumab may be the choice for high risk osteoporosis patient. However, limited report on the adverse effect of denosumab use in patient with graft vs. host disease. We aimed to report serious pneumothorax secondary to prolong pneumonia after denosumab injections.
**Method:** This was a case report. The record of the patient was retrieved and reviewed retrospectively.
**Results:** LEH, 54 years old male, had allogenic stem cell transplant in 2004 and complicated by severe chronic graft vs. host disease. Thus, he was on long term prednisolone and had glucocorticoid induced osteoporosis. He was given alendronate 70 mg weekly for 6 y and was stopped due to teeth falling out spontaneously. Denosumab 60 mg was given in February 2016 and August 2016. Patient developed pneumonia after a week of therapy and depending on oxygen concentrator. He had multiple occasions of pneumonia and was treated as outpatient. Subsequently he was diagnosed with bronchiolitis obliterans in October 2016. In February 2017, patient was admitted in hospital for pneumonia for 3 d. After a week of discharge, he had readmission for right pneumothorax for 30 d and then 9 d and 11 d in February 2017, April 2017 and May 2017, respectively. Patient stopped depending on oxygen since October 2017.
**Conclusion:** This case report may exemplify a potential risk of pneumonia and pneumothorax in the use of denosumab in a transplant patient complicated by graft vs. host disease.

## P334

## THE EFFECTIVENESS OF DIFFERENT HARDNESS CUSTOM INSOLES ON PLANTAR PRESSURE REDISTRIBUTION

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**Objective:** The objective of this study was to investigate the effectiveness of different custom hardness insoles on plantar pressure redistribution during walking and running.
**Methods:** Six males participated in the walking and running test (age: 24±1.6 y, weight: 67.9±3.6 kg, height: 175.5±4.7 cm). All subjects were instructed to walk and run along a 10m pathway wearing two different hardness insoles (i.e., hard custom insoles (CHI) and soft custom insole (CSI)) and control insole (CI) at their preferred speed. Peak pressure, mean pressure, maximum force, pressure-time integral were collected to analyze using SPSS.
**Results:** The maximum force, peak pressure, mean pressure and pressure-time integral of midfoot and heel were significantly increased by both kinds of custom insoles. While the CHI significantly increased mean pressure, peak pressure of the medial forefoot, central forefoot compared with the CSI and CI.
**Conclusion:** The custom insoles showed significantly higher plantar pressure on medial midfoot and lateral midfoot. But CSI was better than CHI because of redistributing the plantar pressure by increasing the plantar pressure of all forefoot. The CHI causes significant high pressure at medial forefoot, which may raise the risk of forefoot pain.

Figure Experimental insoles.

## P335

## FEAR AVOIDANCE IN PATIENTS WITH LOW BACK PAIN AND SCIATICA

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**Objective:** To examine differences in severity of fear avoidance behavior between patients with localized chronic low back pain and those with sciatica.
**Methods:** The study was designed as a cross-sectional study and included 113 subjects, average age 53.24±15.25 y, who were divided into two groups. The first group comprised patients with low back pain and sciatica, and the second patients with localized low back pain. Data about pain duration (in months) were collected. Subjects filled out questionnaire The Fear-avoidance Components Scale (FACS) (1, 2). Also, subjects graded current pain intensity (at the moment of testing) and average pain intensity (in last 4 weeks) using Numerical Rating Scale (NRS).
**Results:** The majority of subjects had low back pain with sciatica - 90 subjects (79.6%), while 23 of them (20.4%) had localized lower back pain. Average pain intensity in last 4 weeks was significantly higher in the sciatica group (6.55 ±2.13 vs. 5.21±1.91, t=2.748, p=0.007). Similar results were found in current pain intensities (5.87±2.48 vs. 4.22±2.39, t=2.864, p=0.005). Interestingly, there was no significant difference in pain duration between groups (69.39±102.48 vs. 80.27±115.50, t=-0.434, p=0.665). The FACS score was

significantly higher in sciatica group (62.12±19.15 vs. 46.83 ±21.75, t=3.324, p=0.001).

**Conclusion:** Although there were no differences in pain duration, the FACS scores in patients with low back pain and sciatica were significantly higher, indicating more pronounced fear avoidance behavior in this group.

**References:**

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2. Knezevic A et al. PloS one 2018;13:e0204311.

## P336

## REDUCING HEALING TIME IN SURGICAL TREATMENT OF COMPLETE FEMORAL FRACTURES ASSOCIATED WITH LONG-TERM BISPHOSPHONATE THERAPY

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**Objectives:** To analyze factors that affect healing time in the operative treatment of complete femoral fractures associated with long-term use of bisphosphonates (BPs). In particular, we sought to determine operatively controllable factors related to fracture healing time.

**Methods:** 99 consecutive patients (109 fractures) who had been operatively treated for a complete atypical femoral fracture were recruited. All patients had a documented history of BP therapy at the time of presentation with an average length of 7.4±3.5 y (range, 3-20 y). Baseline demographic data, characteristics of fracture and surgery, and radiographic findings including femoral neck-shaft angle, coronal and sagittal bowing of the femur, and the thickness of femoral cortex were examined. Univariate and multivariate logistic regression analyses were performed to identify predictable factors associated with delayed union or nonunion.

**Results:** Of 109 fractures, 76 (69.7%) fractures showed bony union within 6 months after the index surgery and were assigned to the successful healing group. The remaining 33 (30.3%) fractures which showed delayed union or nonunion were assigned to the problematic healing group. There were differences in BMI, BP medication period and the incidence of prodromal symptoms between the two groups. Suprasisthmal fracture height, femoral bowing ≥10° in the coronal plane, and mediolateral cortical thickness ratio ≥0.4 were predictable, but uncontrollable factors of the problematic healing. Iatrogenic cortical breakage around the fracture site, and the ratio of the remaining gap to cortical thickness ≥0.2 on the anterior and lateral sides of the fracture site were controllable predictive factors associated with the problematic healing.

**Conclusions:** Higher BMI, longer BP duration and the presence of prodromal symptoms yielded adverse effects on fracture healing. Intramedullary nailing without cortical breakage around the fracture site and decreasing the anterior and lateral fracture gaps as much as possible are recommended to reduce healing time in complete femoral fractures associated with long-term use of BPs.

## P337

## COMPARISON ON ATYPICAL COMPLETE FEMORAL FRACTURES ASSOCIATED WITH BISPHOSPHONATE USE AND NOT ASSOCIATED WITH BISPHOSPHONATE USE

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**Objectives:** The purpose of this study is to compare clinical characteristics and surgical outcome of atypical complete femoral fractures associated with bisphosphonates (BPs) use and those of fractures not associated with BPs use.

**Methods:** 76 consecutive patients (81 fractures) who had been operatively treated for a complete atypical femoral fracture were recruited. Of the 81 fractures, 73 occurred after BPs medication of at least 3 years (BP group) while 8 occurred without a history of BP medication (Non-BP group).

**Results:** There were no differences in demographic data and fracture- and surgery-associated factors between the two groups. of 76 patients (81 fractures), 54 (66.7%) fractures showed bony union within 6 months after the index surgery and 23 (28.4%) showed delayed union at a mean of 11.2 months (range, 8-18 months). The remaining 4 fractures were on to nonunion, even 18 months after the index surgery. There was no difference in healing rate between the BP group and the Non-BP group. There were strong correlations between the fracture height and the degree of bowing regardless of BPs medication. All fractures except 1 occurred at the diaphyseal region of the femur when not associated with BP medication.

**Conclusions:** There were strong correlations between the fracture height and the degree of bowing both in the BP group and in the Non-BP group, although no difference was found in healing rate between the BP group and the Non-BP group.

## P338

## THE ASSOCIATION BETWEEN RESTING METABOLIC RATE AND SARCOPENIC OBESITY IN OVERWEIGHT AND OBESE ADULT WOMEN

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**Objective:** So far, no study has examined the contribution of resting metabolic rate (RMR) to sarcopenic obesity (SO) in obese and overweight people based on quintile of skeletal muscle mass (SMM) and fat mass (FM). This study was conducted to examine the association between RMR and SO.
**Method:** This cross-sectional study was conducted on 301 overweight and obese women aged 18-48 (BMI >25 kg/m$^2$). Anthropometric measurements were assessed in all participants. Body composition was measured using body composition analyzer. Resting metabolic rate was measured by means of indirect calorimetry. The usual intake of food was evaluated over the past year by the use of questionnaire a valid and reliable semiquantitative food frequency containing 147 items.
**Result:** The prevalence of sarcopenia (who had two lower quintiles of SMM) and obesity (who had two highest quintiles of FM) was 19.6%, 20.4% respectively. The rate of SO among participants was 9.9%. Between SO and non-SO individuals there was statistically significant difference in height, BMI, Resting metabolic rate/kg, body fat%, SMM, FM, waist circumference, fat mass index, FBS and T-score (P<0.05). Binary logistic analysis showed that participants with lower RMR/kg had higher odds of SO (OR=0.87, 95%CI=0.78 to 0.98, P=0.03) and the risk of sarcopenia increased by 13%. After adjustment for weight, physical activity and total energy intake, the relationship between the RMR/kg and SO, was still significantly negative (OR=0.87, 95%CI=0.77 to 0.99, P=0.04) and participants with lower RMR/kg had higher odds of SO and the risk of sarcopenia reduced by 13% too.
**Conclusion:** The findings of this study suggest that there is a negative relationship between SO and RMR/kg, and increasing of RMR/kg, has a significant effect on reducing of incidence risk of SO.

## P339
## RESTABILIZATION OF NONUNION OF ATYPICAL SUBTROCHANTERIC FEMORAL FRACTURES USING EXTRAMEDULLARY FIXED ANGLED PLATES

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**Objectives:** This study was conducted to evaluate the outcomes of salvage operation using a 95° angled blade plate for failed osteosynthesis of subtrochanteric femoral fractures associated with long-term bisphosphonates (BPs) use.
**Methods:** From October 2008 to July 2016, 14 patients with failed osteosynthesis of an atypical subtrochanteric femoral fracture were treated with the angled blade plate. Their mean age was 67.8 y (range, 60-74 y), all of which were female. Outcome variables included the time of union, postoperative complications, Harris hip score, and functional rating scale of Sanders.
**Results:** Bony union was achieved in 12 (85.7%) of 14 patients at an average of 8.4 months (range, 4 to 12 months). One patient experienced plate breakage and restabilization with the longer plate and strut-allograft. The other patient with plate pullout and varus angulation of the fracture site, refused to undergo further surgery. The mean Harris hip score was 83.1 points at the time of final follow-up. Functional rating scale of Sanders was good or excellent in 78.6% of the patients.
**Conclusion:** The 95° angled blade plate was shown to be an effective fixation modality for nonunion of atypical subtrochanteric fractures with a high rate of fracture union and functional improvement.

## P340
## ASSOCIATION OF SERUM BONE AND MUSCLE RELATED BIOMARKERS WITH BODY COMPOSITION AND PHYSICAL FUNCTION IN COMMUNITY-DWELLING MIDDLE-AGED AND ELDERLY ADULTS

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**Objective:** Muscles interact with bone mechanically and functionally in skeletal tissues. Endocrine factors, as well as mechanical factors, may affect both muscle and bone metabolism. The aims of this study were to evaluate the association of serum bone and muscle related biomarkers with age, gender, body composition, and physical function in community-dwelling middle-aged and elderly adults.
**Methods:** Serum sclerostin, osteocalcin (OC), IGF-1, myostatin and speed of sound (SOS) through the calcaneus, skeletal muscle mass index, grip strength, gait speed, and tartrate-resistant acid phosphatase-5b (TRACP-5b) were measured at the annual town-sponsored medical checkup in the town of Hino in Tottori Prefecture, Japan. The associations between all criteria were analyzed and independent markers for serum sclerostin, OC, and IGF-1 were analyzed by a multiple regression analysis.
**Results:** Participants included 97 men and 157 women who lived in a community with a mean age of 74.1±8.4 y (range, 43-99 y). Their mean BMI was 22.4±2.9 kg/m$^2$. Sclerostin was positively correlated with age, BMI, SOS, SMI, and grip strength, and negatively correlated with TRACP-5b. OC was negatively correlated with SOS, SMI, and grip strength, and positively correlated with TRACP-5b. IGF-1 was positively correlated with BMI, SOS, SMI, grip strength, and gait speed, and negatively correlated with age and TRACP-5b. Myostatin was not correlated with any of the variables assessed. Multiple regression analysis showed that significant independent predictors for sclerostin were gender, age, SOS, and TRACP-5b, those for OC were gender, SOS, and TRACP-5b, and those for IGF-1 were age, SOS, and BMI.
**Conclusions:** It was suggested that IGF-1 has a significant relationship with not only muscle mass and function but also

with bone, although there was no discernable relationship between serum sclerostin and physical function.

## P341
## VITAMIN D AND THE RISK OF VFX IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

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**Objective:** To study vitamin D status and the prevalence of VFx in postmenopausal women with primary hyperparathyroidism (PHPT).
**Methods:** We studied 43 postmenopausal women with PHPT, average age 62.5±6.12. The control group were 31 postmenopausal women without PHPT, mean age 59.7±6.28 in physiological menopause. Examination: total calcium, phosphorus, albumin, creatinine, PTG, OPG, 25(OH)D, BMD measurements by DXA, LVA.
**Results:** The were no differences in the age, height, weight, BMI, age of menopause starting, duration of menopause in both group. The level of vitamin D in postmenopausal women with PHPT was 17.1 (10.0-20.7) ng/mol, in the control group - 21.0 (17.1-27.4) ng/mol (U=389.0, p=0.004). In postmenopausal women with PHPT and with VFx (n=14) severe vitamin D deficiency (<10 nmol/l) was founded in 50.0% (n=7). In postmenopausal women with PHPT and without VFx (n=29) severe vitamin D deficiency (<10 nmol/l) was founded in 17.2% (n=5), $\chi^2$=5.04, p=0.02, OR: 4.8 (1.9-12.5), p<0.05. Significant differences were detected in vitamin D status in postmenopausal women with PHPT compared postmenopausal women without PHPT. The risk of VFx in patients with severe vitamin D deficiency (<10 nmol/l) is in 4.8 times higher than in patients without severe vitamin D deficiency.
**Conclusion:** The results of the study detected the high risk of VFx in postmenopausal women with PHPT and with severe vitamin D deficiency. The data may indicate the potential effect of vitamin D deficiency on the formation of VFx in postmenopausal women with PHPT.

## P342
## EFFECTS OF ESSENTIAL AMINO ACIDS SUPPLEMENTATION AND REHABILITATION ON FUNCTIONING IN HIP FRACTURE PATIENTS: A PILOT RANDOMIZED CONTROLLED TRIAL

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**Objective:** The high prevalence of sarcopenia in hip fracture patients is a well known issue with a negative impact on disability and functional recovery [1]. In this pilot randomized controlled trial we aimed to evaluate the impact of a 2-month rehabilitative protocol combined with dietetic counseling, with or without essential amino acids supplementation, on functioning in hip fracture patients.
**Methods:** We recruited patients aged more than 65 y, at 3 months after hip fracture, and randomly assigned them into two groups (A and B). Both groups performed a physical exercise rehabilitative program (5 sessions of 40 min/week for 2 weeks, followed by a home-based exercise protocol) and received a dietetic counselling; only group A was supplemented with 2 sachets of 4 g/d of essential amino acids. We evaluated at baseline and after 2 months of intervention (T1): hand grip strength, timed up and go, and Iowa Level of Assistance scale (ILOA). Moreover, patients in both groups were divided in sarcopenic and nonsarcopenic patients, according to Janssen criteria [2], reported by the European Working Group on Sarcopenia in Older People [3].
**Results:** Of the 32 hip fracture patients assessed (mean age 79.03±7.80 y), 16 (mean age 80.33±6.72 y) were allocated in group A and 16 (mean age 77.65±8.40 y) in group B. The prevalence of sarcopenic patients was 68.8% in group A and 75.0% in group B and the whole prevalence was 71.9%. There were no differences between groups at the baseline. All the participants showed significant differences in all outcomes at T1 (p<0.017). Sarcopenic patients in group A (n=10) showed statistically significant differences in all the primary outcomes at T1 (p<0.017), whereas sarcopenic patients in group B (n=13) showed a significant reduction of ILOA only. In nonsarcopenic patients we found no differences at T1 in all outcome measures.
**Conclusion:** Hip fractures are a complex multifactorial condition of the elderly, that determine devastating effects on functioning and independence. In particular, essential amino acidic supplementation induced significant improvements in the sarcopenic subpopulation of the study, suggesting a greater efficacy of this intervention in these patients.

## P343
## HIPOPARA-RED, REAL LIFE EXPERIENCE IN 322 PATIENTS WITH HYPOPARATHYROIDISM IN ARGENTINA

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**Objective:** Hypoparathyroidism (HPT) is a rare disorder characterized by hypocalcemia and absent or deficient PTH. It is associated with an increased risk of various complications, but only a few data are available on the natural history and correct management of this disease. Our aim was to describe clinical characteristics, treatment, and complications in a group of patients with HPT from 6 referral centers for endocrinological diseases, with expertise in HPT, in Argentina. Secondary, describe how many patients reached guidelines recommendations for rhPTH(1-84) treatment (Brandi ML. JCEM. 2016).
**Methods:** In this retrospective study patients with a diagnosis of HPT of ≥6 months were eligible for inclusion. Patients with pseudoHPT were excluded. Demographics, etiology, management, hospitalizations, clinical manifestations (fracture history, seizures, kidney stones, basal ganglia calcification, between others), and biochemical and DXA values were collected.
**Results:** 322 HPT patients were included; mean age was 55.2 ±16.8 y, 85.7% were women. Mean age at diagnosis was 43.8 ±16.8 y and mean follow-up time was 4.9±5.1 y. Regarding etiology 90% were postsurgical (50.3% for thyroid cancer, 41% for multinodular goiter, 2.7% primary hyperparathyroidism; 3.4% secondary hyperparathyroidism and 2.3% cervical cancer). Nonsurgical etiology included: 5 DiGeorge Syndrome, 9 autoimmune and 16 idiopathic. Nonsurgical patients were significantly younger (45±19.5 vs. 56.3±16.1 y; **p<0.01**) and were younger at diagnosis (45.1±15.9 vs. 31.4±20.5 y; **p<0.01**). Treatment regimens were determined by the patients' physician, per usual clinical practice, and most patients were receiving calcium supplementation (mean daily dose: 2019 ±1426 mg), vitamin D (mean weekly dose 34.368±55.278 UI) and calcitriol (mean daily dose: 0.498±0.279 μg). 13 patients were receiving teriparatide (1-34 human PTH). 25.7% had a history of hypocalcemia requiring hospitalization, 4.6% had fragility fracture history (wrist, hip, humerus, vertebra or tibia) and 4.3% has a history of seizures. Only 41.9% had a renal ultrasound done and 15.5% had positive findings (kidney stones and nephrocalcinosis). 54% had 24-h urine calcium excretion measured and almost half of them had hypercalciuria confirmed (56.3%). Only 18,3% patients had central nervous system imaging performed, and 38.9% had basal ganglia calcification. Biochemical and DXA values, while on treatment, are shown in Table 1. Finally, 38.8% met criteria to rhPTH(1-84) treatment according to the guideline; most of them because their daily oral calcium requirements exceeded 2.5 g of calcium.

Table1: Biochemical and DXA values

| | All (n=322) | Surgical (n=292) | Non surgical (n=30) | P |
|---|---|---|---|---|
| Calcium (mg/dl) | 8.4 ± 0.8 | 8.5 ± 0.8 | 8.3 ± 0.9 | 0.47 |
| Ionic calcium | 4.2 ± 0.5 | 4.2 ± 0.5 | 4.1 ± 0.6 | 0.14 |
| Albumina | 4.1 ± 0.4 | 4.1 ± 0.4 | 4.3 ± 0.4 | 0.16 |
| Phosphorus | 4.7 ± 0.9 | 4.7 ± 0.9 | 4.9 ± 1 | 0.20 |
| PTH (pg/ml) | 13 ± 10.8 | 13 ± 10.9 | 11 ± 9.4 | 0.29 |
| 25 OH VitD (ng/ml) | 34.8 ± 13.4 | 34 ± 13.2 | 41 ± 14.8 | 0.08 |
| Magnesium | 1.89 ± 0.22 | 1.89 ± 0.23 | 1.86 ± 0.19 | 0.54 |
| Urine calcium (mg/24hs) | 201.6 ± 130 | 199.1 ± 133 | 225.0 ± 103 | 0.34 |
| C- telopeptides | 383 ± 710 | 357.2 ± 679 | 757.0 ± 1088 | 0.22 |
| Bone Phosphatase | 12 ± 7.3 | 11.9 ± 7.5 | 12.6 ± 5.8 | 0.83 |
| **DXA** | | | | |
| Ts L1-L4 | -0.3 ± 1.9 | -0.3 ± 2 | 0.4 ± 1.5 | 0.38 |
| Zs L1-L4 | 0.7 ± 2 | 0.7 ± 2 | 1.3 ± 1.2 | 0.53 |
| Ts FN | -0.3 ± 1.5 | -0.3 ± 1.5 | -0.2 ± 0.8 | 0.72 |
| Zs FN | 0.7 ± 1.3 | 0.7 ± 1.4 | 0.9 ± 0.4 | 0.59 |

**Conclusion:** Although these patients were followed by experienced physicians, clinical management and monitoring was heterogeneous and probably insufficient to assess all the potential complications of this chronic disease. rhPTH is not yet available in Argentina, but 38.8% of this group of patients met the criteria for this new treatment. Being aware of this situation is the first step to improve our medical management of HPT in the future.

## P344
## EFFECT OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND SEROTONIN NOREPINEPHRINE REUPTAKE INHIBITORS ON TRABECULAR BONE SCORE AND BONE MINERAL DENSITY IN PRIMARY FIBROMYALGIA

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**Objective:** Fibromyalgia is characterized by chronic widespread pain classified as primary and concomitant. This work aimed to determine the correlation between selective serotonin reuptake inhibitors (SSRIs) and serotonin norepinephrine reuptake inhibitors (SNRIs) usage and BMD and trabecular bone score (TBS) changes in primary fibromyalgia patients.
**Methods:** The present study was conducted on study on 100 Egyptian patients diagnosed as primary fibromyalgia categorized according to drug medication into 2 groups, 50 patients on SSRIs and 50 patients on SNRIs, recruited from Rheumatology, Physical Medicine and Rehabilitation Departments at Al-Hussein and Sayed Galal, Al-Azhar University Hospitals. In addition to another 50 age matched the control group subdivided into 25 primary fibromyalgia patients not on those drugs and 25 healthy individuals selected by nurses and medical staff, after an informed consent from all subjects from June 2018 to December 2018.
**Results:** DXA and TBS revealed that usage of SSRIs and SNRI was significantly associated with low BMD (Osteopenia and osteoporosis) specially spine BMD reduction with low TBS (partially degraded and degraded) particularly for old people.

**Conclusion:** The present study provided evidence that usage of SSRIs or SNRI was significantly associated with low BMD (osteopenia and osteoporosis) specially spine BMD reduction with low TBS (partially degraded and degraded) particularly for old people and despite low BMD was found in the SRI users; it also found in primary fibromyalgia not on SRIs so primary fibromyalgia should also be considered as a contributing factor for low BMD.

## P345

## ASSOCIATIONS BETWEEN THE MORPHOLOGICAL PARAMETERS OF PROXIMAL TIBIOFIBULAR JOINT AND CHANGES IN TIBIOFEMORAL JOINT STRUCTURES IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objectives:** Little attention has been paid to proximal tibiofibular joint (PTFJ) and its contribution to knee osteoarthritis (OA). The longitudinal associations between morphological parameters of PTFJ and joint structural abnormalities have not been investigated. Therefore, the aim of this study was to describe the longitudinal associations between the morphological parameters of the PTFJ and joint structural changes in tibiofemoral compartments in patients with knee OA.

**Methods:** A total of 408 participants with knee OA were selected from the Vitamin D Effects on Osteoarthritis (VIDEO) study, which was a multicenter, randomized and double-blind clinical trial. PTFJ morphological parameters were measured on coronal and sagittal MRI. The contacting area of PTFJ (S), its projection areas onto the horizontal (load-bearing area, Sτ), sagittal (lateral stress-bolstering area, Sφ) and coronal plane (posterior stress-bolstering area, Sυ) were assessed, respectively. MRI knee structural abnormalities including cartilage defects, bone marrow lesions (BMLs) and cartilage volume were evaluated at baseline and 2 y later. Log binominal regression models and linear regression models were used.

**Results:** In longitudinal analyses, S (RR, 1.45) and Sτ (RR, 1.55) of PTFJ were significantly and positively associated with an increase in medial tibial cartilage defects over 2 y, after adjustment for age, sex, height, weight, ROA, tibial plateau bone area and intervention. Sτ (β, -0.07), Sυ (β, -0.07) and S (β, -0.06) of PTFJ were significantly and negatively associated with change in medial tibial cartilage volume, after adjusted for covariates. Sτ (RR, 1.55) of PTFJ was positively associated with an increase in medial tibial BML, and Sφ (RR, 0.35) was negatively associated with an increase in medial femoral BMLs. No significant associations were found between PTFJ morphological parameters and osteoarthritic changes at lateral compartment.

**Conclusions:** The longitudinal study suggests that higher load-bearing area of PTFJ is a risk factor for structural changes in the medial tibiofemoral compartment in knee OA patients. This could provide a theoretical support for proximal fibular osteotomy in the treatment of knee OA in medial tibiofemoral compartment.

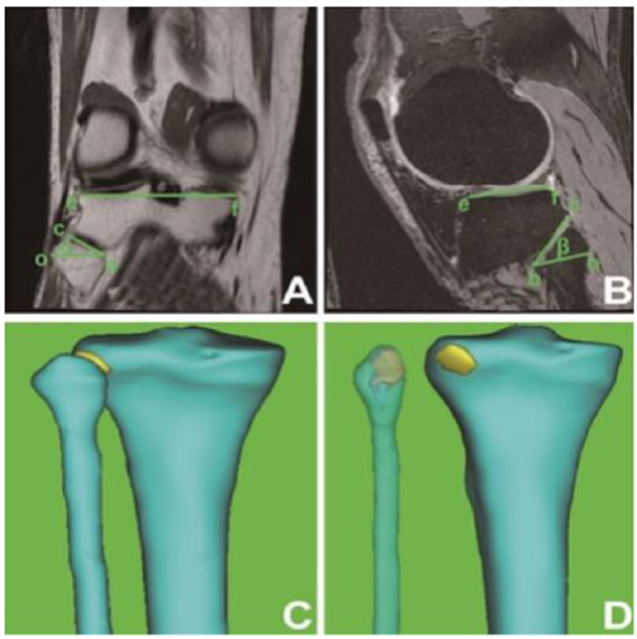


Figure 1. Measures of proximal tibiofibular joint morphological parameters

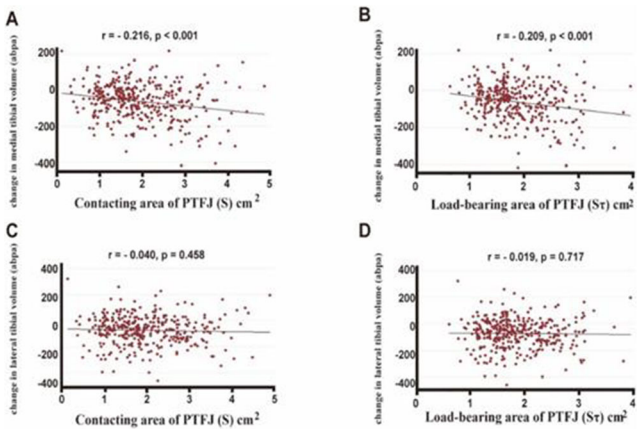


Figure 2. Associations between the areas of PTFJ and change in tibial cartilage volume per annum

## P346
## VISCERAL OBESITY AND SARCOPENIA AS DETERMINING FACTORS FOR INCREASED RISK OF OSTEOPOROTIC FRACTURES AND OSTEODEFICIENCY IN PATIENTS WITH TYPE 2 DIABETES

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**Objective**: To assess the incidence of osteodeficiency and osteoporotic fractures risk in patients with type 2 diabetes in the presence of visceral obesity and sarcopenia.
**Methods:** 49 patients (mean age 61±7.1 y) with type 2 diabetes mellitus (DM) were examined. The estimation of the 10-y probability of the main osteoporotic fracture (OF) was made using the FRAX and QFracture models specific to the respective ethnic group. All patients were exposed DXA, which determined BMD and the content of visceral fat in the body. Diagnosis of sarcopenia was based on the assessment of the content of muscle mass (bioimpedance method) and the determination of the index of muscle strength. The statistical significance of differences in the studied parameters was evaluated by the nonparametric method (by $\chi 2$ criterion).
**Results:** All examined patients were divided into subgroups depending on the absence/presence of visceral obesity and sarcopenia. In the presence of visceral obesity, the risk of OF is significantly lower ($\chi 2$=8.947, df=1, p=0.003) than with the normal content of visceral fat in the body, but osteodeficiency (osteopenia and osteoporosis) is more common ($\chi 2$=7.139, df=1, p=0.007). In patients with type 2 DM and sarcopenia, BMD is significantly lower ($\chi 2$=4.864, df=1, p=0.027) and the probability of major OF is significantly higher when evaluated with the QFracture calculator ($\chi 2$=9.01, df=1, p=0.003).
**Conclusions:** The presence of visceral obesity and sarcopenia in patients with type 2 DM can be considered as potential factors contributing to the development of osteodeficiency and as prognostic indices that increase the probability of osteoporotic fractures. In patients with visceral obesity, there is a discrepancy between the lowered risk of OF and low BMD indices, thus in this category of patients, an additional determination of BMD is recommended. A more sensitive tool for assessing OF probabilities at DM and sarcopenia is the QFracture calculator.

## P347
## PRESENTATION OF A CLINICAL CASE OF COMBINED TREATMENT DENOSUMAB/ SUPPLEMENTS IN SUBJECTS WITH SUPPRESSION OF TSH: MOC DXA1 REVALUATION AT A REDUCED INTERVAL OF 10 MONTHS

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**Objective:** The interval between two MOC DXA[1] assessments is indicated in 18 months. This is due in part to the intrinsic imprecision of the test (perhaps now surpassed by the availability of new equipment) and in part to the more usual therapy represented by antiresorptive drugs, which involves long times to influence the mineralization. These limits could be reevaluated. In consideration of the economic burden of fragility fractures treatment, it is important to identify complementary therapies, to be combined with pharmacological therapies.
**Methods:** The S.MG patient shows up, at the first medical examination, for having suffered 2 vertebral fractures due to bone fragility and in the presence of TSH suppression (<0.03). After checkup by MOC DXA[1], BSI (bone structure index, Bestest, new methodology of bone quality survey), blood CTX and evaluation of analysis results, the patient underwent therapy with denosumab (every 6 months) and, daily, with menaquinone 7 (200 μg), silicon (900 mg), organic lycopene, (10 mg, cis form), collagen (10 g), vitamin D (5000 IU), magnesium bisglycinate (600 mg). Calcium intake was carried out exclusively through the diet, with water high in this mineral. Levothyroxine therapy was corrected.
**Results:** After 10 months of the therapy, a reevaluation of the tests was performed. The results of analysis showed an increase in lumbar BMD (total) T-score from -4.8 to -3.9, with a improvement of 18.8%. The BSI gained correspondently. CTX was not repeated due to suppressive therapy by denosumab. The densitometric and bestest tests were performed in the same structure, with the same devices and by the same operator to minimize the stochastic probabilities.
**Conclusion:** The combination of an antiresorptive therapy with supplements, at the pharmacological dosage, can lead to an important increase in bone mass. Furthermore, if required, the suppression of TSH is to be combined with the prevention of side effects on the bone.
A literature review has been done for both, supplements and devices of follow-up used.
**(1) BMD scan** performed by MOC DXA (Mineralometria Ossea Computerizzata, DXA).

## P348
## GLUTAMINE USE IN PELVIC SARCOPENIA: A PROSPECTIVE, RANDOMIZED, PLACEBO CONTROLLED STUDY

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**Objective:** To determine the effect of additional oral glutamine supplementation to Kegel exercise on pelvic floor strength and clinical parameters of urinary incontinence in females.
**Methods:** It is a randomized, double-blind study. Females with urinary incontinence were included. Digital test and a vaginal manometer were used for measuring the strength of the pelvic floor muscles. 24 h pad weight test was examined. Participants were randomized into 2 groups as oral glutamine 30 g/d and placebo. It was asked to use the supplementation and Kegel exercises to all participants for 3 months. Basic and 3rd month measurements were compared by paired sample T-test and Wilcoxon tests in each group. The progression between measurements at basic and 3rd months was compared between the groups by using Mann-Whitney U test. (Clinical Trials protocol ID: 2014/1203)
**Results:** There were 11 patients in the glutamine arm and 18 patients in the placebo arm. Mean age was 58.2±6.6 y. Mean BMI was 32.9±4.8 kg/m$^2$. There was no age difference between the groups [glutamine 59±3.8, placebo 57.8±7.9 y, $p>0.05$]. In glutamine arm, vaginal muscle strength assessed by digital test was higher at the end of 3 months [2.9±0.7 vs. 4 ±0.9; 0-3 months respectively, $p=0.014$]; perineometer measurements were not statistically different [27.4±8.3 vs. 31.2 ±8.9; 0-3 months respectively, $p>0.05$]; 24 h pad weight was not different [$p>0.05$]. In placebo arm, there was statistically significant progress in vaginal muscle strength assessed by both digital test and perineometer, and 24 h pad weight (p values: 0.005, 0.011, 0.002, respectively). When we compare the progression scores between the groups; there was no statistically significant difference [$p>0.05$].
**Conclusion:** Our study suggests that glutamine supplementation does not provide additional benefit in the treatment of pelvic muscle sarcopenia in patients without protein-energy malnutrition.
**Acknowledgement:** This study is supported by Nestle Health Science.

## P349
## TEMPORAL TRENDS IN FRACTURE LIAISON SERVICES IN NORTHERN IRELAND

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**Objectives:** Fracture Liaison Services (FLS) are clinically and cost effective for fracture prevention. We examined clinical activity and temporal trends in the Belfast FLS over a 12-month period.
**Methods:** In 2003 the Belfast FLS was rolled out to those aged ≥50-75 y with fragility fracture for clinical assessment and bone densitometry (DXA). Risk factors, demographics, fracture type, DXA results and outcomes over a 12-month period were analysed. We extracted data from the Glasgow Integrated System for Management of Osteoporosis database.
**Results:** 16259 individuals were assessed by 2018. Annual fragility fracture cases increased from 302 in 2003, to 1488 in 2018. In 2017 the proportion of low trauma fractures were: wrist 26%, ankle 12%, humerus 11%, hand/foot 11%, hip 9%, tibia/fibula 5%, elbow 5%, vertebral 6%, clavicle 2%, rib 2%, patella 2%, pelvic 1%, other 8%. We observed higher rates of smoking in the current series; lower rates of prior fragility fracture, glucocorticoid use, premature menopause and reported height loss were evident. DXA scanning showed osteopenia (44%), osteoporosis (29%), and normal BMD (35%). FLS interventions included NICE TA161 (97%), calcium/vitamin D (80%) or bisphosphonates (32%). A smaller proportion did not require treatment (17.1%) or were advised to stop bisphosphonate treatment (3%). 266 patients, over the age of 75 y, received an empirical treatment recommendation for primary care led bone protection treatment. 16% were referred to osteoporosis specialist clinics; 31% required follow-up DXA; the remainder (53%) did not require routine follow-up.
**Conclusion:** We observed increasing service demands over 15 y with high recruitment rates of individuals at risk of fragility fracture. We identified increased proportions of non-hip fractures and a lower proportion with osteoporosis compared to 2003. We propose a higher age related cutoff for FLS clinic recruitment and to prioritise hip and major fractures to optimise intervention outcomes.
**Acknowledgement:** Sr. Colette McNally for dedicated service to the Belfast FLS

## P350
## THE ASSOCIATION BETWEEN DASH (DIETARY APPROACHES TO STOP HYPERTENSION) DIET AND SARCOPENIC OBESITY IN OVERWEIGHT AND OBESE ADULT WOMEN

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**Objective**: This study was conducted to examine the association between DASH dietary pattern and sarcopenic obesity (SO) in obese and overweight people based on quintile of skeletal muscle mass (SMM) and fat mass (FM).
**Methods**: This cross-sectional study was conducted on 301 overweight and obese women aged 18-48. Body composition was measured using body composition analyzer. Resting metabolic rate (RMR) was measured by means of indirect calorimetry. The usual intake of food was evaluated over the past year by the use of a valid and reliable semiquantitative food frequency containing 147 items. Major dietary patterns were determined by the

use of factor analysis of 21 foods groups. Serum HDL_c, LDL_c, TG, fasting blood sugar (FBS), total cholesterol (T_chol) and hs_CRP were quantified by ELISA.

**Results**: The prevalence of sarcopenia (who had two lower quintiles of SMM) and obesity (who had two highest quintiles of FM) was 19.6%, 20.4% respectively. The rate of SO was 9.9%. Between SO and non-SO individuals there was significant difference in height, BMI, RMR/kg, body fat%, SMM, FM, waist circumference, fat mass index, FBS and T-chol (P<0.05). By the use of factor analysis, 3 major dietary patterns were extracted: DASH dietary pattern (DDP), western dietary pattern (WDP) and unhealthy dietary pattern (UNHDP), and% of variance of each dietary pattern was 11.97%, 9.63%, and 9.02% respectively, that they covering 30.63% of total dietary pattern of our population. Binary logistic analysis showed that participants in the in the upper category of DDP had lower odds of SO (OR=0.27, 95%CI=0.08 to 0.96, P=0.04) and the risk of sarcopenia reduced by 73%. After adjustment for age, physical activity, and energy intake, the relationship between the DDP and SO, was still significantly negative and participants in the in the upper category of DDP had lower odds of SO (OR=0.20, 95%CI=0.05 to 0.77, P=0.01) and the risk of sarcopenia reduced by 80%.

**Conclusion**: There is a negative relationship between SO and DDP, and adherence to the DDP, has a significant effect on reducing of incidence risk of SO.

## P351

## DOES VIRTUAL REALITY SIMULATOR USE INFLUENCE MEDICAL STUDENTS' ATTITUDES TO A CAREER IN ORTHOPEDIC SURGERY?

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**Objective:** With declining interest in orthopedic surgery, there was been increasing investigation into novel means of stimulating interest in this specialty. With the potential advent of virtual reality (VR) based surgical skills acquisition, it is unclear how exposure to these training methods will impact students' attitudes towards orthopedics. We therefore sought to answer the following: does VR arthroscopic simulator use influence medical students' attitudes towards a career in orthopedic surgery?

**Methods:** *25* medical students completed seven unsupervised sessions on a VR hip-arthroscopic simulator. All participants completed a pre- and post-simulator pseudo-anonymized questionnaire consisting of 10 questions - six 10-point Likert scale questions addressing their interest in orthopedics, surgery and arthroscopy; and four 5-point Likert scale questions addressing their attitudes towards simulation. Pre- and post-paired datasets were analyzed using Wilcoxon signed rank test.

**Results:** Interest in both orthopedics and surgery was found to increase after simulator use (Orthopedics - 6.3 to 8.6 $P<0.01$; Surgery - 6.9 to 9.0, $P<0.01$). It was also found that simulator use increased participants' interest in arthroscopy (5.4 to 8.3, $P<0.01$) and hip-arthroscopy (4.8 to 7.8, $P<0.01$). Participants reported they were more likely to attend endoscopic and arthroscopic surgical lists after simulator use (7.1 to 8.7, $P<0.01$; and 6.1 to 8.6, $P<0.01$). After using the simulator, participants felt more strongly that VR simulation is a valuable training modality ($P<0.01$), that simulation should be a mandatory part of orthopedics and surgical training ($P<0.01$ and $P<0.01$), and that access to VR simulators improves the quality of surgical training ($P<0.01$).

**Conclusions:** These results demonstrate that exposure to VR arthroscopic simulation increased medical students' interest in orthopedics, surgery and arthroscopy, without the need for direct supervision. Following VR simulator use, students were more likely to engage with training opportunities, including arthroscopic and endoscopic surgery. The results of this study demonstrate a novel means of stimulating interest in orthopedics and suggest that there would be good engagement of future trainees with VR simulation training modalities.

## P352

## EFFECT OF TNF INHIBITORS ON BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS PATIENTS RECEIVING BISPHOSPHONATE

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**Objective:** To investigate whether tumor necrosis factor inhibitors (TNFi) have beneficial effects on BMD in rheumatoid arthritis (RA) patients with osteoporosis receiving bisphosphonate.

**Methods:** A total of 239 RA patients, who were diagnosed with osteoporosis and treated with bisphosphonate between January 2005 and March 2017, were reviewed. The BMD ($g/cm^2$) of the lumbar spine, femur neck, and total hip were measured by DXA. Changes in the BMD percentage were compared between patients treated with and without TNFi. Multivariate analysis was performed to identify the factors associated with BMD improvement.

**Results:** Among patients receiving bisphosphonate, 35 patients were exposed to TNFi, and 204 patients were not exposed. The last BMD follow-up was obtained at a median of 2.23 (IQR, 1.13–4.25) years after the initial acquisition of BMD. An improvement of BMD in the lumbar spine was observed for patients treated with bisphosphonate; however, there was no significant difference in BMD between patients treated with and without TNFi (4.92% (IQR, −1.6–9.42) vs. 4.99% (IQR, 0.68–10.09), $P=0.437$). In addition, BMD changes in the femur neck, trochanter, and total hip were not significantly different between the two groups. Furthermore, TNFi use was not associated with BMD improvement in any

sites. On the other hand, cumulative steroid dose was significantly associated with a lower improvement in BMD.
**Conclusions:** In RA patients with osteoporosis receiving bisphosphonate, TNFi did not influence BMD improvement, suggesting that TNFi cannot be considered as a preferred therapeutic option in terms of BMD.

## P353
## A COMPARATIVE STUDY OF THE POLYPHENOLIC COMPONENTS CONTENT AND ANTIOXIDANT CAPACITY OF URTICAE HERBA AND URTICAE FOLIUM

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**Objective:** Flavonoids and polyphenols constitute one of the most numerous, natural substances. There are secondary metabolites in plants that have received more attention since being reported to have a positive influence on human heath due to their multiple activities that were associated with a decrease in the incidence of various diseases. Osteoporosis is a public health problem. Phytotherapy in osteoporosis focuses on the use of herbal remedies to helps provide more calcium to the bones or help the body to produce the principles that help calcium absorption. It was demonstrated that antioxidant content increases the anti-osteoporotic activity of the medicinal plants. *Urtica dioica* L., stinging nettle, Urticaceae family is widely used species by traditional societies in temperate and tropical Asia, Europe, northern America and northern Africa. For medicinal purposes it uses *Uricae radix* (roots) and *Urticae herba* (aerial parts). The aerial parts of this medicinal plant helps to restore bone, which it remineralizes due to its rich content of calcium, magnesium, potassium and iron.
**Methods:** The purpose of the present study was to investigate the comparative content of phenolics components of *Urticae herba* (aerial parts) and *Urticae folium* (only the leaves) as well as their antioxidant capacity using different alcoholic extracts which were evaluated by Folin Ciocalteu method for determining the total polyphenol content and the total flavonoids. Using the reducing-Cuprac assay and FRAP (ferric reducing antioxidant power) method was determined the antioxidant activity of alcoholic extracts.
**Results:** Our results show that the studied medicinal plant possess high levels of antioxidant substances and high antioxidant power. The amounts of total poliphenols is 63.95 mgGAE/100DW in case of *Urticae herba* (aerial parts) and 78.61 mgGAE/100DW in case of *Urticae folium* (only the leaves). The amounts of total flavonoids is 55.24 mgQE/100DW in case *Urticae herba* (aerial parts) 65.43 mgQE/100DW in case in case of *Urticae folium* (only the leaves). Considering our extracts antioxidant capacity, the FRAP method shown 62.55 μmol Trolox equivalent/gDW (TE) in case of *Urticae herba* and 81.31 μmol Trolox equivalent/gDW (TE) in case of *Urticae folium*.
**Conclusions:** The results showed that the alcoholic extracts of *Urtica dioica* (stinging nettle) are rich sources of phenolic compounds, flavonoids and phenolic acids, with antioxidant capacity and reducing power, which can contribute to improve the anti-osteoporotic effect of this herbal remedies. The highest amount of polyphenols, polyphenols and antioxidant capacity was found in *Urticae folium.*

## P354
## NEW POSSIBILITIES IN OA THERAPY WITH COMBINED MODIFIED HYALURONATES

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**Objective:** 1. Prove the efficacy of the new generation chondroprotective preparations for intra-articular (IA) injections based on modified hyaluronic acid salts with combined composition (CM HA) with reparative and anti-inflammatory (AI) action. 2. Confirm the clinical significance of the previously obtained pathogenetic rationale for the differentiated use of 3 different courses, depending on the clinical form of OA.
**Methods:** In 2015-2018 an open multicenter clinical trial was conducted to assess the efficacy and safety of IA use of 3 courses of CM HA with ascorbyl phosphate and amino acids. 147 patients with OA of the knee or hip joint were observed (from the total amount: 10.2% with coxarthrosis, 31.9% with post-traumatic OA, 32.7% with synovitis). Inclusion: OA with radiological verification without synovitis at the baseline. Patients with synovitis received AI treatment before inclusion. Exclusion: IA HA injections or arthroscopy <6 months prior baseline; post-injection synovitis. Three courses consisted of a combination of two CM HA formulas (F): F-02 with proteinogenic amino acids with reparative action; F-10 with antioxidant complex with AI action. The patients were divided into 3 groups after randomization according to the type of course and received three 2.0 ml IA injections each 14 days. Courses differed from each other in a combination of formulas: reparative (F-02 3 injections), analgesic (F-10 1 injection, F-02 2 injections), cytoprotective (F-10 3 injections). Evaluation of the efficacy was performed at 4 visits using a point scale. Physician assessment: pain during physical examination by VAS 0-10; course tolerability, safety, algofunctional efficacy at the end of the course by scale of 1-5 points (when 5 is excellent). Patient's assessment: pain during walking by VAS 0-10, Lequesne questionnaire.

**Results:** Pain on joint palpation and during movements decreased 3-5 times after the course. Reparative course reduced the total Lequesne Index by 7.5-7.6, analgesic – by 8.0-8.4, and cytoprotective – by 9.2-9.5 points. Cytoprotective course has been proven to reduce the higher Lequesne Index with the most pronounced initial inflammatory manifestations. Over 90% of physicians rated all courses on tolerability, safety, and algo-functional efficacy at 5 and 4 points. Post-injection synovitis was observed in 1 patient (0.68%), pain and swelling after administration in 2.72%.
**Conclusions:** CM HA has good tolerability and high safety. Formulas affect reparative potential and reduce oxidative inflammation activity. The differentiated administration of 3 courses was proved depending on the pain or synovitis intensity in patients with synovial joints OA.

## P355
## IMPACT OF MEDICATION USE PATTERN ON 2-YEAR OUTCOMES OF FRACTURE LIAISON SERVICE PATIENTS

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**Objectives:** Previous studies showed that fracture liaison service (FLS) improved patient outcomes. However, medication use patterns vary among FLS patients. We aim to determine whether medication use patterns would have impacts on subsequent fracture, incident fall, and mortality among participants within a FLS at 2years.
**Methods:** We prospectively enrolled 600 patients with hip or vertebral fractures from different 2 institutes into a FLS program. Participants were re-grouped to no use (NO, n=60), no change (NC, n=423), late initiation (LI n=28), medication change (MC, n=52), and early termination (ET, n=37). According to baseline medication use pattern, multivariate logistic regressions were performed to identify baseline correlates on two-year mortality, incident fracture, and fall.
**Results:** Among 600 fracture patients, mortality was significantly higher for NO vs. NC (31.7% vs. 13.2%, P=0.01), NO vs. MC (31.7% vs. 5.7%, P=0.01), and NO vs. ET (31.7% vs. 5.4%, P=0.03). MC group had highest rate for incident fracture over 2-year of follow-up. Multivariate logistic regression analyses showed that medication group, lower BMI, and lower albumin increased mortality risk in 2 y risk factors. The medication group was only risk factor for incident fracture. Older age and higher BMI increased the risk of fall.
**Conclusion:** FLS patients had different medication use patterns. Patients with fractures but not on osteoporosis medications had the highest mortality rate while patients changed medication had highest incident fractures. For fragility fracture patients, osteoporosis medications should be prescribed and maintained to improve outcomes.

## P356
## FRAX® TOOL WEBSITE USAGE IN THAILAND

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**Objective:** To document usage of the web-based FRAX tool and specifically its usage in Thailand throughout the period from 2010.
**Methods:** A descriptive retrospective study using data from Google Analytics that provides numerical and geographical information on internet access to the FRAX tool website worldwide.
**Results:** The USA is the country with the most frequent access to the FRAX tool. There were weak but significant correlations between the absolute number of FRAX sessions and population size ($r=0.165$, $p=0.011$) and country size ($r=0.375$, $p<0.001$). When adjusted for population size, Slovenia is currently ranked highest for access to FRAX. In Thailand, Bangkok is the highest ranked site for FRAX access with more than 20,000 usage sessions since 2010 (3.6 usage session per 1000 population) follow by Khon Kaen and Chiang Mai. It has been accessed from within 76 out of 77 provinces (98.7%). There was a steady increase in access to FRAX from within Thailand of approximately 1000 usage sessions per year between 2010-2016. After the FRAX fracture risk calculation was included in the national guideline for osteoporosis management published in late 2016, the rate of increase in access was 4-fold higher compared to the previous period.
**Conclusion:** Access to the FRAX tool website is increasing in Thailand. The incorporation of FRAX into national guidelines, in parallel to the adoption of osteoporosis fracture prevention into national policy, has had a rapid and significant impact on its use.

## P357
## EXAMINATION OF BONE MINERAL CONTENT IN TYPE 2 DIABETES MELLITUS PATIENTS

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**Objective:** The evidence exists that the level of glycemic control is associated to bone health. Hyperglycemia impairs osteoblast function and antidiabetic medications can contribute to changes in bone tissue. However, patients with type 2 diabetes mellitus (T2DM) do not fit into the classic osteoporosis pathophysiology. With regards to the association between BMC and T2DM, some conflicting results have been reported. The aim of the study was the examination of bone mineral content in T2DM patients comparing with control.

**Methods:** We measured bone mineral content using DXA in 82 patients with T2DM, the control group consisted of 39 health age- and BMI-matched persons. The statistical differences confirmed by glucose level: 8.14 (5.56-9.9) mmol/l in T2DM and 5.48 (4.91-5.78) mmol/l in control group, p=0.001 and by the level of Hb A1c: 7.24 (5.89-8.3)% in T2DM vs. 5.76 (5.52-5.98)% in healthy controls, p=0.001.
**Results:** It has been established that the BMC total in T2DM was lower 2505 (2206–2764) g than BMC total of the control group 2845 (2498-3293) g, p=0.001. No differences were found in BMC (arms+legs) between T2DM patients 1310 (1126–1403) g vs. comparison 1416 (1211-1685) g, p=0.03; while BMC of Trunk in patients with T2DM was lower 776 (642–876) g than BMC of trunk of controls 948 (778-1166) g; p=0.0002.
**Conclusions:** These findings suggest the hypothesis that patients with T2DM are at higher risk of bone loss and OP risk. The absence of target glycemia level of glycated hemoglobin could be one of the reason of bone content lose in patients with diabetes. Because of clinical implications of osteoporosis in well being, it is important to identify and refer for osteoporosis evaluation patients with T2DM.

## P358
## MORBIDITY AND CLINICAL LABORATORY FINDINGS IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA (XLH)

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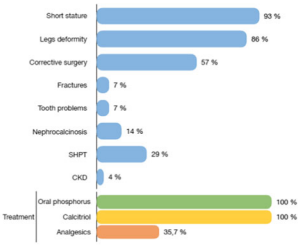
**Objective:** XLH is a rare inherited disease caused by alteration of the PHEX gene that results in an increase in serum levels of fibroblast growth factor 23 (FGF-23) and with it, renal phosphate wasting, reduced 1,25-dihydroxyvitamin D and, thus, hypophosphatemia which result in defects in bone mineralization. In adults, this defects cause significant morbidity, presenting short stature, bowed or bent legs, osteomalacia, bone and joint pain, fractures, hearing impairment, extraosseous calcifications, toth abscess, among others. Despite conventional therapy (oral phosphorus supplementation and calcitriol), a significant percentage of patients develop deformities that impact their functionality and quality of life. Our aim was to deepen the understanding of the clinical course and the impact on morbidity and serum and urine laboratory findings in adult patients affected by XLH.
**Methods:** Longitudinal study with retrospective data collection of a series of 24 no family-related patients affected by XLH who were followed-up in the Outpatient Services of the Department of Nephrology of the Hospital Universitari i Politècnic La Fe. Demographic, clinical and diagnostic variables were collected from the initial diagnosis in childhood until January 2018.
**Results:**

| | | | |
|---|---|---|---|
| Age at diagnosis (years) | 3,75 ± 3,12 | | |
| Sex | Male 35,7%, Female 64,3% | | |
| Follow-up time (years) | 17,92 ± 12,09 | | |
| | At diagnosis | At the end of follow-up | p |
| Phosphorus (mg/dL) | 2,34 ± 0,62 | 2,73 ± 0,74 | 0,1 |
| Calcium (mg/dL) | 9,73 ± 0,48 | 9,4 ± 0,51 | 0,129 |
| Tubular phosphate reabsorption (%) | 76 ± 14 | 74 ± 16,7 | 0,531 |
| **Calciuria (mg/24h)** | 95,2 ± 119 | 128,55 ± 147,87 | **0,037** |
| PTH (pg/mL) | 58,62 ± 35,61 | 88,89 ± 81,82 | 0,267 |
| 1,25-dihydroxycalciferol (ng/mL) | 20,18 ± 5,78 | 24,85 ± 11,49 | 0,328 |
| **Alkaline phosphatase (UI/L)** | 361,16 ± 207,27 | 203,08 ± 153,33 | **0,02** |
| Creatinine (mg/dL) | 0,47 ± 0,25 | 0,58 ± 0,2 | 0,07 |
| UACR (mg/g) | 5,03 ± 4,43 | 7,46 ± 10,54 | 0,521 |
| Proteinuria (g/24h) | 0,15 ± 0,07 | 0,19 ± 0,17 | 0,369 |

*Values are shown as mean ± standard deviation.*




**Conclusions:** Most adults affected by XLH present short stature and lower limb deformity despite the classical substitution treatment taken since the childhood. Although we found a significant reduction of the levels of alkaline phosphatase, the mean of them did not reach the normality. This can be related to poor compliance because of the bad gastrointestinal tolerance of the treatment. In addition, we encountered relevant treatment adverse events, like secondary hyperparathyroidism and nephrocalcinosis in an unacceptable percentage of patients. It is necessary to advance in better treatments that block the mechanism of the disease to allow a normal childhood growth to these patients, avoiding the consequences of XLH in adulthood, since the current treatment is insufficient and leads to undesirable consequences.
**Disclosures:** J.J. Broseta and J. Hernández-Jaras have received remuneration for participating in some lectures by Kyowa Kirin.

## P359
## BILATERAL OVARIO-HYSTERECTOMY INDUCED OSTEOPOROTIC RABBIT MODEL

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Rabbit models have been proposed for the study of postmenopausal osteoporosis by bilateral ovariectomy with reduced dietary calcium intake or glucocorticoid administration. However, restricting dietary calcium intake or administering a glucocorticoid can cause secondary osteoporosis and is not representative of a pure postmenopausal osteoporosis model. The aim of this

study was to establish an experimental rabbit model of osteoporosis induced by ovario-hysterectomy alone. Fourteen female New Zealand rabbits were separated into two groups of a sham (control) and the ovario-hysterectomy-induced osteoporosis group. Tibiae were extracted 24 weeks after ovario-hysterectomy and were scanned by micro-computed tomography. The evaluation parameters were bone mineral density (BMD), trabecular bone volume (BV/TV), trabecular number (Tb.N), trabecular thickness, and trabecular separation (Tb.Sp). The tibial samples were evaluated after hematoxylin and eosin and Masson's trichrome staining. The sham group had significantly higher BMD, BV/TV, and Tb.N values and the lowest Tb.Sp value compared to the ovario-hysterectomy group. The histological analyses revealed a loss of the bony trabeculae and an increase osteoporotic changes in the bone of the ovario-hysterectomy-induced osteoporosis group compared to the control group. Our results indicate that an ovario-hysterectomy-induced rabbit model would be one of the safe, reproducible model for postmenopausal osteoporosis.

## P360

## THE REGULATORY ROLE OF TYPE 3 INTERFERON CYTOKINE BETWEEN OSTEOBLASTS AND OSTEOCLASTS

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**Objective:** The dynamic balance between osteoblastogenesis and osteoclastogenesis maintains bone remodeling and homeostasis. An imbalance between bone resorption and formation can result in bone diseases including osteoporosis. IL-29, a member of type 3 interferon family, signals through the IL-28R1 and IL-10R2 heterodimer receptor complex. Previous studies indicated that IL-29 modulates inflammatory response in rheumatoid arthritis and osteoarthritis. However, its biological role in bone homeostasis remains unclear. Our aims were to explore the effects of IL-29 in the bone homeostasis through regulating osteoblast and osteoclasts.
**Methods:** For osteoblastic experiments, human fetal osteoblast cell line (hFOB1.19) was used in our study. The gene expression of proinflammatory cytokines in IL-29-treated hFOB1.19 cells was analyzed using real-time PCR with specific primers. MTT and BrdU assays were performed to clarify the effect of IL-29 in osteoblast proliferation. To analyze the effect of IL-29 in osteoblastic differentiation, we analyzed the osteoblast-related transcription factor, Runx2, Osterix, and RANKL, using real-time PCR and measured alkaline phosphatase activity. For osteoclastic experiments, we used $CD14^+$ monocyte isolated from human peripheral blood mononuclear cells to perform *in vitro* osteoclast differentiation assay, and used TRAP staining to analyze the effect of IL-29 in osteoclastic differentiation.
**Results:** IL-29 targeted on osteoblast progenitor hFOB1.19 cells to stimulate pro-inflammatory cytokine expression. For the osteoblastogenesis, IL-29 promoted osteoblast proliferation and early differentiation through upregulating osteoblastic gene Runx2 and Osterix. For osteoclastogenesis, we performed *in vitro* osteoclast differentiation system in both human and mouse, and found that IL-29 acted as a negative regulator in osteoclasts differentiation. IL-29 decreased the numbers of osteoclasts, and reduced the TRAP and cathepsin K mRNA expression.
**Conclusion:** IL-29 expressed in human osteoblasts and promoted osteoblast proliferation. IL-29 significantly inhibited osteoclast differentiation. These findings and further elucidation of the pathways might provide more information to the development of novel agents for treating osteoporosis.

## P361

## ELDECALCITOL IS MORE EFFECTIVE THAN ALFACALCIDOL IN INCREASING BMD OF CHINESE OSTEOPOROTIC PATIENTS WITHOUT VITAMIN D OR CALCIUM SUPPLEMENTATION

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**Objectives:** Previous studies have shown that eldecalcitol, a new analog of the active vitamin D, could prevent vertebral fractures and increase BMD under vitamin D sufficiency state. The current study aimed to investigate the effect of eldecalcitol on BMD compared with alfacalcidol in Chinese osteoporotic patients without vitamin D or calcium supplementation.
**Methods:** In this randomized, active comparator, double-blind multicenter study, 265 Chinese osteoporotic patients were randomized to receive alfacalcidol 1.0 μg/d or eldecalcitol 0.75 μg/d for 12 months without vitamin D or calcium supplementation. The main endpoints were changes from baseline BMD in the lumbar spine, total hip and femoral neck at month 12. Changes in bone turnover markers, incidence of new fracture and safety were also assessed.
**Results:** Lumbar BMD increased by 2.51% with eldecalcitol treatment for 12 months, while the increase was 0.46% in the alfacalcidol group (LS mean difference, 2.05%; 95%CI, 0.96-3.15; $p<0.001$). Total hip and femoral neck BMD also increased with eldecalcitol, by 1.50% and 1.95% respectively, but were not increased with alfacalcidol. Baseline serum 25(OH)D levels

and calcium intakes in both groups were below 20 ng/mL and <550 mg/d, respectively and were almost constant throughout the study. Further subgroup analysis was stratified by baseline serum 25(OH)D and calcium intake in the eldecalcitol group and revealed that effect of eldecalcitol on lumbar spine BMD was not affected by serum 25(OH)D or calcium intake. There was no difference in the incidence of any adverse events between the two groups. Serum calcium exceeded 10.4 mg/dL in 5.9% of patients treated with eldecalcitol and 8.7% of patients treated with alfacalcidol. Urinary Ca/creatinine ratio exceeded 0.4 in 5 patients (3.7%) treated with eldecalcitol and 3 (2.4%) treated with alfacalcidol.

**Conclusions:** These results demonstrate that eldecalcitol increases both lumbar and hip BMD in Chinese osteoporotic patients more than alfacalcidol without sustained hypercalcemia or hypercalciuria, and that eldecalcitol increases BMD in osteoporotic patients regardless of serum 25(OH)D level or calcium intake.

**Disclosure:** W.B. Xia serves as a consultant for Chugai Pharmaceutical Co., Ltd. The study was sponsored by Chugai Pharmaceutical Co., Ltd.

## P362
## RADIOLOGICAL INDEX IN THE FLAT VERTEBRA

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**Objective:** Spine is a mechanical structure, which disposes their vertebral bodies in harmony with their stature, and progressively increasing in magnitude from the cervical to the lumbar spine. Defects in type II collagen gene are described, and in these cases, flat vertebra can be found, defined with flattening of the vertebral body, with irregular surface or with nodules of Schmorl, in isolation or in a maximum of two vertebral bodies, to distinguish it from Scheuermann's disease. Current vertebral indexes do not measure a relation between a person height and his vertebra, and if the harmony of the individual is accepted, an index that combines these variables must be created in order to guaranteeing the objectivity of the resultant value.

**Methods:** Patients attending physician since 1994, both sexes, 20-55 years old, in whom Type II collagen disease or vertebral dysplasia was suspected, were selected for the study. A control group was created from patients that didn´t fulfill the last inclusion criteria. Their medical histories were taken. Eighth dorsal flat vertebra in a lateral chest radiograph were assessed by triple observer (two rheumatologists and one radiologist) according to the defined criteria. In all selected patients, a DXA osteoporosis screening was performed, being chest trauma exclusion criteria. Finally, a descriptive study was carried out and a comparative study of average of vertebral index of the eight dorsal vertebra (VIDV8) results was applied: VIDV8=10 x LVD8 / (HVD8 x stature).

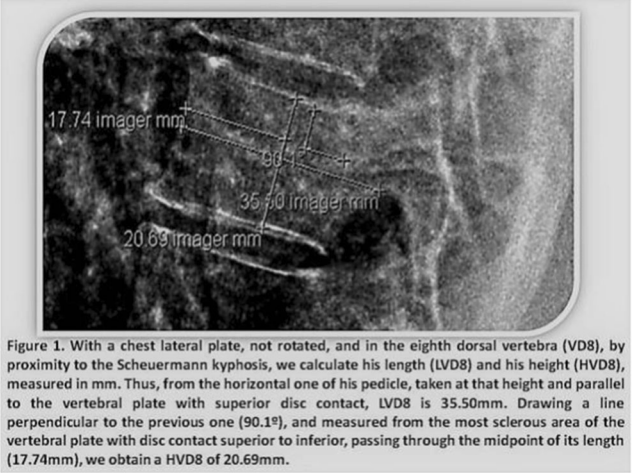


Figure 1. With a chest lateral plate, not rotated, and in the eighth dorsal vertebra (VD8), by proximity to the Scheuermann kyphosis, we calculate his length (LVD8) and his height (HVD8), measured in mm. Thus, from the horizontal one of his pedicle, taken at that height and parallel to the vertebral plate with superior disc contact, LVD8 is 35.50mm. Drawing a line perpendicular to the previous one (90.1º), and measured from the most sclerous area of the vertebral plate with disc contact superior to inferior, passing through the midpoint of its length (17.74mm), we obtain a HVD8 of 20.69mm.

**Results:** 174 subjects were analyzed, 84 in the study group and 90 in the control one, both homogeneous and without statistically significant differences in sex, age and height, with an average value in the study group of 47.15 years old, 48.8% women, 80.5 kg and 1.64 m. In control group: 44.5 years old, 52.2% women, 78.5 kg and 1.65 m. The VIDV8 value, did not show any significant difference compared to the previous variables, except for patient cohort, with an average value of 10.1 $Meters^{-1}$ in control group, and 12.5 $Meters^{-1}$ in pathological one ($p<0.001$). To a value of 11,108 $Meters^{-1}$ the sensitivity is 90.5% and specificity 92.2%.

**Conclusion:** The VIDV8 is stable for the variables sex, age, height, and weight. To an outcome of 11,108 $Meters^{-1}$, it discriminates both groups with sensitivity of 90.5% and specificity of 92.2%, in order to avoid the ambiguity of the explorer.

## P363
## FRAILTY IN OLDER COMMUNITY DWELLING ADULTS: A COMPARATIVE STUDY OF THE UK AND JAPAN

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**Objectives:** Frailty in later life is a major public health problem and associated with adverse health outcomes. It is often viewed as the sequel to sarcopenia development. Several studies have considered the prevalence of the condition in older, institutionalised adults but far fewer data are available in free living older adults. In this unique study we consider the prevalence of the condition in two community based cohorts in Japan and the UK, and relate it to the frequency of osteoporosis, another musculoskeletal condition common in later life.

**Methods:** Hertfordshire Cohort Study participants were born in Hertfordshire between 1931-1939 and live in the community in Hertfordshire, UK. Data available include lifestyle questionnaires, and physical performance tests. The ROAD study is a population based prospective study of Japanese adults based in several communities. Lifestyle questionnaire data are also available, and physical performance testing was undertaken. Frailty was defined in both cohorts as the clinical syndrome in which three or more of the following criteria were present: unintentional weight loss (10 lbs in the last year), self-reported exhaustion, weakness (grip strength), slow walking speed, and low physical activity. Osteoporosis was diagnosed in the UK and Japan as a T-score of -2.5 or below at either hip or lumbar spine, as measured by DXA.

**Results:** The prevalence of frailty in the two countries is shown below:

| | **UK** | | **Japan** | |
|---|---|---|---|---|
| Age | M | F | M | F |
| **65-69** | 3.2% | 8.6% | 0% | 0% |
| **70-74** | 8.6% | 10.6% | 1.2% | 4.1% |

Osteoporosis at either lumbar spine or femoral neck was present in 5.1% UK and 7% Japanese men respectively; in women the corresponding figures were 11.7% and 34% respectively. Of the study population, 0.7% and 2.9% had coexisting osteoporosis and frailty in UK and Japan respectively.

**Conclusions:** Frailty becomes more prevalent with increasing age, even in community dwelling older adults, with higher rates in women than men. UK rates in this study were higher than in Japan, possibly reflecting both differences in lifestyle in the two populations and genetic factors. Despite the lower prevalence of frailty in Japanese subjects, this more commonly coexisted with osteoporosis than in the UK.

**Acknowledgments:** The Great Britain Sasakawa Foundation funded this study.

## P364
## TREATING FIBROMYALGIA PATIENTS WITH OSTEOPENIA WITH TERIPARATIDE DAILY INJECTION

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**Objectives:** This study is showing the clinical results of adding teriparatide injection to the treatment of patients with fibromyalgia who developed osteopenia with teriparatide daily injection along with calcium and vitamin D supplement.

**Methods:** A prospective study for 35 months (from October 2015 to September 2018) in King Faisal Medical Complex in Taif which is a referral hospital serving a population of about 2 million citizens. Screening of patients diagnosed as fibromyalgia for osteopenia and osteoporosis using BMD was done. 27 patients with osteopenia (BMD between -1.0 & -2.5) were included in our study. In attempt to control fibromyalgia symptoms; teriparatide daily injections were given to those patients for initially 6 months, then, in case there is improvement in the symptoms, the treatment is extended to another 6 months. Written consents were taken from all patients before the start of anabolic bone treatment. All patients received daily calcium and vitamin D supplements. Patients who were not compliant to the treatment for any reason were removed from the study. BMD was measured at the beginning of the treatment and after one year.

**Results:** 18 patients (66.67%) reported improvement in the symptoms of fibromyalgia after 3 months of treatment. Improvement was maintained for the whole period of treatment. While 6 more patients (22.22%) reported improvement after 6 months of treatment. Hence, 24 patients (88.89%) in total report improvement and were candidate to extend the treatment for another 6 months. Three patients (11.11%) showed no improvement after 3 and 6 months of treatment and hence the teriparatide injection was stopped after 6 months.

**Conclusion:** Teriparatide daily injection showed a significant improve in the symptoms of fibromyalgia patients with osteopenia. Improvement is significant after 3 months of starting of the treatment and this improvement continue to the whole period of treatment. The conclusion of this series calls for more research in the field of anabolic bone treatment for fibromyalgia patients with osteopenia.

## P365
## CLINICAL RISK FACTORS (CRFS) FOR OSTEOPOROTIC FRACTURES (OFS) ARE FUNCTION OF THE FRACTURE SITE: DATA FROM THE FRISBEE STUDY

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**Objective:** Several CRFs predicting OFs have been described but their association with a particular site of fracture has not been extensively studied. We evaluated if some CRFs are specific for sites of OFs in the FRISBEE cohort (Fracture RIsk Brussels Epidemiological Enquiry).

**Methods:** We analysed the association between CRFs included in the FRAX model or additional CRFs (falls, early untreated menopause, sedentary lifestyle and diabetes) and the first incident validated MOF (vertebral, hip, shoulder and wrist) or other major fracture (ankle, pelvis/sacrum, elbow, knee, long bones).

**Results:** 3560 postmenopausal women, aged 60-85 y (median 70), were recruited from 2007-2013, with a median follow-up of 6.2 y. The first incident validated fractures (n=436) were hip (52), vertebra (120), wrist (122), shoulder (68) or other major (74). For MOFs considered together, the risk of fracture was highly associated in uni- and multivariate analyses (P<0.01) with BMD, osteoporosis (DXA), age, prior fracture and fall history (HR=1.38, 2.34, 1.85, 1.97 and 1.28, respectively). For each site analysed separately, in multivariate analyses, total hip BMD, osteoporosis, age, prior OF and smoking remained independent predictors for hip fractures (HR=1.92, 3.98, 6.40, 2.70 and 3.20, respectively); spine BMD, osteoporosis, age, prior OF and glucocorticoids for vertebral fractures (HR=1.45, 2.08, 2.16, 1.94 and 1.72, respectively); femoral neck BMD, osteoporosis and prior OF (HR=1.56, 1.81 and 1.67, respectively) for wrist fractures; spine BMD, osteoporosis and prior OF (HR=1.31,2.48 and 1.75, respectively) for shoulder fractures; prior OF and diabetes (HR=2.62 and 2.03) for other major fractures.

**Conclusions:** Our study confirms a strong association between the risk of fractures and BMD, osteoporosis, prior fragility fracture and age. Smoking for hip fracture, glucocorticoids for vertebral fracture, falls for MOFs and diabetes for other major fractures were also significant predictors. Our study indicates that the relative importance of CRFs is dependent on the fracture site.

## P366
## LIFE THREATENING SYMPTOMATIC HYPOCALCAEMIA TRIGGERED WITH DENOSUMAB IN PATIENT TREATED WITH CHRONIC ANTIEPILEPTIC THERAPY

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**Objective:** A strong suppression of osteoclasts with denosumab or bisphosphonates can cause hypocalcaemia. The incidence of it in primary osteoporosis is rare, and is usually asymptomatic. In postmarketing settings rare cases of severe symptomatic hypocalcaemia have been reported in the situations of vitamin D deficiency, malabsorption syndrome, chronic kidney disease and other medical conditions that can cause hypocalcaemia.

**Methods:** 82 years old woman was urgently hospitalised due to generalized seizures. Since 2001 on antiepileptic treatment for focal motor seizures related to benign tumor at left frontotemporal lobe. Lastly, she received dual antiepileptic therapy (carbamazepine since 2008, and levetiracetam since 2012). Due to high fracture risk 1st denosumab inj. was delivered by general practitioner (April 29, 2015). At the inj. day she experienced pain at jaw, tooth, palm, joints, tingling in limbs. In the following days frequent cramps at limbs occurred. At the admission day (May 9, 2015) generalized seizures developed.

**Results:** Initial laboratory results: s-Ca 1.32 mmol/L, s-ionised Ca 0.73 mmol/L, s-phosphate 0.55 mmol/L, s-AP 1.85 Ukat/L, s-albumin 39 g/L, GFR >90 ml/min/1,73m$^2$, i-PTH 592.2 pg/mL, 25-OH vitamin D <7.5 nmol/L, celiac disease markers negative. Patient was immediately treated with i.v. Ca-gluconate, and long term with vitamin D and oral calcium. She has been followed in outpatients' endocrinology department. The report of denosumab SAE was sent to Agency for Medicinal Products and Medical Devices of the Republic of Slovenia (JAZMP).

**Last laboratory results:** s-Ca 2.38 mmol/L, s-P 1.04 mmol/L, s-AP 1.08 ukat/L s-ionised Ca 1.24 mmol/L, 25-OH vitamin D 95.1 nmol/L, i-PTH 85.6 pg/ml. Proposed pathophysiology: Increased metabolism of vitamin D with long term antiepileptic therapy, and limited sun exposure resulted in severe vitamin D deficiency with subsequent significant secondary hyperparathyroidism. Strong osteoclast suppression with denosumab resulted in life threatening hypocalcaemia.

**Conclusion:** Acute hypocalcaemia can be life threatening, and immediate correction with i.v. calcium is mandatory. Secondary causes i.e. vitamin D deficiency have to be corrected before starting antiosteoporotic drug. SAEs have to be reported to the appropriate agencies.

## P367
## INTIMA-MEDIA THICKNESS IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS TREATED WITH INFLIXIMAB AND NON BIOLOGICAL THERAPY

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**Objective:** To evaluate the differences in intima-media thickness (IMT) in patients diagnosed of ASpa with the ASAS criteria treated with infliximab (IFX) or with nonsteroidal antinflammatory drugs (NSAIDS).

**Methods:** A cross-sectional study was designed. It included 119 patients. The principal variable was the GIM measured in μm of distal Wall of common right and left carotid 1 cm proximal to carotid bulb. It was measured twice and the mean IMT in right and left sides was made separately. The IMT comparative with general population was made adjusted by sex and gender with references founded in the literature. Statistic analysis: The relationship between IMT with different therapies was made with the U Mann Whitney test.

**Results:** The mean age was 49.3±12.8 y. 83 patients was treated with IFX and 36 with NSAIDS. The distribution of cardiovascular risk factors, BASFI, BASDAI and CRP and SR was homogeneous between the two groups. Atheroma plaques were more frecuent in IFX group. The right mean IMT in male <45 y was 520.8 with IFX and 530.8 without IFX (P:0.69). In 45-64.9 years was 570 with IFX and 542.9 without IFX (P:0.56). In ≥65 y was

645.3 with IFX and 618 without IFX (P: 0.55). The left mean IMT in males <45 y was 564 SD 112.9 (287-895) with IFX and 537.8 without IFX (P:0.69), 45-64.9 y was 640.6 with IFX and 489.6 without IFX (P:0.23), ≥65 y was 798 with IFX and 698 without IFX (P: 0.43). The right mean IMT in females was <45 y 473 with IFX and 519 without IFX (P:0.60); 45-64.9 y was 548 with IFX and 581 without IFX (P:0.47); ≥65 years was 644 with IFX and 721 without IFX (P: 0.12). The left mean IMT in females was <45 y 435 with IFX and 503 without IFX (P:0.43); 45-64.9 y was 631 with IFX and 667 without IFX (P:0.49); ≥65 there were no patients with IFX and 577 without IFX.

**Conclusions:** This study did not find differences in mean left and right IMT of common carotid of patients with ASpa treated with IFX or NSAIDs. Previous studies with smaller sample size show similar results. IMT growth rate may be influenced by the control of the disease in ASpa instead of the type of treatment.

## P368

## DOES ADIPOSE STEM CELL LOCALLY INJECTION HEAL BONE NONUNION? EXPERIMENTAL RAT MODEL STUDY

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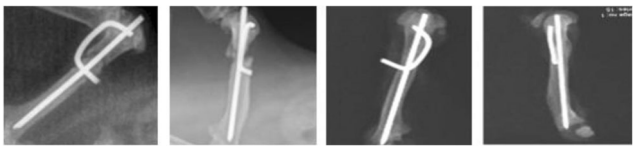
**Objective:** Experimental studies, which are observed the effect of adipose stem cell within bone union pathways, are increasing in literature. The aim of this study was to assess the effects of locally applied adipose stem cell for rats' femur nonunion. We hypothesized that even locally used adipose stem cell for rats' femur nonunion could be supported the bone union by RANK, RANKL and osteoprotegerin (OPG) gene expression.

**Methods:** 48 female Wistar albino rats were included in this study. Rats were randomly divided into six equal groups. Two groups were made diabetic with streptozocin (Group-A4-B2). Left femurs of five groups were osteotomized after anaesthesia was applied (Group-A2-A3-A4-B1-B2). Osteotomized femurs of rats were fixed by K-wire without gap (Group-A2). Osteotomized femurs were fixed by K-wires and U staple after 1.8 mm gap was performed between bone fragments (Group-A3-A4-B1-B2). Tenth week, bone union was detected in group-A2 on the other hand femur nonunion was diagnosed in group-A3-A4-B1-B2 with X-Ray. 2 ml 0.9% NaCl serum was locally injected to the osteotomized area of control groups (A2-A3-A4) and $2x10^6$ adipose stem cells were locally injected to the non-union area of study groups (B1-B2) with fluoroscopy. Eighth week after injection; intracardiac blood samples were taken for biochemical analysis, and femur X-Ray were taken after that rats were sacrificed. After the sacrification, left femurs of rats were taken for histopathological and gene expression evaluation.

**Results:** There were significant differences between the control(A3-A4) and study(B1-B2) groups' bone healing according to radiological and histopathological evaluation ($p<0.05$). Although locally injected adipose stem cells' effect to bone healing process was shown, there was no statically significant effect to bone specific RANK, RANKL and OPG gene expression levels ($p>0.05$).

**Conclusion:** Our study results were promoted our hypothesis for radiologically and histopathological bone healing. Although the effects of adipose stem cell to gene expression level was not detected, we think stem cells could be affected other genes expression levels to bone healing. Also this new hypothesis could be the aim of further studies in the future.

Figure 1: Femur nonunion is seen after ten week femur osteotomy was applied AP and lateral views of X-Ray **(A, B)**. Femur fully bone union is seen after eight week locally injected adipose stem cell to nonunion area in AP and lateral X-Ray views **(C, D)**.



## P369

## TRANSIENT MIGRATORY OSTEOPOROSIS: A VERY RARE CASE OF ALL 4 MAJOR LOWER LIMB JOINTS SEQUENTIALLY AFFECTED

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**Objective:** Transient migratory osteoporosis (TMO) is a rare, self-limiting condition of unknown aetiology. It is characterised by joint pain, usually of acute onset, most prevalent with weight-bearing, and/or limited range of motion. Hip is the joint most typically affected. Involvement of other lower limb joints (knee, ankle) has been described. Radiographs are typically normal, while MR findings are consistent with bone marrow oedema of characteristic distribution. Our aim was too present a very rare case of TMO affecting sequentially all 4 major lower limb joints

**Methods:** We present a very rare case of a 43 years old male, with TMO affecting both hips and knees sequentially (with each lesion presenting after the previous had resolved) within a period of 24 months. History, clinical presentation and findings as well as diagnostic process and treatment (oral bisphosphonates along with Ca and Vit D supplementation in the first 3 episodes and iv bisphosphonates along with Ca and Vit D supplementation in the latest) are described.

**Results:** Two years after the latest episode and treatment with iv pamidronate, patient remains free of symptoms and imaging findings on MRI have completely resolved.

**Conclusions:** Diagnosis of TMO may be difficult as symptoms and findings may overlap with those of early osteonecrosis, bone marrow oedema syndrome and algodystrophy. Identifying presenting features and accurate interpretation of imaging findings enhance diagnosis and allow for prompt management.

## P370
## CAN WEB INFORMATION AND COMMUNICATION TECHNOLOGIES HELP IN THE MANAGEMENT OF OSTEOPOROSIS?

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**Objective:** The internet provides a lot of information regarding risk factors, prevention and treatment of osteoporosis. It remains a considerable challenge for healthcare systems to support individuals with chronic diseases and encourage them to assiduously follow their treatment.
**Methods:** Setting- patients with osteoporosis attending secondary hospital specialist clinic. A bisphosphonate or denosumab leaflet guide, UK National Osteoporosis Society prepaid card, calcium rich food leaflet and an osteoporosis information guide were given to all patients. The active training group additionally received telephone calls after few months to remind them to read the booklets and see osteoporosis website. All patients were followed in clinic at 18 months.
**Results:** Out of 92 participants, 80 patients completed the study at 18 months. Age range 50-85 y. 75% were females. At the end of 18 months of therapy, only 50% of patients continued to take their medication in control group and 75% in intervention group. The intervention group significantly increased general osteoporosis and calcium awareness and knowledge, improved their calcium intake as compared with the control group. Nevertheless, participants from the intervention group were not significantly more likely to meet recommendations for behaviour lifestyle and activity changes. Participants wanted more detailed information about weight-bearing activity, exercises, about long term side effects. Some reported that they would be motivated by group education classes, some wanted interactive website discussions.
**Conclusions:** Well informed patient is more likely to participate in healthy behaviours and to better manage their conditions. Tailored strategies are needed to improve participation and compliance in osteoporosis. Use of interactive web based internet creates new opportunities for individuals to participate actively in monitoring and improving their health themselves with reduced reliance on healthcare providers.

## P371
## PARAMETERS OF MINERAL-BONE METABOLISM AND FETUIN-A LEVEL IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Fetuin-A (FA) is a multifunctional glycoprotein which plays an important role in systemic inflammation. Recently it was shown, that FA may restrict the inflammation in patients with rheumatoid arthritis (1). More than that, FA is an essential protein for mineral-bone metabolism (2). The aim of this study was to investigate the relationship between FA, parameters of mineral-bone metabolism and BMD in patients with RA.
**Methods:** We measured FA (BioVendor human fetuin-A ELISA, CZE), 25-hydroxycholecalciferol (25-(OH)D) (IDS, ELA, UK), N-terminal propeptide of type I procollagen (PINP) (Cloud-Clone Corp., ELISA, USA), C-terminal telopeptides of type I collagen (CTX-1) (IDS, ELISA, UK), serum calcium and BMD (Lunar DPX-NT GE) in 110 patients with RA and 30 healthy controls.
**Results:** The reference values for FA determined from healthy controls were 653.55-972.19 μg/ml (M±2σ). All patients were divided in two groups. Group 1 included 23 patients with low FA levels (≤653.55 μg/ml). Group 2 included 87 patients with normal level of FA (>653.55 μg/ml). 1st group patients had higher rate of osteoporosis (86.9% vs. 36.7%; $p<0.001$) and osteoporotic fractures (52.1% vs. 13.7%; $p<0.001$), lower BMD in lumbar spine (L1-L4) (0.905±0.025 vs. 1.064±0.017 g/cm$^2$; $p<0.001$), femur neck (0.732±0.022 vs. 0.89±0.014 g/cm$^2$; $p<0.001$) and femur total (0.756±0.027 vs. 0.915±0.015 g/cm$^2$; $p<0.001$), lower levels of 25-(OH)D (40.43±3.68 vs. 51.48±1.75 nmol/l; $p=0.005$) and higher levels of CTX-1 (0.9±0.106 vs. 0.678 ±0.037 ng/ml; $p=0.016$). PINP and serum calcium concentration were not significantly different in examined groups (62.35±4.1 vs. 58.64±5.05 pg/ml; $p=0.713$ and 2.364±0.029 vs. 2.388 ±0.017 mmol/l; $p=0.515$ respectively).
**Conclusion:** Low levels of FA associate with lower BMD, higher rates of osteoporosis and osteoporotic fractures, lower levels of 25-(OH)D and higher levels of β-CrossLaps in patients with RA. This data suggests that FA may play a protective role in bone metabolism.
**References:**
(1) Papichev EV et al. Klinicheskaya Laboratornaya Diagnostika (Russian Clinical Laboratory Diagnostics) 2018;63:756 (In Russ.).
(2) Price PA et al. J Biol Chem 2009;284:17092.

## P372
## RESULTS OF COMPLEX TREATMENT PATIENTS WITH OSTEOGENESIS IMPERFECTA USING DRUGS OF PAMIDRONIC ACID AND SURGICAL CORRECTION WITH TELESCOPIC RODS

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**Objective:** The disordered structural and functional state of bone in osteogenesis imperfecta complicates surgical interventions. We studied the impact of preoperative pamidronate on surgical outcomes in patients with osteogenesis imperfecta.
**Methods:** Retrospective analysis of 12 patients with osteogenesis imperfecta (Sillence type I in 5 patients, type III in 7 patients) We assessed structural and functional state of bone by biochemical study of bony metabolism and DXA of lumbar spine with subsequent preoperative treatment of metabolic alterations that included administration of calcium supplements (500-800 mg/d), active forms of vitamin D (0.25-1 μg/d) and pamidronate (0.5-1.0 mg/kg/d provided that serum Ca was above 2.4 mmol/L). Pharmacological preparation included 3 cycles separated by three month intervals. The number of infusions was determined by the level of disturbance of bone density and metabolism. Therapeutic efficacy was assessed by the decrease of β-CTx and increase of Z-factor. Subsequently the patients underwent surgical interventions for correction of long bone axial deformities with intramedullary telescopic rods.
**Results:** Average age on treatment was 8.5 y (range 3-15 y), with 2-y postoperative follow-up. To evaluate the osseous tissue's condition preoperatively we checked level of serum osteocalcin (118.14±63.61 ng/ml), total PINP (342.07±293.14 ng/ml), β-CTx (1.24±0.68 pg/ml), and DXA Z-score (-4.64 ±1.14). Analysis of the data received shows that after pamidronate treatment, the rate of bony resorption diminished on average by 25% (β-CTx – 0.93±0.388 pg/ml, p=0.026); Z-score increased by 12% (-3.9±1.4; p=0.04). We noted that the lowering of serum Ca by 0.2-0.3 mmol/l during administration of pamidronate comparing to the baseline parameters was eliminated with calcium supplementation and vitamin D. Visually during the operative intervention we noted the thickening of cortical layer and increase of bony strength. All operative patients experienced timely union of osteotomies. One patient developed fracture of femoral bone on rod after the onset of independent ambulation that was effectively corrected by plaster bandage. 8 patients became community ambulators without support, whereas the remaining 4 patients are at the last stage of surgical intervention.
**Conclusion:** Preoperative treatment with pamidronate and calcium in patients with osteogenesis imperfecta improves bone quality and does not inhibit bony union after osteotomy.

## P373
## COMPARISON OF LARGE-SCALE GENE EXPRESSION MICROARRAY STUDIES IN DIFFERENT JOINT TISSUES IN OSTEOARTHRITIS

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**Objective:** Osteoarthritis (OA) affects not only the articular cartilage, but also the subchondral bone and the synovium. The aim of our review is the comparison of large-scale gene expression studies, performed in different joint tissues among patients with OA and healthy subjects as well as animal models using the technology of microarrays.
**Methods:** The results of 18 published gene expression array studies were compared. Genes that displayed altered regulation in more than one tissue were noted and analyzed for their key functions.
**Results:** 66 genes had altered regulation in at least two issues: 11 genes displayed altered expression in all three tissues, 35 genes in both cartilage and subchondral bone, 13 genes in synovium and cartilage and 7 genes in subchondral bone and synovium. Differentially expressed genes in all three joint tissues were involved in collagen synthesis (*COL1A2*, *COL3A1*), extracellular matrix (ECM) (*FN1*, *HAPLN1*), WNT signaling pathway (*WNT5B*), inflammation (*S100A9*, *PTGES*), osteoblast function (*MMP3*), bone development (*BMP6*) and cartilage synthesis (*CILP*). Common genes in synovium and subchondral bone were related to angiogenesis (*STC1*), immune response (*MIF*), osteoclast activation and differentiation (*RANKL*), collagen synthesis (*COL16A1*) and TGF-β/BMP or WNT signaling pathway (*WNT5A*, *RUNX2*). Genes with altered regulation in both cartilage and synovium were predominantly involved in inflammation (*IL6*, *CXCL2*, *S100A8*). Cartilage and subchondral bone shared the majority of differentially expressed genes implicated in collagen synthesis (*COL1A1*, *COL5A1*), ECM breakdown (*MMP13*, *MMP2*), osteoclast differentiation (*ADAM8*, *OPG*), osteoblast differentiation (*IGFBP3*), tissue development and regeneration (*POSTN*), bone remodeling (*ADAMTS5*, *WISP1*), WNT or TGF-β signaling pathway (*FRZB*, *CD14*, *TGFb2*), inflammation (*CXCL1*, *CTSG*), cartilage and/or bone development (*HOXA11*, *MATN3*) and adipogenesis (*LIPE*).
**Conclusion:** It is well established that OA is a multitissue disease, rather than a cartilage lesion. On molecular level, several genes related to crucial pathways have altered regulation in more than one tissue, indicating that interplaying mechanisms and pathological processes might be involved in all three of the joint tissues. Further studies are needed.

## P374
## SUBSCAPULAR SPARING DELTOPECTORAL APPROACH FOR REVERSE TOTAL SHOULDER ARTHROPLASTY IN OSTEOPOROTIC PATIENTS

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In reverse ball shoulder replacement, surgery is usually performed using a deltopectoral approach or an anterosuperior transdeltoid approach. The deltopectoral approach is to incise the pectoralis major to 1/3 to 1/2, and the scapula should be removed at the lesser tuberosity of the humerus. This approach has the problem of breaking the shoulder deltoid instead of incising the rotator cuff. Therefore, we report a

detailed procedure reverse ball shoulder replacement in osteoporotic patients using approach without incision of the pectoralis major muscle and subscapularis muscle.

## P375
## HYPOCALCEMIA NOT JUST RELATED TO EGFR AND CAN OCCUR UP TO SIX MONTHS POST DENOSUMAB INJECTION

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**Objective**: Denosumab is recommended as a treatment option for the primary and secondary prevention of osteoporotic fragility fractures only in postmenopausal women at increased risk of fractures who are unable to comply with the special instructions for administering alendronate and either risedronate or etidronate, or have an intolerance of, or a contraindication to, those treatments. It is also used for male osteoporosis where bisphosphonate are either not tolerated or contraindicated. It has strong antiresorptive function and there is incidence of hypocalcemia in 2-20%. It is most likely to occurs in 1-2 weeks post injection in the patients who have EGFR <30. Our aim is an audit to investigate the incidence of hypocalcaemia amongst patients taking Denosumab in our department and to evaluate our level of compliance with national guidance when monitoring hypocalcaemia. Firstly to see whether the patient was on denosumab for the correct indication and on right dose. Secondly whether patients were taking calcium and vitamin D supplement at right dose. Thirdly whether patients at high risk of hypocalcaemia, i.e., EGFR <30 had their calcium checked between 1-2 weeks after the first denosumab dose.

**Method:** A retrospective study of the patients between 3 January and 3 July 2018. Inclusion criteria: all patients attending the osteoporosis treatment clinic for denosumab over a 6-month period. Exclusion criteria: any patients on 120 mg of denosumab.

**Result:** 214 patients were identified 1 was excluded. Indication for denosumab were treatment failure in 29.5% (63 patients), poor renal function in 33.8% (72 patients), side effects on bisphosphonate 15% (32 patients), deterioted on DXA 4.69% (10 patients), other 35/231. 100% of the patients had correct dose of denosumab, baseline renal function were checked in 96% of patients, baseline calcium were checked in 99% and 82% had baseline vitamin D checked. Only 2.5 (5 patients) EGFr was <30. Hypocalcemia was found in 14% at level <2.17 and 2% <2. Of those who developed hypocalcaemia 77% had a calcium profile checked before their last denosumab was administered and all but 3 had Ad Ca >2.25. Only 7% had hypocalcemia within 2 weeks, 27% had within one month, further 20% in 2 months and 27% in 3 months, 3% in 4 months.10% in 5 months and 13% in 6 months, respectively.

**Conclusion:** There was no incidence of hypocalcemia found in patients with EGFr <30. Hypocalcaemia does occur up to 6 months post denosumab. It is not just related to EGFr. Only 7% occurs in first two week. Only 27% patients have hypocalcemia in first month. Maximum number of patients have hypocalcemia at 3 months post denosumab.

## P376
## GEOGRAPHICAL VARIATION IN OUTCOMES OF PRIMARY HIP REPLACEMENT: STUDY FROM "THE NATIONAL JOINT REGISTRY OF ENGLAND AND WALES"

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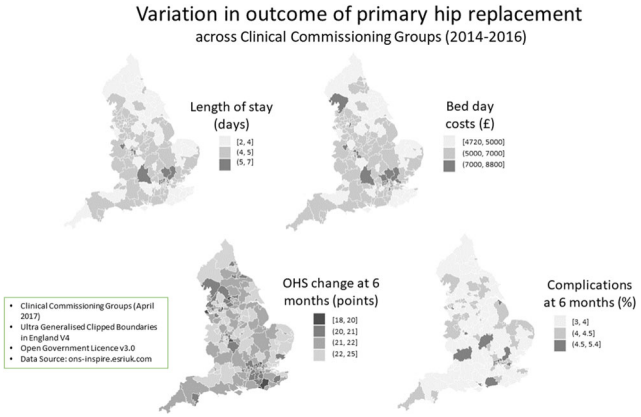
**Objective:** To explore variation in patients' outcomes for primary hip replacement surgery across Clinical Commissioning Groups (CCGs), and to identify whether patient, surgical and hospital factors can explain why such variation exists.

**Methods:** The National Joint Registry was used, which incorporates data on hip replacement surgeries. Primary operations were linked with Hospital Episode Statistics data which contains records of all inpatient episodes undertaken in NHS hospitals, and Patient Reported Outcome Measures (PROMs). Primary hip replacement in people aged 18 years or over between 2014-2016 were identified. Multilevel regression models were generated for the following outcomes: length of stay (LOS), bed costs, change in Oxford hip score (OHS) 6months after surgery, and complication by 6 months. Models included a wide range of patient, surgical and hospital organisation factors. Geographical Information Systems are used to display maps describing adjusted estimates of variation in outcomes across NHS CCG areas.

**Results:** 173,107 primary hip replacements were identified within 207 CCG areas. 60% of patients were women, with an average age 69.3 y (SD±10.7 y). Whilst we identified a number of factors that predicted outcomes of surgery (e.g., age, gender, comorbidity, deprivation, baseline function, surgical volume, numbers of orthopaedic surgeons, beds, operating theatres), these factors did not explain the observed geographical variations in outcomes of surgery across CCGs. The predicted mean length of stay at hospital oscillated from 2.7 to 6.1 d, bed-day cost £4727 to £8800, absolute predicted change in OHS 18.8 to 24.6, predicted 6-month complication rate from 3.0% to 5.4% (Figure).




**Conclusions:** We have identified potentially unwarranted variations in patient outcomes of hip replacement surgery. This variation cannot be explained by differences in patients case mix, surgical factors, or hospital organisational factors. This information is informative to patients in making a decision in where they have their surgery, and to commissioners in monitoring variations in outcomes of surgery.

**Acknowledgments:** We would like to thank the patients and staff of all the hospitals in England and Wales who have contributed data to the National Joint Registry (NJR). The authors thank Ed Burn for his advice using R.

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## P377
## PATIENT USE OF INTERNET FOR INFORMATION ABOUT OSTEOPOROSIS

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**Objective:** To determine patient use of Internet for health information to describe the types of information sought, to evaluate patients' perceptions of the quality of this information, and to determine if patients who use the Internet for health information discuss this with their doctors.

**Method:** Design: questionnaire study. Setting: specialist osteoporosis hospital clinic. Participants: randomly selected patients with confirmed osteoporosis who completed a structured questionnaire.

**Results:** 112 patients were included. 75% females. Age range 50-95 y. 95% had internet connection at home. 46% of the patients included in the study had a personal computer. 75% stated that they used the Internet for medical information. Those using the Internet for medical information were more educated ($P<0.001$) and younger below 65 y ($P<0.001$). 90% felt osteoporosis information websites were very useful. 20% reported that some websites gave conflicting information. Amongst those using internet 92% felt they had improved their calcium intake and lifestyle habits including overall activity and gained better knowledge about disease and drugs. 35% were seriously concerned about side effects of drugs especially on teeth, amongst these 90% did discuss their concerns with their dentist. 5% mentioned bisphosphonate drugs caused more fractures. 10% were seriously concerned about cardiovascular side effects of calcium tablets.

**Conclusion:** Healthcare providers should recognise that patients are using the worldwide web as a source of medical and health information and should be prepared to offer suggestions for appropriate web-based health resources. The use of these new information and communication technologies by patients could be useful as a resource promoting their independence, compliance and empowerment. Internet for healthcare can empower and facilitate patients to become safe and active participants in their own healthcare. Quality of information available on websites needs further research as patient's concerns could affect compliance with prolonged treatments especially for silent disease such as osteoporosis.

## P378
## OSTEOPOROTIC VERTEBRAL FRACTURES IN IRELAND AND NORTHERN IRELAND: A SYSTEMATIC REVIEW

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**Objective:** Vertebral fractures (VF) are the most common subtype of osteoporotic fractures accounting for 15-64% of all fractures in published studies. They are associated with significant morbidity, mortality and are an important predictor of future fracture risk. A 2017 IOF report noted Ireland has the 6th highest incidence of hip fracture worldwide. The epidemiology of VF in Ireland is limited. Published data suggest they represent only 5% of fractures requiring hospitalisation. Empirical evidence at our institution shows that many are under-reported, not coded as a diagnosis, and follow-up is sporadic. Thus, a greater understanding is needed of the scale and impact of VF in Ireland. Our aim was to conduct a systematic literature review of osteoporotic VF in Ireland.

**Methods:** Searches using PubMed, Medline, Embase, Scopus, Cochrane electronic databases to identify publications from the island of Ireland addressing osteoporotic VF that were eligible for inclusion.

**Results:** The search produced 1558 citations, 21 of whom met our inclusion criteria, all published since 2000. VF were defined morphometrically in 9 studies, clinically in 11 studies and one study included both definitions. Data was obtained on 191,920 patients with fractures. 10 studies included more than 100 subjects, and 4 >1000. 66.9% were female and 33.1% male with a mean age of 63.8 y (34-94). There was significant heterogeneity in terms of study design and outcome measures. Studies varied from review of administrative claims data on hospitalisations in public hospitals, surgical interventions, medical management, the impact of a fracture liaison service, use of lateral vertebral assessment (LVA) and the economic impact on the burden of osteoporosis and VF. Only 2 studies systematically reviewed spinal imaging on a cohort of patients using blinded assessors and validated diagnostic criteria to assess the prevalence of fractures. We found a prevalence ranging from 0.86% to 87% in published studies.
**Conclusions:** Few publications address osteoporotic VF in Ireland. A large gap exists in our country addressing the epidemiology and importance of VF in Ireland. Detailed studies are urgently needed.

## P379
## FACTORS INFLUENCING THE ADDRESSABILITY OF PATIENTS SUFFERING OF OSTEOPOROSIS AND THE BENEFITS OF GEOTHERMAL WATER BASED HYDRO-PROCEDURES USED BY A PUBLIC HOSPITAL'S AMBULATORY

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**Objectives:** Osteoporosis usually influences people above the age of 50s. The hydrotherapy used by physiotherapy and medical recovery can improve the symptoms of osteoporosis in its incipient and medium phase. The hydrotherapy using geothermal water from the source 1705 of Marghita city (panonic acvifer) is used by our public hospital's ambulatory for the treatment of rheumatism and post-trauma treatments well as for osteoporosis therapy in its incipient and medium phase. This research is looking for the external factors which might influence the addressability of the patients suffering of osteoporosis and the benefits of geothermal water used during the hydrotherapy at the "Dr. Pop Mircea" Hospital, between 2013-2017.
**Methods**: statistical indicators of the physiotherapy ambulatory between 2013-2017.
**Results:** Almost 90% of the patients treated in the ambulatory system of the hospital's physiotherapy have been cured using physiotherapy procedures, the others being treated with drugs. The lowest interest for such treatments was in 2016, followed by 2014. The reasons are related to serious changes in physiotherapy treatments in the last decades. Initially all kind of procedures used by the physiotherapy have been supported and paid by the National Health Insurance. As soon as the National Health Insurance House (NHIS) has been founded, a paid rate has been established for each of the treatments. The amount paid by NHIS is different: sometimes even decreasing. But in the same time the rate paid for each procedure is increasing. For this reason, the number of the procedures supported by thy NHIS is decreasing. Medical recommendations using electrotherapy procedure are the most frequent ones, followed by therapeutic massage and hydrotherapy – sometimes this kind of treatment being not recommended. More than 57% of the patients are older than 50 y; 71% of them suffering from osteopenia and osteoporosis evidenced by DXA or X-ray. It has been evidenced that hydrotherapy for 83% of them has been beneficial.
**Conclusions:** There is an evidence of negative influence regarding the financing system of the physiotherapy. The hydrotherapy is successfully used for the treatment of patients suffering from osteoporosis, but due to the maladies' pathology the addressability is lower than for treatments using electrotherapy and massage.

## P380
## OPERATIVE TREATMENT OF THE TIBIA FRACTURE NONUNION USING NONE OF THE ADVANTAGES OF THE NEW CUTTING EDGE BIOMATERIALS

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**Objective:** The operative treatment of tibial fracture nonunion represents a great challenge. In the last years several treatment options have been described, all using new cutting edge biomaterials analyzing their various advantages. The reported high rate of postoperative complications of nonunited tibial fractures after an open reduction and internal fixation require several revisions and sometimes with a worse outcome. [1] The current trend though for the treatment of tibial fracture non-unions does not promote a single method without the use of any metal work. We would like to present our results regarding the operative treatment of tibial fracture nonunions with the so now considered outdated Phemister technique which was initially described in 1947. According to this we only applied at the nonunion site autologous cortico-cancellous bone graft without any stabilizing factor of a hardware.
**Methods:** After obtaining approval from our hospital's ethics committee, we reviewed the case notes and x-rays of all patients with a tibial fracture nonunion treated operatively from 1994 until today using the Phemister technique. The year 1994 was chosen as from then we have found available patient data in the Orthopaedic Department. The inclusion criteria were based on the patient reported data, the clinical findings and the images on x-rays. All patients included in the study were complaining of tibial pain on weight bearing 6 months

since the fracture with local bone movements and instability on palpation and no radiographic evidence of callus formation bridging the fracture bone ends. The Phemister technique was applied with the patient in supine position in order to harvest the bone-graft of 20-30 g from the anterior iliac crest. The fracture site was approached anterolaterally and a debridement was performed at the nonunion site followed by the positioning of the autologous bone graft. The patient had a log leg cast nonweight-bearing for 3 months.

**Results:** All 16 patients treated with the Phemister technique achieved radiographic union at a mean of 26 months. No postoperative infection was reported and there was no donor site complication. 11 patients developed a decreased range of ankle joint movement and 6 patients had a leg length discrepancy with a mean of 3.7 cm.

**Conclusion:** According to our data the Phemister technique although does not follow the current trend by using any of the advantages of the new cutting edge biomaterials, has good results in the operative management of the tibial fracture nonunions.

**Reference:** 1. Bose D et al. Bone Joint J 2015;97-B:814.

## P381
## PRIMARY HYPERPARATHYROIDISM WITH BROWN TUMORS AND CALCIFIC PANCREATITIS: A CASE REPORT

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**Objective:** We describe PHPT case in white young female with brown tumors and calcific pancreatitis.

**Methods:** Female (F) 30 y.o. with two preterm births (32/33 wks) in anamnesis, seizures in children at the first days of life, lumbar pain during the 2nd pregnancy with inability to walk. MRI performed at wks 26/27 showed pathological heterogeneous masses up to 28*51*41 mm in the right ilium and lateral sacrum., Postpartum PET-CT confirmed multiple metabolic active formations in bones and revealed a pathologic lesion near left thyroid gland lobe. Biopsy of sacroiliac area showed osteoblastoclastoma and F was referred to an oncologist. Detailed biochemical examination was performed only postpartum. Serum iCa level was 1.5 mmol/l (1.16-1.32), total calcium 2.77 mmol/l (< 2.5), PTH 1275 pg/ml (15.0-65.0). PHPT was diagnosed and left parathyroidectomy was performed in Aug 2017. In post-op, serum iCa level and PTH level normalized (1.15 mmol/l and 39.44 pg/ml accordingly), lumbar pain disappeared.

**Results:** After 6 months, F was hospitalized with hyperglycemia (glucose level up to 48.0 mmol/l, HbA1c 16.9%). DM was diagnosed and basis-bolus insulin therapy initiated. Retrospectively F had gestational diabetes during both pregnancies and was treated by diet only. Negative GAD Ab (0.28 U/ml) and low C-peptide level 0.80 ng/ml (1.10-4.40) confirmed absolute insulin deficiency non-autoimmunic etiology. PET-CT data reassessment showed multiple calcinosis of pancreas as sign of PHPT hence DM was associated with PHPT. Genetic analysis did not reveal CaSR mutation, though we found SDHB mutation that is nonspecific for PHPT, but could be associated with MEN syndrome. PET-CT was repeated in Dec 2018 and showed signs of fibrocystic osteodystrophy, brown tumors and absence of hyperfixation in comparison with pre-op PET-CT data.

**Conclusion:** This case demonstrated unrecognized PHPT with brown tumors and calcific pancreatitis in white young female with the first clinical manifestations in pregnancy.

## P382
## COMPUTERIZED OSTEOPOROSIS DECISION SUPPORT TOOLS FOR PRIMARY CARE PHYSICIANS

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**Objectives:** Osteoporosis is a silent yet common disease, managed mainly in the primary care setting; however, recent surveys depict substantial knowledge deficits among family physicians. We aimed to develop and monitor the efficacy of automated personalized alerts to assist clinical decision making in Osteoporosis.

**Methods:** We utilized the computerized Osteoporosis registry of Maccabi healthcare services (a large payer provider in Israel), including daily data from all bone density tests performed by Maccabi members in Assuta medical centers, as well as fractures events and therapy. To avoid overloading the physicians we focused on naïve patients with either a T-score ≤-2.5 or vertebral or hip fracture (in accordance with the USA national guidelines). As long as the patient remained naïve, on each visit his/her assigned family physician received a pop-up recommendation to consider treatment. A follow-up screen was designed to conveniently gather links to useful, relevant actions: issue prescriptions (supplements and first line medication), print an information page for the patient, refer to a nutritionist and/or refer to laboratory tests.

**Results:** On October 2017 the population identified for intervention included 12,000 patients, on average 10 cases per physician, 53% being longstanding cases: untreated for over 1 y since the event (bone density test/fracture). Overtime this population grew according to incident fractures and new bone tests. Within 1 y from activation over 16,000 cases were repeatedly alerted (n=275,820 times), 29% initiated therapy (21% purchased, 8% prescribed), and additional 6% were referred to consult with an endocrinologist, which may start therapy in the near future. Treatment initiation rate was lower for secondary prevention patients (12%/8% for hip/vertebral fractures respectively vs. 25% for those with T-score ≤-2.5), for men as compared with women, and patients older than 80 years old.

**Conclusions:** Our targeted alert was efficient in raising attention to missed cases at risk of fracture, although awareness to secondary prevention was still suboptimal. We continue to design further tools to support osteoporosis management in the community, including alerts for potential treatment failure (fractures or bone loss under adherent therapy) and visualization of long-term persistence.

## P383
## TRADITIONAL CHINESE MEDICINE SUBSIDES KNEE ARTHRITIS WITH EFFUSION

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**Objective:** The case to be reported here involved a 82-year-old female patient who visited our traditional Chinese medicine clinic on December 15, 2018, has no hypertension, no diabetes, no cardiovascular disease, and no major immune system disease. She presented to the clinic complaining of right knee pain with swelling, VAS=8-9. She regularly (every 60 d did sonoguided aspiration about 50-60 cc yellowish serous fluid from the right suprapatellar recess, for about 6 months and take Arcoxia QD for 6 months.
**Methods:** Initially, the patient complained of severe right knee pain with swelling, VAS=8-9. The sonogram showed much hypoechoic fluid accumulation at the right suprapatellar recess. She took arcoxia every day and regularly (every 60 d) did sonoguided aspiration about 50-60 cc yellowish serous fluid from the right suprapatellar recess, for about 6 months. The concept of traditional Chinese medicine of the patient's symptom is "Dampness-*heat* Impeding" and this treatment is adjusting the meridian system through "Clear Heat, Drain Dampness" formula by "Dang Gui Nian Tong Tang".
**Results:** After one month of receiving traditional Chinese medication (the formula of "Dang Gui Nian Tong Tang" treatment) since December 15, 2018, the follow-up result of the Patient revealed that the VAS=3 and she DC Arcoxia. On 2018/1/16, sonoguided aspiration about 20-30 cc yellowish clear fluid from the right suprapatellar recess. Besides, no obvious side effect was found after these treatment.
**Conclusion:** The knee arthritis with effusion may cause severe pain in elderly. Thus, some medical therapies for treating these pain were proposed, such as COX-2. Through the positive report in this case, we suggest traditional Chinese medicine may be a safer, simpler, cheaper and more effective treatment for knee arthritis with effusion and severe pain.

## P384
## TISSUE CYTOKINES AND THEIR ROLE IN THE PATHOGENESIS OF RHEUMATIC DISEASES

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**Objectives:** The scientific interest in adipokines (adiponectin and visfatin) [1,2], hepatokin - fetuin-A [3] and neurohormones nesfatin-1 [4] is associated with their effect on inflammation and clinical manifestations of RA. Our aim was to clarify the pathogenesis of RA by determining the level of adiponectin, fetuin-A, visfatin, nesfatin-1 in the serum of patients with RA.
**Methods:** 60 patients with RA and 30 healthy individuals were studied. The level of adipokines was determined indirectly by ELISA using commercial test systems.
**Results:** Adiponectin levels (<0.8 μg/ml) were detected in 25% of patients, fetuin (<653.55 μg/ml), in 27%, high visfatin levels (39 ng/ml) in 91%, nesfatin (37.95 ng/ml) at 60%. The level of tissue cytokines is associated with RA and high activity on DAS 28, positivity for ACCP, and foliar manifestations of RA. The level of fetuin and nesfatin also correlates with marked radiographic changes.
**Conclusion:** A low level of adiponectin and fetuin-a, a high level of visfatin and nesphatin-1, is characteristic of RA with high activity. The level of fetuin and nesfatin is related to the degree of bone damage. It is interesting to study their relationship with BMD and markers of bone metabolism. Further study of these cytokines may be useful for understanding the pathogenesis of RA and, possibly, other rheumatic diseases.
**References:**

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## P385
## INCIDENCE OF ASYMPTOMATIC VERTEBRAL FRACTURES IN PATIENTS WITH CHRONIC BACK PAIN

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**Objective:** Vertebral fractures are underdiagnosed, mostly due to the high prevalence of back pain, especially in people older than 65 y diagnosed with degenerative osteoarthritis. Studies show different prevalence of asymptomatic vertebral fractures, varying from 14% to 37%, since they can be unheeded because of chronic

back pain. The aim of this study was to analyze the presence of nondiagnosed vertebral fractures in those patients presenting back pain, and to review data available about risk factors of osteoporosis, retrospectively.

**Methods:** A Cross-Sectional study was carried out. We included patients who presented *de novo* vertebral fracture in spine radiography, attended in Rheumatology and Rehabilitation due to chronic back pain. from 1st July 2018 to 31st December 2018 (6 months). Clinical records of patients with radiological findings of vertebral fracture were recruited: age, sex, BMI, smoking, alcohol consumption, comorbidities, previous study of osteoporosis, clinical history of fractures (patients and family), physical exercise, secondary osteoporosis, osteoporosis treatment, bone densitometry, and FRAX score. Statistical analysis: descriptive statistical analysis: mean and standard deviation for quantitative variables and frequencies for qualitative variables. FRAX score was established as: low risk <10%, moderate risk 10-20% and high >20%.

**Results:** 270 patients were attended among the study period due to back pain. 42 of them (15.5%) were diagnosed with vertebral fracture in spine radiography. The mean age was 75.17 y ±10.3, and 83% of patients were female. Clinical characteristics related to risk of fractures are shown in Table 1.

Table 1

| | YES n (%) | NO n(%) |
|---|---|---|
| Personal history of fracture | 9 (21.42) | 33 (78.57) |
| Family history of fracture | 5 (11.9) | 37 (88.09) |
| Alcohol consumption | 5 (11.9) | 34 (80.95) |
| Smoking | 9 (21.42) | 33 (78.57) |
| Previous Bone Densitometry | 22 (52.38) | 20 (47.61) |
| Previous osteoporosis treatment | 8 (19.04) | 34 (80.95) |
| Physical exercise | 5 (11.9) | 37 (88.09) |

22 patients were classified in high risk of vertebral fracture according to FRAX >20%, 11 patients with moderate risk (FRAX 10-20%) and 9 patients with low risk. That means, 78,5% of patients had a moderate-high risk of fracture and only 9 patients were previously diagnosed with osteoporosis and risk factors were identified.

**Conclusion:** In this study, we observed a similar prevalence of asymptomatic vertebral fractures than in other studies. Data draw attention to importance of correct and comprehensive anamnesis about osteoporosis and risk factors of fracture. In order to stablish an accurate treatment to prevent new fractures.

## P386
## DIAGNOSTIC APPROACH OF PARATHYROID CANCER IN THE ELDERLY PATIENT: CASE REPORT AND REVIEW OF THE LITERATURE

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**Objective:** Parathyroid carcinoma is a rare entity and even more so in geriatric patients. It affects bone metabolism and masks itself with more common pathologies that cause fractures, such as postmenopausal osteoporosis. Our aim was to illustrate the diagnostic approach of atypical fractures and describe clinical-pathological forms of parathyroid cancer, to favor early diagnosis and minimize the impact on morbidity and mortality.

**Case presentation:** A 71-year-old woman with osteoporosis spontaneously presents an atypical femur fracture. During the diagnostic process constitutional symptoms, anemia, generalized osteolytic lesions, nephrolithiasis and hypercalcemia are documented. Frequent gynecological neoplasms and plasma cell tumors are ruled out. The presence of bone metastatic disease vs. brown tumors is considered. Tc-99m MIBI-negative primary hyperparathyroidism is diagnosed, tomographic studies show pulmonary nodule and 4 cm thyroid nodule. Fine needle aspiration reports oncocytic follicular adenoma. Patient underwent exploratory surgery after receiving zoledronate and left thyroidectomy with its parathyroids in bloc and right upper parathyroidectomy. Pathology and immunohistochemistry of neck mass are compatible with parathyroid carcinoma, remaining parathyroid glands are unaltered. Postsurgical follow-up shows higher PTH elevation and hypercalcemia, follow-up tomography shows multiple pleural nodules suggestive of metastasis.

**Results:** Postmenopausal osteoporotic fractures are frequent, but in the presence of atypical fractures or Z-score ≤-2, in addition to the tumoral and infectious causes, the early evaluation of phosphocalcium metabolism must be considered to identify primary hyperparathyroidism. Parathyroid carcinoma is more frequent around the 5th decade of life, however, it can occur at any age. In the elderly, it shares clinical characteristics with more prevalent etiologies such as nephrolithiasis, thyroid nodule, anemia and cervical mass.

**Conclusion:** Parathyroid cancer has a broad clinical spectrum and should be a diagnostic alternative in atypical fractures and hyperparathyroidism, even in the absence of an imaging parathyroid lesion, or in the presence of thyroid disease.

## P387
## ENTHESEAL AND PERIPHERAL JOINT INVOLVEMENT IN REACTIVE ARTHRITIS: AN ULTRASOUND STUDY

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**Objectives:** Reactive arthritis is an entity of spondyloarthritis characterized by asymmetric mono or oligoarthritis and extra-articular manifestations such as enthesitis which develops after an enteral, genitourinary or poststreptococcal infection [1, 2, 3]. The purpose of this study is to determine the role of ultrasonography in monitoring joint and entheseal involvement in reactive arthritis.
**Methods:** The study included 12 patients (7 males, 5 females) diagnosed with reactive arthritis following enteral (25%), genitourinary (58.33%) and poststreptococcal (16.67%) infections. Other inflammatory joint diseases were excluded. We performed laboratory tests which included inflammatory markers (erythrocyte sedimentation rate and C reactive protein), rheumatoid factor and human leukocyte antigen (HLA)-B27 determination. Musculoskeletal ultrasound (MUS) of the knees, ankles and Achilles tendons and other joints with significant arthritis upon clinical examination was performed using a MyLab25Gold machine with a multifrequency array probe.
**Results:** Erythrocyte sedimentation rate levels were higher than 10 mm/h in 75% of cases, while C reactive protein was above normal limit in 66.7% of cases. HLA-B27 was positive in 3 patients. Involvement of the large joints was predominant (75%) with ankle and knee arthritis revealed by MUS in 58.33% and 50% of cases, respectively. The presence of tenosynovitis, mainly of the posterior tibialis tendons and peroneus tendons was found in 41.66% of patients. Achilles tendon enthesitis was demonstrated in 8 cases (66.67%), with the presence of enthesophytes in 7 cases (58.33%), increased thickness and hypoechogenicity in 8 cases (66.67%), power Doppler signal in 6 cases (50%) and erosions in 4 cases (33.33%).
**Conclusion:** MUS is a helpful examination in order to assess disease severity, joint and entheseal involvement in reactive arthritis.
**References**
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## P388
## QUALLEFO-41 GREEK VERSION OSTEOPOROSIS QUALITY OF LIFE QUESTIONNAIRE: CLOSING THE VALIDATION'S LOOP

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**Objective:** 4 y after the Quallefo-41 (Q-41) Greek version validation and the initial publication of data, we wanted to close the loop of the study and reassess the same group of osteoporotic patients' quality of life (QoL) comparing the results. [1]
**Methods:** After obtaining the approval of the Western Macedonian Greek Medical Association Ethics Committee, we redistributed the Q-41 to the same cohort of 54 Caucasian patients. The inclusion criteria were patients diagnosed with osteoporosis according to the WHO standards with at least one low velocity vertebral fracture who were included in the initial study in 2015 and returned the questionnaires. All the participating patients resigned the consent form and completed the Q-41 instrument of osteoporosis QoL measurement voluntarily and anonymously. The Q-41 total and domain scores were adapted so 100 represented the best quality of life value. For the statistical analysis the Stata software (Version 10.1 M.P., Stata Corporation, College Station, T.X. USA) was used and the statistical importance was set at $p<0.05$.
**Results:** 47 patients finally participated in the new study as 3 patients could not be reached and 4 did not returned the questionnaires. The Q-41 average total score was 68 and the average domain scores were between 45 and 74 compared to the previous data of 64, 44 and 78 respectively. P values ranged between 0.01-0.37 compared to previous 0.01-0.46. All new values were very close to the data obtained during the first study.
**Conclusion:** After closing the validation's loop and completing the research methodology by repeating the study based on the same scientific principles, the similar obtained data prove the validity, consistency and reliability of the Q-41 Greek version.
**References:** 1. https://www.iofbonehealth.org/quality-life-questionnaires-qualeffo-41

## P389
## INCIDENCE OF OSTEOPOROSIS IN PSORIATIC ARTHRITIS: A STUDY GROUP

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**Objectives:** Psoriatic arthritis (PsA) is an inflammatory disease characterized by symmetric joint arthritis, axial and entheseal involvement, associated with cutaneous psoriasis. PsA belongs to the spondyloarthritis group along with ankylosing spondylitis and reactive arthritis [1, 2]. The aim of our study is to investigate the BMD in patients with PsA.
**Methods:** We included in our study 28 patients with nonaxial PsA (20 females, 8 males) with mean age of 54.25 (±5.45) y, mean disease duration of 7.45 (±2.35) y and 28 age and sex matched controls. Neither of the patients or controls had received treatment with corticosteroids. We evaluated the patients through clinical examination and laboratory tests including biological inflammatory syndrome (erythrocyte sedimentation rate and C reactive protein) and measured BMD of the lumbar spine and hip using DXA scanner.
**Results:** The study group included polyarticular disease (67.85%), oligoarticular disease (25%) and arthritis mutilans (7.15%). Erythrocyte sedimentation rate and C reactive protein levels were above normal limit in 57.14% and 53.57% of patients, respectively. The BMD

of the lumbar spine, quantified by the T-score, measured in PsA patients was lower, with a mean value of -1.42 SD (±0.28) than in the control group with a mean value of -1.23 SD (±0.16). The measurement of the BMD of the hip proved similar results with the lumbar spine scan, with a mean value of -1.14 SD (±0.23) in the PsA group and -0.98 SD (±0.25) in the control group.

**Conclusions:** Although the existence of systemic osteoporosis in PsA patients has not been extensively studied, our evaluation showed that BMD is lower in patients with arthritis than in the healthy control group.

**References:**

1. Musetescu AE et al. Rom J Morphol Embryol 2017;58:801.
2. Bumbea AM et al. Farmacia 2017;65:917.

## P390

## VITAMIN D DEFICIENCY: ASSOCIATED OR NOT WITH DISEASE ACTIVITY IN SPONDYLOARTHRITIS?

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**Objectives:** The term spondyloarthritis comprises a group of inflammatory diseases characterized by axial and peripheral joint involvement, such as ankylosing spondylitis, psoriatic arthritis or reactive arthritis [1,2]. The aim of this study is to determine the association between vitamin D deficiency and disease activity in axial spondyloarthritis (axSpA).

**Methods:** The study included 30 patients (23 males, 7 females) diagnosed with axSpA according to the modified New York criteria with average age of 54.3 years and disease activity ranging from 2-15 y. Patients were undergoing treatment with nonsteroidal anti-inflammatory drugs (56.7%), biological therapy (43.3%) and were not receiving vitamin D supplementation. We determined 25-hydroxyvitamin $D_3$ levels with values <30 nmol/L considered deficient and <20 nmol/L considered insufficient, C reactive protein (CRP), erythrocyte sedimentation rate (ESR), HLA-B27 and calculated the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI).

**Results:** ESR levels were higher than 10 mm/h in 10 patients (33.33%), CRP levels were above 5 mg/dL in 9 patients (30%) and vitamin D levels were deficient in 9 cases (30%). HLA-B27 was positive in 24 cases (80%). Median BASDAI value was 6.1. Patients with biological inflammatory syndrome presented deficient values of 25-hydroxyvitamin $D_3$, emphasizing the fact that active disease has negative effects on serum vitamin D levels. Furthermore, patients with higher BADSAI also had the lowest vitamin D serum values, consistent with our previous findings.

**Conclusions:** Disease activity indexes and marked biological inflammatory syndrome are linked to vitamin D levels in patients with axSpA. However, the study does not prove whether vitamin D deficiency occurred after the increase in disease activity or before. Further studies have to be conducted in order to prove the immunomodulatory role of 25hydroxyvitamin $D_3$ in spondyloarthritis.

**References:**

1. Musetescu AE et al. Rom J Morphol Embryol 2017;58:801.
2. Bumbea AM et al. Farmacia 2017;65:917.

## P391

## FRACTURE RISK IN PATIENTS WITH RHEUMATOID ARTHRITIS: A STUDY GROUP

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**Objectives:** Rheumatoid arthritis (RA) is a systemic autoimmune disease characterized by symmetric, destructive arthritis of the joints and extra-articular manifestations. A variety of treatment options can be used in RA such as corticosteroids, conventional disease modifying drugs and also biological therapy [1, 2]. Osteoporosis is considered a complication of RA with high risk of fractures. The aim of our study is to determine the correlation between the 10-y risk of fractures using FRAX without BMD assessment and disease activity in RA.

**Methods:** The study included 35 patients (27 females, 8 males) diagnosed with RA according to the ACR/EULAR 2010 criteria with mean age of 44.92 y (±4.27) and mean disease duration of 6.37 y (±1.02). Laboratory tests included erythrocyte sedimentation rate (ESR), C reactive protein (CRP), rheumatoid factor (RF), anti-citrullinated protein antibody (ACPA). Disease activity was calculated using disease activity score (DAS) 28. The 10-y fracture risk was evaluated using FRAX.

**Results:** ESR and CRP levels were above normal limit in 60% and 54.28% of cases, respectively. RF was positive in 32 patients (91.42%), while ACPA was positive in 25 cases (71.42%). 17.14% patients had low disease activity, moderate and high disease activity were revealed in 54.28% and 28.57% of cases, respectively. Estimated mean risk for hip fracture was of 6.35%, while the mean risk for a major osteoporotic fracture was of 13.75%. Both hip fracture and MOF risk correlated with DAS 28 ($p<0.005$).

**Conclusion:** FRAX score is increased in patients with active RA, even in the absence of BMD determination. Disease duration, high biological inflammatory syndrome and disease activity may be possible risk factors for osteoporotic fractures in RA.

**References:**

1. Bumbea AM et al. Farmacia 2017;65:917.
2. Ferro F et al. Clin Exp Rheumatol 2017;35:721.

## P392
## MUSCULOSKELETAL ULTRASOUND RELIABILITY IN EVALUATING EARLY RHEUMATOID ARTHRITIS

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**Objectives:** Musculoskeletal ultrasound (MUS) is an important tool in assessing the presence of synovitis, tenosynovitis and erosions in inflammatory diseases such as rheumatoid arthritis (RA) [1]. The detection of early RA is important in order to start treatment and limit disease activity, since the treatment of RA has improved considerably with the introduction of biological agents [2, 3]. The aim of our study is to determine the value of MUS in detecting early RA.
**Methods:** The study included 34 patients with mean age of 47.4 y and a female to male ratio of 27:7. The mandatory criteria for inclusion in the study were the presence of inflammatory joint paint in at least 5 joints of the hands, lasting for more than 6 weeks. The patients underwent clinical evaluation, laboratory tests, MUS examinations and plain radiographs of the hands. MUS scans of the metacarpophalangeal, proximal interphalangeal joints and wrists were performed using a MyLab25Gold machine with a multifrequency array probe.
**Results:** Rheumatoid factor was positive in 76.47% of cases. Erythrocyte sedimentation rate and C reactive protein were above normal limits in 47.05% and 52.94% of cases, respectively. Clinical examination of the joints detected tenderness at palpation or swollen joints in 44.11% of patients, while MUS revealed ultrasonographic changes such as synovitis in 82.35%, tenosynovitis in 70.58% and erosions in 44.11% of cases. MUS detected the presence of synovitis in 26.47 of patients who had no swollen joints upon clinical examination and erosions in 11.76% of cases who had no erosions on plain radiographs of the hand. The most affected joints were the second and third MCP and radiocarpal joints.
**Conclusions:** MUS has proven more useful in detecting subclinical synovitis and erosions than clinical examination and plain radiographs which emphasizes on its important role in diagnosing early RA.
**References:**
1. Musetescu AE et al. Rom J Morphol Embryol 2017;58:801.
2. Bumbea AM et al. Farmacia 2017;65:917.
3. Abbasi M et al. J Cell Physiol 2018; doi: 10.1002/jcp.27860.

## P393
## TENOSYNOVITIS IN RHEUMATOID ARTHRITIS: A MARKER OF DISEASE ACTIVITY?

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**Objectives:** Rheumatoid arthritis (RA) is an autoimmune disorder characterized by peripheral symmetric arthritis, mainly involving the small joints of the hand and feet, but also extra-articular manifestations in multiple sites such as the heart or lungs [1,2]. The purpose of this study is to evaluate the presence and clinical significance of tenosynovitis in patients with RA.
**Methods:** The study included 28 patients (21 females, 7 males) with mean age of 53.75 y (±12.35) diagnosed with RA according to ACR/EULAR 2010 criteria, naive to biological treatment. Clinical, biological and musculoskeletal ultrasound (MUS) examinations were performed. Mandatory laboratory tests included erythrocyte sedimentation rate (ESR), C reactive protein (CRP), liver enzymes, creatinine, rheumatoid factor (RF) and anticitrullinated protein antibodies (ACPA). Disease activity was assessed using the disease activity score (DAS) 28. MUS evaluated the presence of joint effusion, synovial proliferation, erosions and power Doppler signal at the metacarpophalangeal and radiocarpal joints. The presence of tenosynovitis was assed at the following sites: the extensor compartment of the wrist and the flexors of the fingers.
**Results:** Seropositivity for RF and ACPA was encountered in 20 patients (71.42%) and 18 patients (64.28%), respectively. ESR was higher than the normal limit (10 mm/h) in 85.71% of cases, with CRP values above normal range (5 mg/L) in 78.57% of patients. DAS 28 calculated with CRP showed low disease activity in 10.71% of patients, moderate disease activity in 35.71% of cases and high disease activity in 53.58% of cases. Tenosynovitis was observed in 17 patients (60.71%) at evaluated sites, synovial proliferation and erosions being present in 26 cases (92.85%). Tenosynovitis was present 10 patients with high disease activity, 5 patients with moderate disease activity and 2 patients with low disease activity, the most frequently involved tendons being the extensor carpi ulnaris, I, II and III flexor digitorum.
**Conclusion:** Tenosynovitis is an important manifestation in patients with RA, being associated with high disease activity. However, more extensive studies have to be conducted for further assessment of our findings.
**References:**
1. Bumbea AM et al. Farmacia 2017;65:917.
2. Musetescu AE et al. Rom J Morphol Embryol 2017;58:801.

## P394
## DICLOFENAC USE IN ACUTE AND CHRONIC PAIN: WHAT ARE THE SOURCES OF CONFLICTUAL POSITIONS OF REGULATORY BODIES, PRESCRIBERS AND PATIENTS?

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**Objectives:** Nonsteroidal anti-inflammatory drugs (NSAIDs) are largely used in rheumatic diseases being the core of drug therapy. They are used both for their structural and for their symptomatic role. The class has some important advantages (low prices, wide availability, a long history and various OTC formulations) that made it highly appreciated by physicians. Various regulatory bodies imposed restrictions in usage of NSAIDs due cardiac and digestive adverse reactions are in place. Despite all warnings, the patients continue to prefer them, and family practitioners tend to follow their patient's request. We intended to identify possible sources of this conflictual positions between regulatory bodies vs. prescribers and patients.

**Methods:** Several scientific experts in internal medicine, rheumatology and gastroenterology fields that cover a jurisdiction of about 20 million European Union inhabitants, debated the present place of diclofenac between the stiffness of international guidelines and the perceptions and behavior of prescribing physicians and the end-user: the patients. The exercise was based on published studies that triggered the debate; however, the clinical experience of attending experts was also discussed.

**Results:** The expert group agreed that diclofenac remains a major NSAID in every rheumatologist's portfolio. On the positive side the group noted a relatively long history of use (longer than for any specific COX2 molecule), a robust prescribing expertise (especially in mature rheumatologists that have used diclofenac in a time when not so many NSAIDs were available). On the negative side the group noted conflictual reports regarding cardiovascular safety, the EMA position statement and the lack of interest from major pharmaceutical sponsors to support safety studies developed under current guidelines. As a result, diclofenac is perceived as a mature molecule that for the time being suffers a certain degree of "public image" deterioration. The expert group agreed that regulatory bodies (like EMA or FDA) played a positive major role in increasing the general awareness about NSAIDs safety and their messages have been properly disseminated. However, the June 2013 EMA statement regarding diclofenac probably induced a negative impact on the level of trust the physicians have in this molecule. However, diclofenac efficacy is considered a major asset that has a superior value in the patient's eye compared with safety issues.

**Conclusions:** The expert group agreed that diclofenac should be actively assessed for safety (systemic and topical formulations) and efficacy (topical formulations) following the major therapeutic guidelines and these studies should have rather a local population cover than an interntional dimesnion. The expert group feels that it is necessary to increase the knowledge and improve a subsequent dissemination of trustful data regarding cardiovascular safety of NSAIDs in general and diclofenac in particular. However the information campaign should be based on local values. The experts considered the importance of a proper understanding of the amplitude of gastrointestinal vs. cardiovascular risks

## P395

## ASSOCIATION OF SERUM CADMIUM ON BONE MINERAL DENSITY IN POSTMENOPAUSAL SAUDI WOMEN WITH AND WITHOUT OSTEOPOROSIS

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**Objective:** Osteoporosis is a chronic disease including genetic, endocrine, exercise and diet-related factors. It is reported to be common among middle-aged Saudi women. Serum trace elements such as cadmium may be associated with BMD. However, their exact involvement in osteoporosis has not yet been fully clarified. Our aim was to investigate the associations of serum cadmium with BMD and other bone and inflammatory markers in postmenopausal Saudi women with and without osteoporosis.

**Methods:** A total of 206 postmenopausal Saudi women ≥50 years old, 109 with osteoporosis and 97 without osteoporosis were recruited from King Salman Hospital and King Fahd Medical City, Riyadh, Saudi Arabia. BMD ($g/cm^2$) of lumbar vertebrae (L2-L4) were measured using DXA (Hologic QDR 2000 Inc., Waltham, MA). Serum 25(OH)D and osteocalcin were determined using electrochemiluminescence (COBAS e411). Serum calcium, albumin, glucose, lipid profile, and inorganic phosphate were measured by a chemical analyzer (Konelab 20). Serum TNFα, IL-6, IGF-1 and IGF-2 were determined using Luminex xMAP technology. Serum cadmium was determined using inductively coupled plasma mass spectrometry. The correlation between various measured parameters was performed using Pearson's test.

**Results:** BMD values were significantly lower in patients with osteoporosis than those without at all measured sites ($p<0.01$). In the osteoporosis group, cadmium was significantly and inversely correlated with T-score of spine ($r=-0.218$, $p=0.05$) while it was positively associated with total cholesterol ($r=0.25$, $p=0.01$). Osteocalcin was also significantly associated with cadmium in all subjects ($r=0.23$, $p=0.01$) as well as with TNFα and IGF-1 in the osteoporosis group ($r=0.5$, $p<0.01$ and $r=0.28$, $p<0.05$ respectively).

**Conclusion:** Our findings demonstrate the negative associations of cadmium on bone metabolism in postmenopausal Saudi women with osteoporosis.

## P396

## UNITY IS STRENGTH: DRUGS AND PHYSIOTHERAPY IN THE TREATMENT OF OSTEOPOROSIS

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**Objective:** Approximately many people (75%) have a condition of skeletal fragility; about 42% of women (between the ages of 70-80) suffers from osteoporosis. It is therefore necessary to implement a series of measures to prevent the evolution of the disease, precisely in relation to the important economic and social consequences that it determines. The physiological evolution of osteoporosis is represented by the fracture, more frequently the vertebral, often unknown, more rarely but disabling the femoral. However, the evolution of the disease always leads to a change in the patient's quality of life, also in relation to pain and physical limitations. Starting from these premises we tried to identify a therapeutic protocol that is not based exclusively on pharmacological treatment to try to reduce the problems related to osteoporosis, also in relation to the obvious side effects that often therapies for the most classic osteoporosis.

**Methods:** Between June 2014 and January 2017, 213 patients were identified with a diagnosis of primary osteoporosis, of whom 120 were recruited for the study. The average age of the sample was 71.8 aa. (min 64 - max 82). All the selected patients did not show up at the time of recruitment under treatment specific for osteoporosis on average over 2 y and did not present any cognitive disturbances of any kind. About 45% made occasional use of calcium with or without vitamin D3 combination. All patients at the time of recruitment (T0) were subjected to densitometry using the DXA method of the lumbar and femoral spine. The patients were then subjected to a physiatric and geriatric evaluation, VAS scale, ADL and IADL and QoL. The mean values of VAS were 3.7 of average, while the values of IADL and ADL reflect a certain autonomy in the management of the daily living. The T-score valued at the DXA was on average 2.3. The presence of amplitude reduction of vertebral bodies was not considered relevant. The patients were subdivided into three homogeneous groups by age, clinical characteristics, densitometry and averages of rating scales. One group was treated with alendronate in mono weekly administration (Group A), the second group with denosumab in 6-monthly administration (Group B) and the third group was treated with denosumab in combination with physical therapy (Group C). Treatment with physical therapy involved 60 min of total body magnetotherapy alternating between 80-100-80 Gauss, TECAR antalgic electrotherapy in the neck and in the loin sacral region, 20 min of gentle gymnastics. The pharmacological treatment was continued uninterruptedly for 12 months, while the physiotherapy treatment involved 10 consecutive sessions to be repeated at 3 months of distance for a total of four cycles. At 12 months, all patients repeated the T0 evaluation. Every 3 months the patients were called by telephone on the general conditions of health.

**Results:** It was observed a greater improvement in patients performing combined denosumab and physiotherapy treatment, but also between patients who make alendronate and denosumab there are some differences. First, we analyzed the pain: in patients who perform combined treatment (Group C), the mean value of VAS has increased to about 1.8 with a reduction of about 50% compared to the starting value. Patients treated with denosumab alone (Group B) show a reduction of about 24%, while patients with alendronate (Group A) are around 13%. Moreover they reduced the use of drugs in patients in group C significantly compared to six months before the start of treatment in progress; also those in group B indicated a reduction of NSAIDs use, while patients in group A did not report substantial changes. Daily activities and quality of life: both parameters improved in patients undergoing treatment. The group that showed the greatest improvement is group C, with a statistically more significant result compared to patients in group A and with significantly percentages than group B, located in an intermediate position between the two groups.

**Conclusion:** Therefore, the rehabilitative treatment is useful for patients suffering from osteoporosis and is able to enhance the action of antiosteoporosis drugs. Not all drugs, however, have the same effect. Likely the indirect action of denosumab on osteoblasts, miming a physiological action is able to modulate the process of bone remodeling. This mechanism could be the basis of pain reduction in patients who use it. If it is supposed that the pain is linked to the microfractures to which the bone trabeculae are subjected to microtrauma, which we could define as paraphysiological, but not supported by the fragile osteoporotic trabecula, the presence of a drug able to facilitate the reconstruction of the trabeculation, without altering the mechanisms of mineralization, it would ultimately facilitate the reconstruction of the bone itself, obviously in nonadvanced stages of pathology. The action of physical therapy, with the double biostimulating effect of magnetotherapy and mobilization, enhanced in this case by the direct antalgic effect of electrotherapy. We certainly cannot draw firm conclusions from this study. The results achieved can however help us to promote a new way of acting towards a patient with osteoporosis, considering that the quality of the bone is also the quality of life.

## P397

## EFFECTS OF TWO YEARS OF TERIPARATIDE TREATMENT FOLLOWED BY TWO YEARS OF BISPHOSPHONATES IN REDUCTION IN FRACTURE RATE AND BACK PAIN AT PATIENTS WITH MULTIPLE PRE-EXISTING VERTEBRAL FRACTURES

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**Objective:** Teriparatide (TPTD) is a therapeutic agent that increases the formation of new bone tissue and provide some

remediation of the architectural defects in the osteoporotic skeleton. It is unclear which treatment should be given after stopping teriparatide therapy for severe osteoporosis. Bisphosphonate therapy can maintain BMD gains after medication cessation. Our aim was to evaluate the effect of prior teriparatide exposure and after that the bisphosphonate response and to compare BMD effects of follow-up treatments.
**Methods:** Ten osteoporotic naïve-patients (7 postmenopausal women and 3 men) are treated with TPTD 20 μg/d for 24 months, followed by risedronate 75 mg/mo for other 24 months. All patients received calcium and vitamin D supplementation. Changes in BMD from baseline to 24 mo, 48 mo were analyzed. Fasting serum was collected for baseline PTH. 25 hydroxyvitamin D, and baseline and treatment 24, 48 mo, PINP, CTX. bone ALP, osteocalcin, serum calcium.
**Results**: Daily teriparatide treatment for 2 y significantly increased spine BMD by 16.6%, total hip and femoral neck, 7.5% and 11,9% respectively. Under the risedronate the year 2 have had an increase of BMD at the lumbar by 6.7%. and 4.0% at the total hip and -1.6% at femoral neck. Markers of bone formation (PINP, bone ALP, osteocalcin) increased early during TPTD therapy. Under the risedronate markers in bone resorption (CTX) decreased.
**Conclusions:** BMD increases progressively over 2 y of TPTD therapy in patients with severe osteoporosis. After discontinuation of teriparatide, risedronate 75 mg increases spine and total hip BMD . This confirms the need an antiresorptive treatment to prevent bone loss after TPTD.

## P398
## USING TERIPARATIDE IN PROMOTING POSTOPERATIVE HEALING OF COMMINUTED FEMORAL SHAFT FRACTURES

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**Objectives:** To study the effect of using teriparatide injection for 3 months after surgical fixation of comminuted femoral shaft fractures in trauma, healthy, nonosteoporotic adult patients.
**Methods:** King Faisal Medical Complex in Taif is a referral central hospital accepting road traffic accidents occurring in Taif city and 8 other rural communities around. During the period of 45 months (from September 2014 to June 2018), we conducted a case series study for selected RTAs victims admitted in our hospital. We included young nonosteoporotic adult patients with comminuted femoral shaft fractures. We excluded patients with associated head injuries and patients with previously hormonal disturbances. All patients underwent surgery with either bridging plate or interlocking intramedullary nail with or without bone substitute. As a result of the comminuted nature of the fractures; none of these fixations were compressing the fracture edges. This situation calls for the use of Teriparatide injection in the first 3 months of the healing period, to catalyze the healing process. Patients were consented about using Teriparatide. Calcium and vitamin D supplements were given. Monthly follow-up with check x-rays were done to all our patients till complete healing.
**Results:** 37 patients were included in our study; all patients completed the 3 months period of teriparatide injection. 23 patients (62.16%) reached complete healing by the end of the first 3 months, 9 patients (24.32%) reached complete healing in the second 3 months, while 5 patients (13.51%) experienced nonunion which needed revision surgery after 6-12 months of the primary surgery.
**Conclusion:** In our series it was evident, clinically and radiologically, that teriparatide promotes callus formation and callus volume, thus promoting fracture healing. We are convinced through our experience that teriparatide should be indicated for promoting fracture healing especially for comminuted fractures regardless the presence of osteoporosis. Many case-series studies in the literature agree with our findings. However, more studies are needed to gain required evidence level to consider teriparatide injection in treating comminuted fractures in nonosteoporotic adults.

## P399
## EVALUATION OF SEASONAL VARIATION EFFECT ON HIGH SCHOOL STUDENTS' PHYSICAL ACTIVITY AND ENERGY EXPENDITURE

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**Objective:** We wanted to evaluate the season's variation effect on physical activity and energy expenditure in high school students.
**Method:** A total of 300 female and male students from 2 different general high schools in a rural area in northern Greece participated in the study. Consent was obtained from a student's guardian. According to the study's design, the International Physical Activity questionnaire (IPAQ) was administered once in the winter time (December) and once in spring (April) to every participant who filled it voluntarily and anonymously. The IPAQ is a self-administered instrument of daily physical activity measurement for a total period of 7 d. The daily physical activity includes all household work, walking, sitting, traveling, activity in school and sports and it is distinguished in 3 different levels: high, moderate and low. [1, 2] A total score of physical activity is calculated which also represents the weekly energy expenditure in metabolic equivalents (METs). One MET is defined as the amount of oxygen consumed while sitting at rest and is equal to 3.5 ml $O_2$ per kg body weight x min. [3] For the statistical analysis of the obtained data we used the IBM SPSS software and the

Bonferroni and Sidak multiple comparisons tests and the statistical importance was set at p<0.05. [4,5]

**Results:** 206 students (125 females) completed the IPAQ twice while 75 students (32 males) completed it only once in December. 19 students did not complete it at all. The mean age of the participants (n=206) was 16.74±0.8 y. In Table 1 below are the results regarding the level of the physical activity in the winter and spring with p<0.037.

Table 1.

| Level of physical activity | Cohortn=206) | | Female students (n=125) | | Male students (n=81) | |
|---|---|---|---|---|---|---|
| | Winter | Spring | Winter | Spring | Winter | Spring |
| High | 143 (69%) | 159 (77%) | 81 (65%) | 90 (72%) | 62 (77%) | 69 (85%) |
| Moderate | 36 (18%) | 31 (15%) | 23 (18%) | 21 (17%) | 13 (16%) | 10 (12%) |
| Low | 27 (13%) | 16 (8%) | 21 (17%) | 14 (11%) | 6 (7%) | 2 (3%) |

In Table 2 are the results regarding the seasonal variation effect on energy expenditure expressed in METs of the 3 high school grades with p<0.0267.

Table 2.

| Seasonal variation | Female students' METs total score in min/7 days | Male students' METs total score | 1st grade students' METs total score | 2nd grade students' METs total score | 3rd grade students' METs total score |
|---|---|---|---|---|---|
| Winter | 5346 | 7437 | 7726 | 6241 | 4343 |
| Spring | 5941 | 7450 | 6822 | 6314 | 6740 |

**Conclusions:** According to our data, the seasonal variation does not have an effect on physical activity and energy expenditure in high school students. The students' physical activity and energy expenditure were influenced though by the grade they were at as the first one scored the highest values.

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## P400

## EFFECT OF 3D PRINTING-ASSISTED MIPPO IN THE TREATMENT OF CLAVICLE FRACTURE

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**Objective:** To investigate the effect of 3D printing-assisted minimally invasive percutaneous plate osteosynthesis (MIPPO) in the treatment of clavicular fracture.

**Methods:** 28 cases of clavicular fractures were randomly divided into two groups: 3D printing-assisted MIPPO group and MIPPO group, fourteen cases in each group. In the 3D printing-assisted MIPPO group, CT scan the healthy clavicle side before the operation to provide inverted image in the software in order to build the 3D printed physical model which is helpful in selecting the steel plate of appropriate length, whose local angle can also be adjusted and preset, whereas the MIPPO group only made a surgical plan based on imaging data. The incision length, bone fracture healing time, operation time, bleeding volume, fluoroscopy times, incidence of complications, Constant score, DASH score and Neer score were compared between two groups.

**Results:** Between 3D printing-assisted MIPPO group and MIPPO group, there was no significant difference in aspects of incision length [(7.71±1.32) cm VS. (8.04±1.41) cm], bone healing time [(2.9±0.2) months VS. (3.0±0.3) months], Constant scores (97.21±1.26) *vs.* (94.35±2.31), DASH scores (2.71±0.16) *vs.* (2.93±0.32) and Neer scores (93.5±3.1) *vs.* (91.2±2.7). There were significant differences in aspects of bleeding volume [(45.3±4.2) mL *vs.* (72.4±1.9) mL], operation time [(40.2±6.3) min *vs.* (53.2±4.1) min], fluoroscopy times (3.4±1.2) *vs.* (6.2 ±1.9), rate of superficial infection around the incision (0% vs.7.146%) and incidence of internal implants protrusion (7.14% VS. 28.6%), $P< 0.05$.

**Conclusion:** 3D printing-assisted MIPPO has great significance in the treatment of clavicular fracture. It is helpful the doctor to select the appropriate length of anatomic plate before operation and to pre-bend and adjust it. It is also helpful the surgeon to clearly know the expected operation reduction and understand the expected effect. So as to shorten the operation time, reduce the amount of bleeding and reduce the number of fluoroscopy. It is worthy of clinical application.

## P401

## AN ERRA MODULATOR DERIVED FROM AN HERBAL MEDICINE INHIBITS OSTEOCLAST DIFFERENTIATION

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**Objective:** To determine andrographolide, a diterpene lactone extracted from *Acanthaceae paniculata* herb, inhibits osteoclast differentiation as an inverse agonist of estrogen-related receptor α (ERRα).

**Methods:** Autodock Vina was employed to study the possible binding mode of andrographolide to ERRα. Co-

immunoprecipitations of ERRα and PGC-1β was performed from cells extracts to study how andrographolide modulate such interaction. Luciferase reporter assay, real-time PCR and Western blot were used to analyze how andrographolide affect the expression levels of ERRα target genes. Bone marrow monocytes from male mice were isolated and then infected with ERRα-expressing lentivirus and treated by different doses of andrographolide to assess osteoclast differentiation *ex vivo*.

**Results:** Andrographolide dose dependently suppressed the activity of a reporter luciferase that reflects the extent of interaction between co-activator PGC-1β and the ligand binding domain of ERRα. Additionally, andrographolide disrupts the interaction between PGC-1β and ERRα by a co-immunoprecipitation assay. ERRα coordinated with PGC-1β to facilitate osteoclast differentiation which was enhanced by lentivirus-mediated ERRα overexpression and repressed by andrographolide treatment in a dose dependent manner.

**Conclusion:** Acting as an ERRα inverse agonist, andrographolide can effectively reduce osteoclast differentiation through disrupting the interaction between ERRα and coactivator PGC-1β; thereby, modulating the transcriptional regulation of ERRα in osteoclast.

## P402

## PRIMARY HYPERPARATHYROIDISM IN IRAQI PATIENTS WITH DISTAL FOREARM FRACTURES

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**Objective:** Primary hyperparathyroidism is a generalized disorder of calcium, phosphate, and bone metabolism due to an increased secretion of PTH. The elevation of circulating hormone usually leads to hypercalcemia and hypophosphatemia. Since PTH removes calcium from bones, all patients with a parathyroid problem will eventually develop thin bones. Bones with osteoporosis due to parathyroid problems can ache and hurt because the PTH is actively destroying the bone. We showed few cases of undiagnosed hyperparathyroidism in patients who presented with a distal forearm fracture. This study aims to discover the undiagnosed primary hyperparathyroidism in patients with distal forearm fracture and assessment of the prevalence of radiological changes associated with it. Also, it aims to assess serum calcium (Ca), phosphate (Po4), vitamin D and BMD in those patients with a distal forearm fracture.

**Methods:** This is a prospective cross-sectional study conducted in Orthopedic Outpatient Unit in Al Fayhaa General Hospital, Basra, Iraq, and Al-Bari Medical center, Baghdad, from April 2017 till July 2018. Participants consent was taken for inclusion in the study. 40 patients were involved in this study. Those patients were men >55 y and women >50 y of age who presented with a distal forearm fracture. The fracture was diagnosed by using plain x-ray which was analyzed by an orthopedic surgeon. Blood samples were collected for measurement of serum level of PTH, total calcium, phosphate, vitamin D, and alkaline phosphatase (ALP). BMD was measured by lumbar DXA scan using Stratos densitometry and analyzed according to Turkish ethnicity.

**Results:** Most of the patients included in the current study were women (82.5%). The mean age for all patients was 56.98±9.5 y. All patients had normal hands X-ray except one who had a subperiosteal reaction in the phalangeal bones. This patient also had high PTH (≥3-fold), and high ALP (≥2-fold) but normal S.Ca and S.Po4. There was no significant association between the level of PTH and history of previous fractures, vitamin D level, S. Po4, and bone status. Most of our patients were had normal S.Ca and ALP even in presence of very high PTH (≥3-fold) (p value=0.037, 0.00 respectively). That means there is subclinical hyperparathyroidism.

**Conclusions:** There are few undiagnosed cases of primary hyperparathyroidism (PHPT) which can be presented as distal forearm fracture. There was no significant association between the level of PTH and history of previous fractures, vitamin D level, S. Po4, and bone status. The biochemical changes are not common to occur in patients with PHPT.

## P403

## CHANGES IN THE PERIPHERAL BLOOD GENE EXPRESSION ASSOCIATED WITH GLUCOSE METABOLISM AND JOINT DESTRUCTION DURING TYPE II DIABETES DEVELOPMENT IN OSTEOARTHRITIC PATIENTS

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**Objective:** Osteoarthritis (OA) involves degenerative changes in articular cartilage, remodeling of the subchondral bone and limited synovial inflammation. OA shares similarities with type 2 diabetes (T2D) including chronicity, high prevalence to end-organ failure, and strong association with age and obesity. Moreover, an adverse effect of T2D on OA development, severity, and therapeutic outcomes was observed. However, the molecular mechanisms of T2D and OA association are not completely clear. Here we hypothesized that T2D development in OA patients might involve changes in gene expression related to glucose metabolism and energy generation. Our aim was to investigate the peripheral blood gene expression associated with T2D development in OA patients during longitudinal follow-up.

**Methods:** Peripheral blood of 5 OA women was obtained annually in the course of 4-6-y follow-up, which included

the year of T2D onset. Annual clinical testing comprised physical examination, radiographic and WOMAC scoring, and ultrasonography. Peripheral blood of 27 healthy volunteers was used as a control. Protein levels were quantified by ELISA. Expression of the genes related to glucose metabolism, extracellular matrix destruction, and general metabolic regulation was performed with quantitative real-time RT-PCR.
**Results:** Gene expression analyses in five examined OA patients revealed similar changes during T2D development. Specifically, the onset of T2D and further progression of the comorbidity was associated with upregulation of genes related to ATP generation in glycolysis and tricarboxylic acid cycle as well as increased expression of the genes encoding pentose phosphate cycle enzymes (G6PD and TKT) and matrix metalloproteinases (MMP-9 and MMP-8). Augmented expression of AMPKα and mTOR was also noted. In contrast, expression of HIF1α and hexosamine pathway related genes (GFAT and OGT) decreased at T2D onset.
**Conclusions:** T2D onset in OA patients might be associated with augmented ATP requirements, increased redirection of glucose into pentose phosphate cycle, and greater extracellular matrix degradation. This might be caused by disturbances in protein glycosylation due to hexosamine pathway attenuation.

## P404
## COMBINED ALFACALCIDOL AND ALENDRONATE THERAPY IS SUPERIOR TO THE RESPECTIVE MONOTHERAPIES IN ESTABLISHED POSTMENOPAUSAL OR MALE OSTEOPOROSIS

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**Objective:** To compare the efficacy and safety of a treatment with alfacalcidol and alendronate combined to the treatment with either alfacalcidol or alendronate alone in patients with established postmenopausal or male osteoporosis.
**Methods:** 90 patients were included as matched pairs to receive randomly either 1 μg alfacalcidol + 500 mg calcium daily (group A, n=30) or 70 mg Alendronate weekly + 1000 mg calcium + 1000 IU vitamin D daily (group B, n=30) or 1 μg alfacalcidol daily + 70 mg alendronate weekly + 500 mg calcium daily (group C n=30). The three groups were well matched in terms of sex, mean age, height, weight, baseline mean BMD at lumbar spine and femoral neck, the prevalence rates of falls, vertebral and nonvertebral fractures. BMD was measured at the lumbar spine and at the femoral neck with DXA (Lunar) at the beginning and after 12 and 24 months.
**Results:** During the 2-y study we observed significant increases of BMD at the lumbar spine of 3.0% in group A compared to baseline, of 5.4% in group B and of 9.6% in group C respectively. The differences between the combination therapy and alfacalcidol (6.6%) and alendronate (4.2%) were highly significant with P<0.001. We also observed significant increases of the BMD at the femoral neck of 1.5% in group A, of 2.4% in group B and of 3.8% in group C respectively. The differences between the combination therapy and alfacalcidol (2.3%) and alendronate (1.4%) were again significant. The 2-y number of patients with vertebral fractures were 5 in group A, 4 in group B and 1 in group C. The 2-y incidences of nonvertebral fractures were 4 in group A, 6 in group B and 1in group C, i.e., the fracture data support the view of a relevant superiority of alfacalcidol and alendronate combined vs. either alfacalcidol or alendronate alone. At month 24 (80%) of the patients in the combination therapy group were free from back pain, compared to 43.3% in the alfacalcidol group and 30.0% in the alendronate group.
**Conclusion:** The combination therapy of alfacalcidol and alendronate exhibited superiority over either alfacalcidol or alendronate alone. In addition the overall safety profiles of the three treatment regimens were found to be similar in this study.

## P405
## PRIMARY HYPERPARATHYROIDISM SURGERY: OUR EXPERIENCE

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**Objective:** We analyzed the surgical experience of the primary hyperparathyroidism (PHPT) in a University Hospital of Madrid. Extended results.
**Methods:** A retrospective study was conducted on 60 patients operated of PHPT from January 2005 to January 2017. We collected epidemiological and clinical data, biochemical parameters, the surgical characteristics included the measurement of intraoperative PTH (ioPTH) and osteoporosis data (fracture risk factors, densitometric data and drugs).
**Results:** 60 operated patients aged 55.5±15.3 y (85% female) were studied. The main surgical criterium was the hypercalcemia, but 15% of the patients had normocalcemic hyperparathyroidism. Patients who achieved healing after surgery were significantly younger. Patients with normocalcemic hyperparathyroidism had lower PTH in all measurements, higher levels of vitamin D and creatinine. We compared the clinical characteristics in patients with osteoporosis with respect to those who did not have it. Patients with OP received significantly more vitamin D supplements. They had more peripheral fractures (no significant results for vertebral and hip fractures). In addition, we found significant results in terms of the age of the patients. It was higher in those with osteoporosis (63±11.6 y vs. 49±15.6; p<0.000). The preoperative calciuria was lower in patients with OP (220.4 mg/24h±107.6 vs. 446.7 ±214.7; p<0.000) and ioPTH at 15 min was significantly higher in patients with smaller bone masses (82.9 pg/mL ±58.0 vs. 45.3±39.0 p<0.013). Patients with PTH had a worse densitometric value in the lumbar spine before surgery (BMD in femoral neck preoperative -1.7±0, 9 vs. BMD in lumbar spine -2.5±1.1). There was improvement in both the femoral

neck (BMD -2. 1±1.1) and the lumbar spine (-2.1±1.1) after surgery although it was not significant.

**Conclusions:** PHPT occurs in clinical practice with an increasingly broad spectrum. As it is demonstrated in the literature, the densitometric results after the PHPT surgery of our series, improve and especially at lumbar spine. The measurement of ioPTH is a useful tool in the surgical treatment and it provides a prognostic value in the follow-up of these patients.

## P406

## THE EFFECT OF A HOLISTIC THERAPEUTIC EXERCISE PROGRAM IN PATIENTS WITH SYMPTOMATIC HIP DYSPLASIA

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**Objectives:** To investigate the effect of a holistic therapeutic exercise program in different parameters (e.g., strength, balance, flexibility and functionality) in a patient with symptomatic hip dysplasia. In our knowledge, this study constitutes the first quantitative examination of the above-mentioned parameters on a patient with hip dysplasia at preoperative stage.

**Methods:** Five patients (females, mean age 62.8 years old) who performed 8 weeks (24 sessions) of a holistic therapeutic exercise program. Knee flexion and extension peak torque of the pathological limb was assessed by isokinetic dynamometry in two angular velocities (60°/s and 120°/s). Balance was evaluated in single leg stance with open and closed eyes (pathological limb). Flexibility was measured by sit and reach test. Furthermore, functionality was examined with the usage of three functional tests (6-min walk test, 30-s chair-test, time up and go). The functional tests were carried out in three subsequent examinations: initial, intermediate (end of program) and final examination (8 weeks after the end of program) to detect the adjustments over time.

**Results:** The evaluated parameters showed improvement in all patients, during the intermediate and final assessment in addition to initial assessment.

Isokinetic Dynamometry

| Angular Velocity | Knee Extension (Peak Torque) Initial (N.m) | Final (N.m) | Variation (%) | Knee Flexion (Peak Torque) Initial (N.m) | Final (N.m) | Variation (%) |
|---|---|---|---|---|---|---|
| 60°/s | 63.4 | 86.9 | 37 | 32.4 | 42.8 | 32 |
| 120°/s | 50.9 | 66.1 | 29.8 | 28.7 | 27.6 | -3.8 |

Balance

| Single Leg Stance | Initial | Final |
|---|---|---|
| Open eyes | 5 s | 56 s |
| Closed eyes | 2 s | 8 s |

Flexibility and Functional Tests

| Test | Initial | Intermediate | Final |
|---|---|---|---|
| Sit and Reach | 16 cm | 19 cm | 19 cm |
| 30-s Chair test | 8 reps | 17 reps | 17 reps |
| Time up and Go | 6.6 s | 5 s | 5.3 s |
| 6-min Walk test | 378 m | 444 m | 435 m |

**Conclusion:** The holistic program that was designed and implemented was effective in all patients with hip dysplasia, in improving all the "functional" parameters as indicated by the results of this study.

## P407

## ABSOLUTE RISK OF OSTEOPOROTIC FRACTURES (FRAX®) AND WELFARE INDICATORS IN URBAN POPULATION OF THE RUSSIAN FEDERATION

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**Objective:** To estimate associations of absolute risk (AR) of major osteoporotic fractures (MF) and hip fractures (HF) with certain basic economic features of cities and parameters of healthcare availability to the citizens.

**Methods:** A representative sample was formed from the population of 8 Russian cities: Vologda, Ivanovo, Volgograd, Tyumen, Kemerovo, Krasnoyarsk, Vladivostok, Vladikavkaz. In total 9143 Russian residents aged 40-69 y participated in the study (6324 women, 2819 men). AR of fractures was calculated on the basis of the Russian model FRAX without BMD using the batch data processing. The associations between the AR of fractures and the following indicators: total regional product (TRP) per capita, mean individual income (MII) and mandatory state health insurance (MHI) were studied. The official data of the Russian state statistical agency Rosstat and the regional funding of MHI programs for 2013 were used.

**Results:** Mean AR of MF and HF in the sample were 7.8% and 0.7% respectively. The highest AR of MF and HF was observed in Vologda and Vladivostok, and the lowest rates were noted in Tyumen and Krasnoyarsk. The significant difference in AR of MF was detected between these cities, however no clear north-to-south gradient was observed. According to the official data of Rosstat, Tyumen and Krasnoyarsk had more favorable economic conditions. The correlation coefficients between welfare indicators and mean AR of fractures in each city were quite high, but cannot be deemed statistically significant due to the insufficient number of cities included in the study: for MF with TRP r=-

0.48 (p=0.19) and MII r=-0.49 (p=0.18); for HF with TRP r=-0.44 (p=0.24) and MII r=-0.46 (p=0.21). However, the low negative correlation coefficients between the economic parameters of the cities, including MHI, the individual AR of MF (p=0.0001) and the individual AR of HF (p=0.0001) were determined to be statistically significant.

**Conclusion:** The AR of fractures negatively correlated with the economic parameters of the healthcare availability and the population's welfare. Consequently, this might be indicative of the fact that the economic conditions of each particular region, along with climate and geography, might play a significant role in the risk of fractures.

## P408

## POLYPHARMACY AND OTHER GERIATRIC SYNDROMES

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**Objective:** Polypharmacy is also defined as the use of multiple medications and generally ranges from 5-10 medications. When older people compared with younger individuals, they tend to have more chronic diseases and more prescriptions for these conditions. We aimed to assess the relationship between polypharmacy and frailty, malnutrition, functionality, urinary incontinence and falls.

**Methods:** 1107 individuals ≥60 y of age admitted to Istanbul Medical School Geriatrics outpatient clinic for the first time the period between 2013-2016 were enrolled to study. We used The International Association of Nutrition and Aging's FRAIL scale. Polypharmacy was defined as the use of five and more medications. Patients were asked about their falls, urinary incontinence, activities of daily living (ADL), instrumental activities of daily living (IADL),and assessed about their nutritional status by Mini Nutritional Assessment (MNA).

**Results:** 1107 patients were analyzed with a comprehensive geriatric assessment. The sample was composed of women (66.8%) and men (33.2%) with mean age of 78.5±5.7 y. Prevalance of polypharmacy was 16% (n=179). Univariate and multivariate regression analysis were performed to investigate the association between polypharmacy and other factors. In multivariate analysis polypharmacy was found independently assosiated with urinary incontinence (p=0.022) and malnutrition (p=0.028).

**Conclusions:** Polypharmacy is a common problem among older adults; which is an independent risk factor for inappropriate medication use and adverse events. In our study malnutrition and urinary incontinence were found independently associated with polypharmacy. Clinicians should be aware of polypharmacy and prevent patients from poor outcomes associated with this condition.

## P409

## SUBGROUP ANALYSIS OF THE EFFECT OF DENOSUMAB (DMAB) COMPARED WITH RISEDRONATE (RIS) ON PERCENTAGE CHANGE IN LUMBAR SPINE BONE MINERAL DENSITY AT 24 MONTHS IN GLUCOCORTICOID-TREATED INDIVIDUALS

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**Objectives:** Analyse the effects of DMAb and RIS on lumbar spine (LS) BMD in subgroups of glucocorticoid (GC)-treated individuals at 24 months (mos).

**Methods:** This phase 3, randomized, double-blind, double-dummy study enrolled patients age ≥18 y receiving ≥7.5 mg prednisone or equivalent daily for <3 mos (GC-initiating [GC-I]) or ≥3 mos (GC-continuing [GC-C]) before screening (Saag *ACR* 2016; Saag *ECTS* 2018). Subjects were randomized 1:1 to DMAb 60 mg SC every 6 mos or RIS 5 mg PO daily for 24 mos. All subjects were to receive daily calcium (≥1000 mg) and vitamin D (≥800 IU). The treatment difference (DMAb – RIS) for percentage change from baseline LS BMD at 24 mos was estimated in the GC-I and GC-C subpopulations, overall and in 7 prespecified subgroups.

**Results:** The study enrolled 795 subjects (290 GC-I, 505 GC-C; baseline characteristics balanced between treatment groups within each subpopulation). DMAb was superior to RIS for gains in LS BMD at 24 mos in both the GC-I and GC-C subpopulations. Within each subgroup (Table), DMAb was consistently associated with greater gains in LS BMD at 24 mos *vs.* RIS. Significant quantitative interactions were observed only in the sex and race subgroups in the GC-I subpopulation; qualitative tests indicated the direction of the DMAb effect did not differ significantly by sex or race in this subpopulation.

Table. Treatment Difference (DMAb – RIS) in Lumbar Spine BMD Percentage Change From Baseline at Month 24

| | Glucocorticoid-initiating Subpopulation (N = 133 RIS / 128 DMAb) | | | | Glucocorticoid-continuing Subpopulation (N = 230 RIS / 228 DMAb) | | | |
|---|---|---|---|---|---|---|---|---|
| | DMAb (n) | RIS (n) | Least Square Mean Estimate of Difference (95% CI) | Interaction P value Quantitative (Qualitative) | DMAb (n) | RIS (n) | Least Square Mean Estimate of Difference (95% CI) | Interaction P value Quantitative |
| **Overall subpopulation** | 107 | 113 | 4.5 (3.2, 5.8)* | – | 183 | 174 | 3.2 (2.0, 4.3)* | – |
| **Sex** | | | | | | | | |
| Female | 69 | 72 | 5.7 (4.0, 7.5)* | 0.013 | 141 | 131 | 3.7 (2.4, 5.0)* | 0.13 |
| Male | 38 | 41 | 2.1 (0.1, 4.1)* | (0.50[a]) | 42 | 43 | 1.4 (-1.1, 4.0) | |
| **Race** | | | | | | | | |
| Caucasian | 92 | 97 | 3.9 (2.4, 5.3)* | 0.024 | 166 | 158 | 3.3 (2.1, 4.5)* | 0.63 |
| Not Caucasian | 15 | 16 | 7.6 (3.8, 11.4)* | (0.50[a]) | 17 | 16 | 1.9 (-1.6, 5.4) | |
| **Age** | | | | | | | | |
| < 60 years | 28 | 41 | 2.9 (0.1, 5.8)* | 0.089 | 79 | 86 | 2.9 (1.2, 4.6)* | 0.72 |
| ≥ 60 years | 79 | 72 | 5.1 (3.6, 6.6)* | | 104 | 88 | 3.4 (1.9, 5.0)* | |
| **Baseline LS T-score** | | | | | | | | |
| ≤ –2.5 | 17 | 21 | 4.6 (1.0, 8.1)* | 0.066 | 66 | 68 | 3.4 (1.1, 5.6)* | 0.44 |
| > –2.5 | 90 | 92 | 3.9 (2.5, 5.2)* | | 117 | 106 | 2.9 (1.6, 4.2)* | |
| **Baseline LS T-score** | | | | | | | | |
| ≤ –1.0 | 55 | 60 | 5.4 (3.6, 7.3)* | 0.13 | 142 | 141 | 3.2 (1.8, 4.5)* | 0.89 |
| > –1.0 | 52 | 53 | 2.8 (1.0, 4.6)* | | 41 | 33 | 2.9 (1.0, 4.8)* | |
| **Geographic region** | | | | | | | | |
| Europe | 65 | 73 | 4.0 (2.4, 5.6)* | 0.24 | 135 | 122 | 3.2 (1.8, 4.6)* | 0.90 |
| Non-Europe | 42 | 40 | 5.3 (2.9, 7.8)* | | 48 | 52 | 2.6 (0.8, 4.5)* | |
| **Menopausal status** | | | | | | | | |
| Premenopausal | 9 | 3 | 11.4 (1.2, 21.7)* | 0.77 | 20 | 20 | 3.9 (0.2, 7.6)* | 0.98 |
| Postmenopausal | 59 | 67 | 5.7 (3.9, 7.6)* | | 119 | 109 | 3.7 (2.3, 5.1)* | |
| **Baseline GC dose[¶]** | | | | | | | | |
| ≥ 7.5 to < 10 mg | 20 | 28 | 6.3 (2.8, 9.7)* | 0.57 | 61 | 67 | 3.4 (1.6, 5.2)* | 0.88 |
| ≥ 10 mg | 85 | 85 | 4.3 (2.8, 5.8)* | | 121 | 107 | 3.2 (1.7, 4.7)* | |

CI = confidence interval; N = Number of randomized subjects with a baseline measurement and ≥ 1 postbaseline measurement for the lumbar spine BMD; n=number of subjects with observed value. *p<0.001, DMAb vs RIS. *p<0.05, DMAb vs RIS. [a]Qualitative p-values >0.05 support consistent directionality of treatment effect within the subgroups. [¶]In prednisone equivalents.

**Conclusion:** DMAb consistently increased LS BMD more than RIS at 24 mo in GC-I and GC-C patients, with no evidence of directional heterogeneity in treatment effect across 7 prespecified subgroups of GC-treated individuals. DMAb may be a useful addition to the osteoporosis armamentarium in the common clinical setting of GC use.

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## P410

## FRACTURE RISK ASSESSMENT (FRAX) IN PATIENTS WITH RHEUMATOID ARTHRITIS IN THERAPY WITH ANTI-TNFα

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**Objective:** Osteoporosis is an extraarticular complication of rheumatoid arthritis (RA) associated with increased risk of fractures, morbidity, mortality, and healthcare costs. FRAX is online tool for assessing risk of osteoporotic fracture. We verified the fracture risk assessment tool (FRAX) and we compared the probability of osteoporotic fracture in 2 groups of patients with rheumatoid arthritis (RA). One group with anti-TNF therapy and another with DMARDs therapy (leflunomide, methotrexate).

**Methods:** 83 RA patients were enrolled from our rheumatology clinic and predicted 10-y risk of hip fracture and major osteoporotic fracture (MOF) calculated online by FRAX. 52 patients were treated with anti-TNF therapy, and 31 patients with DMARDs therapy. We assessed 10-y fracture risk using country specific FRAX and its relationship with disease activity score, disease duration in RA, age, current smoking and glucocorticoids therapy. Clinical information was obtained from a questionnaire of their case history and medical records. Their lumber spine and femoral BMD were determined by DXA. The gender, age, disease duration, menopause status, BMI and accumulative dose of glucocorticoid were obtained in retrospect.

**Results:** We studied the correlation between the BMD and clinical information. Compared with the patients with normal BMD, the subjects with low BMD had significantly older age, longer period for corticoids usage, higher day dose and accumulated dose of corticoids. Corticotherapy at the dose above 10 mg/d correlated positively with increased risk of fracture in DMARDs therapy group more than in anti-TNF therapy patients who have lower doses of corticosteroids below 10 mg/d (p=0.01). FRAX estimated significantly enhanced fracture risk in active RA (DAS28>2.6), MOF and hip fracture risk correlated with DAS28 and disease duration. Patients with anti-TNF treatment have lower disease activity and, implicitly, lower risk of fracture (p=0.001). The group of patients between 40-50 y had a significantly lower risk of fracture than patients over 50 y (p=0.001). Also smoking as a risk factor has been correlated with increased risk of fracture in both groups.

**Conclusions:** Patients with active rheumatoid arthritis have an increased FRAX score indicating an enhanced 10-y probability of MOF and hip fracture. Long disease duration, high disease activity are potential disease specific risk factors for osteoporotic fractures in rheumatoid arthritis. The risk of fracture was higher across patients with rheumatoid arthritis in treatment with DMARDs than anti-TNF group patients. It is necessary to eliminate all risk factors for the prevention of MOF.

## P411

## BONE MINERAL DENSITY IS MAINTAINED OR INCREASED UPON TRANSITION FROM DENOSUMAB TO ALENDRONATE: EVIDENCE FROM THE DENOSUMAB ADHERENCE PREFERENCE SATISFACTION (DAPS) STUDY

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**Objective:** Limited data are available on patients transitioning from denosumab (DMAb), a reversible antiresorptive agent, to bisphosphonates, which are more gradually reversible. The Denosumab Adherence Preference Satisfaction (DAPS) study (NCT00518531), which reported that subjects were more adherent, persistent, and compliant with subcutaneous DMAb injection compared with oral alendronate (ALN) (Freemantle *Osteoporos Int* 2012), assessed changes in BMD. Here, we further characterize the BMD response in patients during 1 y of DMAb treatment followed by 1 year of ALN.

**Methods:** DAPS was a 24-month, open-label, randomized, cross-over study designed to compare adherence to 12 months of DMAb treatment (60 mg Q6M SC) with ALN (70 mg QW PO) in postmenopausal women with a T-score ≤-2.0 to ≥-4.0 at the lumbar spine (LS), total hip (TH), or femoral neck (FN). BMD was measured by DXA at the LS, TH, and FN at baseline and months 12 and 24. Patients from the DMAb to ALN sequence arm were evaluated. BMD values were summarized using descriptive statistics, and a 3% BMD threshold was selected to represent subjects who lost, maintained, or gained BMD (change ≤-3%, >-3% and <3%, or ≥3%, respectively).

**Results:** A total of 126 subjects were randomized to the DMAb/ALN sequence, and 115 subjects (91%) transitioned to ALN at month 12. At study baseline, subjects had a mean age of 65 y and mean BMD T-scores for the LS, TH, and FN of -2.0, -1.6, and -2.0, respectively. BMD increased after 1 y of DMAb and was maintained after switching to ALN (Table). From baseline to month 12 of DMAb treatment, BMD increased by 5.6%, 3.2% and 3.1% at the LS, TH and FN, respectively. From month 12 to 24 of ALN treatment, 63% (52/82), 82% (75/92), and 61% (56/92) of subjects maintained the BMD gains initially achieved with DMAb at the LS, TH, and FN, respectively, and 21% (17/82), 11% (10/92), and 17% (16/92) showed gains in BMD. A small number of subjects lost BMD [13/82 (16%) at LS, 7/92 (8%) at TH, and 20/92 (22%) at FN]. Treatment with DMAb was well tolerated, and adverse event profiles were similar between groups.

**Table. Changes in bone mineral density during 1 year of denosumab (M0 - 12) followed by 1 year of alendronate (M12 - 24).**

| | Lumbar Spine | Total Hip | Femoral Neck |
|---|---|---|---|
| | N = 93 | N = 109 | N = 109 |
| Change in BMD (%) from M0 to M12, % (SD) | 5.6 (3.8) | 3.2 (3.2) | 3.1 (4.1) |
| | N = 82 | N = 92 | N = 92 |
| Change in BMD (%) from M12 to M24, % (SD) | 0.6 (3.4) | 0.4 (2.4) | -0.1 (3.8) |
| | | | |
| Subjects stratified by BMD change from M12 to M24, n (%)[a] | N = 82 | N = 92 | N = 92 |
| Lost | 13 (15.9) | 7 (7.6) | 20 (21.7) |
| Maintained | 52 (63.4) | 75 (81.5) | 56 (60.9) |
| Gained | 17 (20.7) | 10 (10.9) | 16 (17.4) |
| | | | |

M = month
BMD = bone mineral density
SD = standard deviation
[a] Based on a 3% BMD threshold. A BMD change ≤–3% indicated that subjects lost BMD; >—3% and <3% indicated maintained BMD; and ≥3% indicated a gain in BMD.
N = Number of subjects with measurements at baseline (M0 or M12) and timepoints of interest

**Conclusions:** Transitioning to ALN is effective at preserving the bone mass gained after 1 y of DMAb. Additional studies are needed to determine the BMD effect of longer-term DMAb exposure on the transition to other antiresorptive treatments.

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## P412

## STIMULATION OF OSTEOGENESIS IN SURGICALLY TREATED PERTROCHANTERIC FRACTURES

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**Objective:** The fractures of the proximal part of the femur are more common with an increase in the average length of life. Nonsurgical treatment methods do not offer satisfactory anatomical and functional results. Surgical treatment, dynamic implants is the method of choice in pertrochanteric fixation of fractures. Our aim was to compare the effects of two physical modalities, magnetic therapy vs. treatment with interferential currents in the physical treatment and rehabilitation of patients with surgically determined pertrochanteric femoral fracture with DHS and indicate the reasons for any differences.
**Methods:** The study represents a prospective randomized clinical trial implemented at the Institute for Physical Medicine and Rehabilitation - Skopje. Include two groups with 90 participants with surgical pertochanteric femoral fracture, Kyle types I, II with dynamic fixation implant-DHS (dynamic hip screw). Respondents are divided into two groups: Examined group - 45 patients is treated with kinesitherapy and Magnetic therapy and control group - which has 45 patients treated with kinesitherapy and interferential currents. Respondents were followed for one year, during which were performed three examinations, the first control on the day of discharge, 6 and 12 months, from the first review which is input for selected patients who meet the criteria for inclusion in research.
**Results:** Tested difference between the two groups in terms of sex and age, for p>0.05, indicated no statistically significant difference. After the analysis, patients in the experimental group have 4,125 times more likely, after 12 months have shaped callus compared to control group. Upon physical examination after discharge, 6 and 12 months.
**Conclusions:** In the postoperative rehabilitation of pertrochanteric femoral fractures, Kyle type I, II with fixation dynamic implant-DHS, therapy of choice is magnetic therapy and kinesitherapy, from which improvement in functional status as well as in the stimulation of osteogenesis and quality of life in elderly patients.

## P413
## PHOSPHATURIC MESENCHYMAL TUMOR: A RARE TUMOR LOCALIZATION IN AN ELDERLY PATIENT – A CASE REPORT AND REVIEW

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**Objective:** Phosphaturic mesenchymal tumor (PMT) represents a rare cause of osteomalacia. The clinical signs and symptoms are vague and the diagnosis is commonly delayed for years. In the presence of hypophosphatemia and relatively high urine phosphate excretion this entity should be taken into account in the deferential diagnosis of osteomalacia.
**Methods:** We describe a case of a 81 years old man presented to our clinic for evaluation due to osteopenia. Laboratory tests disclosed hypophosphatemia, relatively increased urine phosphate excretion and increased level of FGF-23. A 68-Gallium DOTANOC PET/CT revealed pathological uptake in the upper aspect of the left shoulder adjacent to the coracoid process.
**Results:** For suspected PMT a wide resection of the tumor was performed and pathological findings were consistent for PMT. Laboratory tests were normalized postoperatively. Reviewing the literature, we had identified 33 reported cases of PMTs among elderly patients age ≥70. Unlike previously reported data, where tumors predominantly localized in the lower extremities and pelvis, our search disclosed high rate of tumor localization (10 cases. 33.3%) in the head with equal number of tumors (14 cases, 42.4%) localized in the head and upper extremity as well as in pelvis and lower extremity.
**Conclusions:** The present case describes an elderly patient with unique phospaturic mesenchymal tumor localization. Unlike previously reported data, our review disclosed a high rate of tumor localization in the head among eldely patients.

## P414
## ROLE OF GENDER IN THE CLINICAL PRESENTATION OF PRIMARY HYPERPARATHYROIDISM; IMPACT OF MENOPAUSE

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**Objective:** Primary hyperparathyroidism (PHPT) is a common endocrinological problem. It is predominant among women with a female to male ratio 3:1. Few studies have focused on the clinical presentation of this common endocrinological entity in regard with the gender of the patients and the effect of menopausal status.
**Methods:** A retrospective study evaluating differences regarding gender, biochemical values and clinical presentation in 164 enrolled patients with PHPT: 36 male (55.7±16.5 y) and 128 female (61.3±13.3 y), of whom 22 were premenopausal (F-pre) and 106 postmenopausal (F-post).
**Results**: Male patients were significantly younger (p=0.0049) and more frequently symptomatic than women (63.8% vs. 46.87%, p=0.044). No gender difference was found in serum PTH, corrected calcium for serum albumin, creatinine and

urinary calcium levels whereas serum phosphate was higher in women. 25OHD levels were significantly higher among male patients. Nephrolithiasis (detected by imaging or positive medical history) was more frequent in men (44.4% vs. 21.29% in women, p=0.021) and osteoporosis (T-score <-2.5 at any site) in women (54.68% vs. 47.22% in men, p=0.003). Symptomatic PHPT was reported in 49.5%, 34.78% and 63.8% of F-post, F-pre and men, respectively, with highest prevalence among male patients. Osteoporosis was more frequent, and nephrolithiasis was less frequent in F-post than in F-pre (62.2% vs. 8.8% and 19.8% vs. 34.78%, respectively). Osteitis fibrosa cystica was more often reported among male patients in comparison with female of any age. After combining symptomatic and asymptomatic patients, no gender difference was observed in the proportion of patients referred for surgery (86% male vs. 82,8% female).

**Conclusion**: Gender does not seem to affect the biochemical activity of PHPT, but clinical presentation of this common endocrinological entity is substantially different among male and female patients, mostly due to menopausal status. On the other hand, both male and female patients met the established surgical criteria for surgical treatment on equal levels.

## P415
## GREATER INCREASES OF CORTICAL AND TRABECULAR VBMD BY 3D MODELING OF HIP DXA IN PATIENTS TREATED WITH DENOSUMAB VS. BISPHOSPHONATES

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Patients taking denosumab have greater increases in DXA aBMD at hip than patients on bisphosphonate[1]. This may reflect denosumab's greater access to the cortical bone compartment with reduction in cortical porosity. 3D-SHAPER software, provides a 3D model of femoral compartments from hip DXA scans, allowing the evaluation of volumetric cortical and trabecular bone[2].

We retrospectively reviewed 239 consecutive patients at an osteoporosis referral center, either treatment-naïve started on denosumab (tnDmab, n=89), bisphosphonate (tnBP, n=44) or switched from bisphosphonates to denosumab (Switch, n=106). Hip aBMD by DXA and hip cortical and trabecular vBMD by 3D-SHAPER (v2.7.3, Galgo Medical SL, Spain) was performed at baseline, 1, 2, 3 and 4 y of therapy.

Patients (218 females, 21 males) had mean age 71.8±10 y; groups had similar baseline hip aBMD (0.677 g/cm$^2$±0.109). tnDmab and Switch hip aBMD increased significantly at one-year (2.64% and 1.64% respectively) with progressive increases to the 4$^{th}$ year (8.79% and 5.96% respectively). tnBP aBMD remained stable at one and two years, with increases of 0.48% in the third year. Trabecular vBMD improved significantly across all groups; there were greater increases in tnDmab (20.4%) and Switch (18.9%) compared with tnBP (9.9%) at the third year (p<0.001 for all). The greatest increases in cortical vBMD were observed in tnDmab (2.25% at 1 year, 5.18% at 4 years). In Switch, cortical vBMD increased 2.85% at 2 years, then remained stable to the 4$^{th}$ year. Cortical vBMD increased more at 1 y in tnDmab vs. tnBP (2.25% v. 0.12%, p=0.01). In all patients, DXA aBMD correlated more with cortical vBMD (r=0.85; p<0.001), than trabecular vBMD (r=79; p<0.001).

3D-SHAPER determination of changes in cortical and trabecular bone compartments may be helpful to differentiate the longer-term efficacy of denosumab vs. bisphosphonate. Denosumab's greater access to cortical bone may account for its greater hip vBMD efficacy compared to bisphosphonate. This may contribute to the progressive decline in nonvertebral fractures in patients treated long-term with denosumab.

**References:**

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## P416
## SARC-F SCORE IS NEGATIVELY ASSOCIATED WITH FUNCTIONAL INDEPENDENCE IN GENERAL REHABILITATION PATIENTS

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**Objectives:** SARC-F is a screening tool for sarcopenia, with the score of above 3 predictive of sarcopenia. Functional independence measure (FIM) is a measure of patients' independence, commonly used in rehabilitation. Association of SARC-F with FIM and quality of life in general rehabilitation patients is currently unknown. We hypothesized that patients with higher SARC-F scores would exhibit higher functional dependence and poorer quality of life on admission to rehabilitation.

**Methods:** A cross-sectional study was conducted in a general rehabilitation unit in a tertiary referral metropolitan hospital, Melbourne, Australia, enrolling cognitively intact patients. The association between admission SARC-F and FIM (adjusted for age and Charlson comorbidity index (CCI)), and SARC-F and quality of life (as measured by EQ visual analogue scale (EQ VAS), adjusted for age, CCI and gender) was investigated using quantile regression with bootstrapped standard error estimation.

**Results:** 208 patients were recruited: median age 64.5 (IQR 54.5-73), 110 (53%) male, median CCI 2 (IQR 0-3). Diagnostic streams: 34 (16%) amputee, 67 (32%) musculoskeletal, 39 (19%) neurological, 47 (23%) deconditioning/other, 21 (10%) spinal. SARC-F median was 7 (IQR 5-8). FIM score median was 87 (IQR 75.5-99). Adjusted for age and Charlson score, 1 extra point on SARC-F was associated with a lower FIM score: 3.7 (95%CI 2.19-5.2) for the median patient, 3.7 (95%CI 1.48-

5.86) for the 25th percentile, and 3.13 (95%CI 1.72-4.54) for the 75th percentile (all p<0.001). Adjusted for age, Charlson score and gender, 1 extra point on SARC-F score was associated with a lower EQ VAS: 0.37 (95%CI 0.14-0.59, p=0.002) for the median patient, 0.35 (95%CI 0.16-0.53, p<0.0001) for the 25th percentile, and 0.24 (95%CI 0-0.48, p=0.05) for the 75th percentile.

**Conclusions:** Higher SARC-F scores on admission to rehabilitation were associated with higher functional dependence and lower quality of life.

## P417

## EVALUATION OF THE CAUSAL ASSOCIATION BETWEEN BLOOD METABOLITES AND RHEUMATOID ARTHRITIS: A MENDELIAN RANDOMIZATION STUDY

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**Objective:** Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by uncontrolled joint inflammation and destruction of bone and cartilage. Metabolomics is a nontargeted analysis of global changes of the complete set of metabolites in organisms, and many metabolites have been reported to be associated with RA using this method. The aim of this study is to explore the causal associations between blood metabolites and RA.

**Methods:** We used available summary-level genome-wide association studies (GWAS) data for blood metabolites from large samples (sample sizes of up to 24,925) which including amino acids, lipids, carbohydrates, et al. And then selected near-independent GWAS SNPs for each blood metabolites at a suggestive threshold ($P<1x10^{-5}$) using the clumping algorithm in PLINK ($r^2$ threshold=0.05 and window size=1 Mb) with the 1000G-imputed ARIC data as the reference for linkage disequilibrium estimation. Only the metabolites with more than 10 independent SNPs were used in this study to ensure the strong power. The summary-level GWAS data for RA was computed from meta-analysis in a total of 103,638 subjects. We then performed a multi-SNP Mendelian randomization analysis using summary-level data from GWAS to test the causal associations of blood metabolites with RA via GSMR.

**Results:** We analyzed a total of 989 blood metabolites and 913 of them had more than 10 independent SNPs after clumping. We identified 50 blood metabolites had risk effects on RA and 36 blood metabolites had protective effects on RA with a suggestive *P* value (P<0.05). After multiple testing corrections, two glycerophospholipids still showed risk effects on RA, lysophosphatidylcholine acyl C20:4 (odds ratio, OR=1.33, $P=1.74x10^{-5}$), phosphatidylcholine diacyl C38:4 (OR=1.38, $P=1.99x10^{-5}$), and one kind of amino acid still showed protective effect on RA, glycine (OR=0.67, $P=2.37x10^{-5}$).

**Conclusions:** We investigated the causal effect of global blood metabolites on RA using summary data-based Mendelian randomization analyses. Our results suggest the risk/protective effects of three candidate blood metabolites for association with RA.

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## P418

## EVALUATION OF THE CAUSAL ASSOCIATION BETWEEN BLOOD METABOLITES AND MULTIPLE OSTEOPOROSIS ASSOCIATED PHENOTYPES: A MENDELIAN RANDOMIZATION STUDY

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**Objective:** Osteoporosis is a common metabolic bone disease characterized by decreased bone mass and increased tendency of fragility fractures. In this study, we explored the causal associations between blood metabolites and all the osteoporosis associated phenotypes via Mendelian randomization (MR).

**Methods:** Four available summary-level genome-wide association studies (GWAS) data for blood metabolites with near 1000 blood metabolites were used as exposures. Risk factors including amino acids, lipids, carbohydrates, nucleotides, peptides, et al. We then applied the clumping algorithm in PLINK to select near-independent GWAS SNPs for each blood metabolites ($r^2$ threshold=0.05, window size=1 Mb and $P=5x10^{-8}$). Eight osteoporosis associated phenotypes are femoral neck BMD (FNBMD), lumbar spine BMD (LSBMD), forearm BMD (FABMD), and osteoporosis with large samples. We then applied the GSMR method to test for causal associations between blood metabolites and four osteoporosis associated phenotypes.

**Results:** We analyzed 989 blood metabolites. And identified a total of 63 blood metabolites had increasing effects on more than one osteoporosis associated phenotypes and 114 blood metabolites had decreasing effects on osteoporosis associated phenotypes with a suggestive *P* value (*P*<0.05). However, there are no significant casual association between blood metabolites and osteoporosis associated phenotypes after multiple testing corrections ($P<6.32x10^{-6}$). The most significant increasing effect is androsterone sulfate on FNBMD (beta=0.109, se=0.027, $P=5.92x10^{-5}$) and the most decreasing effect

is the ratio of bisLallylic bonds to double bonds in lipids on FABMD (beta=-0.089, se=0.021, $P$=3.31x10$^{-5}$).
**Conclusions:** We investigated the causal effect of global blood metabolites on available osteoporosis associated phenotypes using summary data-based Mendelian randomization analyses. Our results suggest the modest increasing/ decreasing effects of blood metabolites for association with osteoporosis associated phenotypes.
**Acknowledgements:** The study was supported by grant from National Science Foundation of China (81573241).

## P419
## SECONDARY BONE SIZE DEFICIT IN PATIENTS WITH EHLERS-DANLOS SYNDROME

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**Objective:** Ehlers-Danlos Syndrome (EDS) is a group of connective tissue disorders caused by defects in the biosynthesis or secretion of fibrillar collagens, which might impair bone strength in EDS patients. We compared volumetric BMD (vBMD), areal BMD (aBMD), bone geometry, muscle size and body composition between patients with EDS hypermobility Type (EDS-HT) and controls.
**Methods:** Cross-sectional data comprised 43 EDS-HT females (age 41.0±10.8 y) and 43 age-matched females, 8 y later 30 EDS-HT and 17 control subjects were re-evaluated. Tibial vBMD, bone geometry and lower leg muscle cross-sectional area (CSA) were measured using pQCT. DXA determined body composition and aBMD.
**Results:** Although EDS-HT patients did not differ from controls regarding vBMD, periosteal- and endosteal circumference, muscle density and bone/muscle area ratio (BMR), they had significant smaller trabecular bone area and content, cortical bone area, cortical thickness, aBMD and muscle CSA (all $p<0.05$). Longitudinal data showed similar decreases in lumbar and subtotal aBMD and muscle CSA in both groups, EDS-HT patients showed a significant decrease in muscle density (all $p<0.05$).
**Conclusion:** EDS-HT patients have a trabecular and cortical bone size deficit compared to controls, possibly contributing to their increased fracture risk. Decreased muscle CSA and normal BMR suggest that this bone size deficit is secondary to decreased mechanical loading. Further, there were no arguments for accelerated bone loss in EDS-HT subjects. Decreases in muscle CSA were comparable between both groups although only EDS-HT subjects showed a decline in muscle density.

## P420
## MORTALITY AFTER OSTEOPOROTIC HIP FRACTURE: OUR SURVEILLANCE

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**Objective:** To evaluate the mortality rate of osteoporotic hip fracture patients in four periods of time. We compare mortality in two files, from years 2003-2010 and 1995-2002.
**Methods:** We retrospectively reviewed the medical records patients who were treated for osteoporotic hip fractures. Data was obtained from hospital information system ORDINIS and database E-health. Patients up to 50 years old and with pathological fracture were excluded. There were evaluated 4 interval of mortality rate: 10-d mortality rate, 10-90-d mortality rate, 90-365-d mortality rate and cumulative 1-y mortality rate. The purpose of this study was to compare the 1-y mortality after osteoporotic hip fracture with two periods of time: 2003-2010 to 1995-2002.
**Results:** There were reviewed 240 patients in 1995-2002 (79 men, 161 women) and 314 in 2003-2010 (99 men, 215 women). 10-d mortality rate in our group (2003-2010) was 9.09% in men and 4.18 in women. 10-90-d mortality rate was 12.12% in men and 13.95% in women. Mortality rate 90-365-d was 13.13% in men and 13.48% in women. Cumulative one-year mortality was 34.34% in men and 31.62% in women. Cumulative one-year mortality in 1995-2002 was 25.83% and in 2003-2010 was 30.3%. Statistically significant difference of cumulative 1-y mortality was not found between these two periods of time (p-0.238). Statistically significant difference of 10-d mortality rate is between men and women (p-0.084) in group 2003-2010.
**Conclusion:** Despite our ambition to decrease one-year mortality rate of osteoporotic hip fracture, there persist about 30% death to one year from injury. In group 2003-2010 is higher 10-d mortality rate in men according to available studies.

## P421
## ORGANIZATION OF INTERACTION BETWEEN DOCTORS OF DIFFERENT SPECIALTIES IN THE FIGHT AGAINST OSTEOPOROSIS IN THE FRAMEWORK OF ST. PETERSBURG OSTEOCLUB

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**Objective:** According to the standards of medical care in the Russian Federation doctors of different specialties deal with the problem of osteoporosis. Treatment approaches among these doctors vary for such patients despite that there are osteoporosis treatment guidelines issued by the National Antiosteoporotic

Association. The problem is particularly actual for patients with osteoporotic bone fractures. Traumatologists usually treat these patients and traditionally pay insufficient attention to osteoporosis treatment. Our aim was to show the benefits of work coordination for osteoporosis treatment made by doctors from different medical establishments and specialties in the modern megapolis by means of interaction in the framework of voluntary public organization – the Osteoclub.

**Methods:** The Osteoclub was established in March 2015 in St. Petersburg on the initiative of the management of the National Antiosteoporotic Association. The Osteoclub unites about 30 city opinion leaders, practicing doctors of different specialties and scientific researchers who study various aspects of osteoporosis problem. During 2018 14 meetings were held and 48 reports were made and discussed by doctors of different specialties from: trauma, therapy, rheumatology, endocrinology, gerontology, obstetrics and gynecology, pediatrics, radiology and laboratory diagnostics. Representatives from patients' organizations took part in the Osteoclub meetings as well.

**Results:** Work coordination of doctors of different specialties in the framework of the Osteoclub has allowed to solve the following tasks: 1. To inform doctors systematically about the latest scientific achievements and developments according to reports from appropriate international and Russian scientific congresses. 2. To organize the information spread for doctors about the National Antiosteoporotic Association resolutions. 3. To conduct discussions about interesting clinical cases regularly. 4. To solve questions about treatment optimization for patients in St. Petersburg. 5. To distribute and popularize advanced practice in the fight against osteoporosis. 6. To solve current organization questions, e.g. establishing prophylaxis service for repetitive fragility fractures. 7. To plan to hold specific public events, e.g. the International day of osteoporosis in St. Petersburg. 8. To schedule and coordinate collective scientific studies and preparation of scientific reports about osteoporosis made by doctors of different specialties. 9. To discuss projects of the clinical guidelines dedicated to various aspects of osteoporosis problem. 10. To perform functions of the regional department of the National Antiosteoporotic Association.

**Conclusion:** Four years' experience of the Osteoclub service has confirmed its establishing experience and revealed practical usage of its functions in the framework of this voluntary organization making for doctors of different specialties the opportunity to coordinate osteoporosis treatment in St. Petersburg.

## P422

## X-LINKED HYPOPHOSPHATAEMIA: PREVALENCE AND MORTALITY RATE WITHIN THE UK CLINICAL PRACTICE RESEARCH DATALINK

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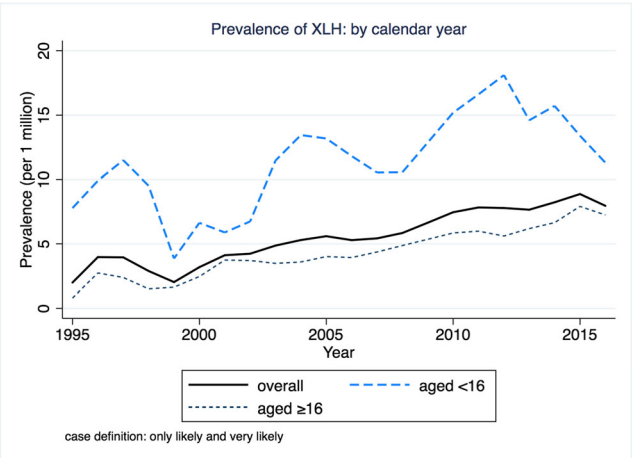
**Objectives:** To determine the prevalence of X-linked hypophosphataemia (XLH) in children and adults in the UK and compare mortality rates between XLH cases and matched controls.

**Methods:** The Clinical Practice Research Datalink (CPRD) GOLD was used to identify XLH cases (1995-2016) in primary care using Read codes identifying rickets, hypophosphataemia and osteomalacia. Two clinicians with experience in paediatric (NS) and adult XLH (MKJ) independently reviewed potential cases using Read codes, laboratory values including serum phosphate, alkaline phosphatase, timing and duration of prescriptions, and features inconsistent with a diagnosis of XLH. Cases were graded as highly likely, likely, possible or unlikely. Four non-XLH patients of same age, gender and GP practice were matched to each case. Temporal trends in XLH prevalence were estimated using CPRD annual denominator data. Mortality incidence rates were calculated for cases and controls and compared using extended Cox regression. Main analyses included all possible cases, with sensitivity analyses focusing only on highly likely and likely cases.

**Results:** Weighted kappa between assessors was 0.88. From 522 potential cases, 122 were scored as at least possible XLH (least conservative) while 62 were defined as likely or very likely (most conservative). In main analyses, prevalence [95%CI] increased from 3.0 [1.2-7.2] per million in 1995/6 to 15.6 [12.0-20.4] per million in 2015/6. Corresponding estimates using the most conservative definition were 3.0 [1.2-7.2] to 8.4 [5.9-12.1] (Figure). Nine (7.4%) cases died during follow-up (at median age 64 y) at a rate of 12.1/1,000 person-years. Fourteen (2.9%) controls died (at median age 72.5 y) at a rate of 4.8/1,000 person-years. This yielded a hazard ratio of 2.93 [1.24 – 6.91]; p=0.014. Under the most conservative analysis, the hazard ratio was 6.65 [1.44 – 30.72]; p=0.015.




**Conclusions:** XLH prevalence estimates have increased in the UK, most likely due to improved coding practice. Adults with XLH appear to have shortened survival. This has implications for how adults are managed by clinicians, including potential use of novel therapies.

**Disclosures:** Kyowa Kirin Hakin International providing funding for this project to the University of Oxford. The funder was provided reports at the end of each stage of work but had no other influence on the development, conduct and reporting of the project.

## P423
## FRAGILITY FRACTURE SERVICE IN HONG KONG: FROM THEORY TO PRACTICE

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**Objective:** Hip fractures are common among frail elderly populations and often have serious consequences on function, mobility and mortality. International studies have shown that interdisciplinary, multidirectional and systemic assessment for fragility fracture in elderly is beneficial to patients. However, in Hong Kong previously, there was no systemic management of fragility fractures until the setup of Key Performance Index for hip fractures in elderly in Hospital Authority. A working group on Fragility Fracture has been set up in 2013, followed by a formal Fragility Fracture Registry subcommittee. The aim is to promote integrated clinical care in terms of holistic management journey from admission, operation to rehabilitation, until the patients return to community. Prevention of secondary fracture is important. Leung et al 2017 conducted a pilot study in 6 major public hospitals to capture the essential data (acute management, rehabilitation and 1 y follow-up) for managing fragility fracture patients. Data in 2012 of these 6 hospitals were collected and analyzed. Overall 91% of patients received orthopaedic care within 4 h of admission. 60.5% received surgery within 48 h. 3.5% of patients received preoperative Orthogeriatric service. Only 22.9% patients were discharged with bone health protection medication. 16.2% of patients required institution stay on discharge. Only 35.1% of patients attended outpatient clinic follow-up 1 y after fracture, and morbidity had deteriorated to 69.9% compared with that of the premorbid state. Death occurred in 17.3% of patients within 1 y postsurgery, compared with 1.6% mortality rate in age-matched Hong Kong general population.

Comparison of six standards for hip fracture care between Hong Kong (HK) and the National Hip Fracture Database of the United Kingdom (UK NHFD)[3] in 2012

| Standard | HK (%) | UK NHFD (%) |
|---|---|---|
| 1. Admission to orthopaedic ward within 4 hours | 91.0 | 52 |
| 2. Surgery within 48 hours and during working hours | 60.5 (exactly 48 hours) | 83 |
| 3. Patients developing pressure ulcers | 5.3 | 3.7 |
| 4. Preoperative assessment by an ortho-geriatrician | 3.5 | 43 |
| 5. Discharged with bone protection medication | 22.9 | 69 |
| 6. Received a falls assessment prior to discharge | 98 | 92 |

The efficiency and quality of acute care for fragility hip fracture patients was documented. The next step is to promote the standard setting for the management of the fragility hip fracture in Hong Kong. A unified multidisciplinary Fragility Hip Fracture Pathway (FHFP) from admission to rehabilitation and back to community was established in 2015. The acute phase of the pathway was put into pilot in Queen Elizabeth hospital.

**Method:** A retrospective review of two-year outcome after the implement of the fragility hip fracture pathway. Patients admitted to Queen Elizabeth hospital from 1/1/2016 to 31/12/2017 with a hip fracture resulting from fall on standing height were included. Major outcome parameters were studied.

**Results:** There were total 1572 patients included, age from 65-102 (average 83.72), male to female ratio is 2:5. Overall 1317 hip operations performed (832 fixations, 478 hemiarthroplasties and 7 excisional arthroplasties) including 3 patients presented and operated for bilateral hip fractures in single admission. 88.58% of patients received orthopaedic care within 4 h of admission. 58.7% received surgery within 48 hours. 67.7% of patients had acute length of stay within 10 days. 41.4% patients were discharged with bone health protection medication in 2016 and increase to 94.4% in 2017. Only 5.69% received antiosteoporotic agents in 2017. One year secondary fracture incidence is 4.67%. Operative complications in one year is 4.44% on fixations and 3.69% on arthroplasties. One year mortality is 13.44% and 14.17% in 2016 and 2017 respectively. Only 20.5% had DXA study performed. 79.8% in range of osteoporosis (T-score < -2.5), 17.7% in osteopenia and 2.4% had normal T-scores.

**Conclusions:** Two year outcome evaluation has been done and the result is very convincing. The FHFP has been shown to have better functional outcome, and shorter length of stay. Further integration such as orthogeriatric collaboration, 7-d rehabilitation, fracture liaison service, community programme, bone health and sarcopenia management are all crucial to optimize the FHF care in the near future. With the increasing awareness of the society, and more collaboration, we hope the policy makers will be convinced and recognize the important of setting a standardized territory-wide policy in managing the fragility fracture in Hong Kong in future. Finally, we strongly believe that the quality of life of the elderly will improve then.

**Reference:** Leung KS et al. Hong Kong Med J 2017;23:264.

**Acknowledgement:** Thanks to the dedication, passion and trust to all members of the QEH PTFF team.

## P424
## ADIPONECTIN AS NEW DIAGNOSTIC BIOMARKER OF BONE TISSUE METABOLISM DISORDERS IN RHEUMATOID ARTHRITIS

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**Objective:** BMD and proteins/peptides determination in blood and urine as markers of bone resorption and formation are currently used to diagnose osteoporosis (OP) and metabolic bone diseases. Recent evidence suggests that in RA changes in the secretion of hormones of white adipose tissue can be revealed [1,2,3,4,5]. One of them is Adiponectin possessing anti-inflammatory, antidiabetic and anti-atherogenic properties. Changes in adiponectin levels may reflect influence of immune inflammation on bone turnover. Our aim was to study the clinical and diagnostic value of serum Adiponectin determination in RA patients complicated by OP.

**Methods:** We examined 88 women with documented diagnosis of RA and mean disease duration of 6.56±0.88 y and control group of 45 healthy females were included in the study. We measured serum adiponectin levels (μg/ml) using human adiponectin ELISA commercial test systems (BioVendor, Czech Republic, cat № RD195023100). We diagnosed OP using DXA with Lunar DPX Pro (GE, USA).

**Results:** Serum adiponectin levels in the control group were 12.5 ±0.9 μg/ml (M±m). Adiponectin levels in healthy subjects measured as M±2d, ranged between 0.44-24.56 μg/ml. Patients with OP and RA had significantly higher levels of serum adiponectin ($p<0.001$). Mean serum adiponectin levels in RA patients who had normal bone density and had no OP were 35.21±0.6 μg/ml. Mean serum adiponectin levels in RA/OP patients with low BMD were 52.42±0.69 μg/ml. Adiponectin levels of 44 μg/ml and higher were associated with osteoporosis. Adiponectin levels of 43.9 μg/ml and lower were associated with normal bone density.

**Conclusion:** Adiponectin levels depend on osteoporosis presence in RA patients. We suppose that adiponectin determination may be useful laboratory marker for OP diagnosis. The test may be used to reduce the risk of low-energy fractures and to improve the quality of life in RA.

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## P425

## HIGH LEVEL OF ADIPOKINES AND OVERWEIGHT AS FACTORS CONTRIBUTING TO OSTEOARTHRITIS PROGRESSION

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**Objective:** Obesity is a condition that prolongs chronic inflammation and promotes synthesis and secretion of pro-inflammatory factors by adipose tissue, such as classical cytokines, TNF-α, adipokines (leptin, adiponectin, resistin, nicotinamide phosphoribosyl transferase (visfatin, Nampt)) and other newly identified proinflammatory factors (hemerin, lipokain, serum amyloid protein 3) [1,2,3,4,5,6]. We investigated the relationship the effect of weight loss over 5 kg on the clinical manifestations of OA and Nampt serum levels in patients with OA.

**Methods:** We observed 160 patients with different forms of OA and the control group (60 healthy individuals). Nampt level in serum was determined by ELISA using a commercial test systems.

**Results:** We observed significant decrease in the severity of the clinical manifestations of OA (decrease the level of pain on the VAS scale at rest and during walking, total score on the WOMAC), visfatin level, CRP, and glucose levels and lipid profile in the group of patients who were able to reduce body weight by 5 kg and more (36 pers.).

**Conclusion:** As a result of our study patients with OA with weight loss of more than 5 kg had more obvious pain relief, a significant improvement in carbohydrate and lipid metabolism, a decrease in the activity of the inflammatory process and level of visfatin.

**References:**

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## P426

## EXERCISE AS A TREATMENT TO ATTENUATE BONE LOSS IN WOMEN AFTER ROUX-EN-Y GASTRIC BYPASS: A RANDOMIZED CONTROLLED TRIAL

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**Objectives**: To investigate the role of an exercise training program in mitigating bone loss in morbidly obese women after Roux-en-Y gastric bypass.

**Methods**: 70 women were randomly allocated into one of two groups: bariatric surgery (RYGB, BMI=48.5±8.1 kg/m$^2$) and bariatric surgery plus exercise training (RYGB+ET, BMI=49.8 ±7.0 kg/m$^2$). Subjects were evaluated at baseline (PRE), three

(POST3), and nine months (POST9) after surgery. Exercise training started after the POST3 assessments. Serum bone turnover markers (CTX, PINP) were assessed by electrochemiluminescence. DKK-1, sclerostin, osteocalcin and osteopontin were quantified using the Luminex® xMAP® technology. Lumbar spine, femoral neck, total hip, distal radius and whole-body aBMD, as well as body composition were evaluated by DXA. HR-pQCT at the radius was used to evaluate volumetric density (vBMD) and structural parameters. aBMD data were convert into percent changes (POST9 to PRE), and thereafter analyzed by a mixed-model assuming group as a fixed factor. The remaining dependent variables were analyzed by a mixed-model for repeated measures assuming group and time as fixed factor and single-degree-of-freedom contrasts to determine whether the means significantly differed between groups. Significance level was set at $P<0.05$.

**Results:** CTX, PINP and sclerostin increased in both groups at POST3 (P<0.001 for all markers) and POST9 ($P<0.001$ for all markers) compared to PRE. Interestingly, CTX ($P=0.002$), PINP ($P=0.024$) and sclerostin ($P=0.046$) were significantly greater in RYGB compared to RYGB+ET at POST9. DKK-1, osteocalcin and osteopontin did not significantly differ between groups. Both groups demonstrated a significant sustained reduction in all aBMD sites along the time ($P<0.05$). Importantly, aBMD percent changes were attenuated in RYGB+ET compared to RYGB for femoral neck ($P=0.007$), total hip ($P=0.009$) and distal radius ($P=0.038$), but no differences were observed for lumbar spine and wholebody aBMD. No significant changes between groups were found for radius vBMD and structural parameters.

**Conclusions:** Our findings indicate that a supervised exercise training program effectively attenuated bariatric surgery-induced bone loss by modulating bone turnover markers and aBMD reduction, suggesting that exercise should be incorporated into the routine of postbariatric patients in order to alleviate the adverse effects of surgery on bone.

## P427

## EFFECTS OF CALCIUM SUPPLEMENTATION ON BONE MINERAL DENSITY IN LACTATING WOMEN: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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**Objective:** To evaluate the effect of calcium supplementation on BMD in lactating women.

**Methods:** Design: systematic review and meta-analysis. Data sources: electronic search of Embase, Medline, Web of Science, Cochrane Central Register of Controlled Trials and clinical trial registries to October 2018. Eligibility criteria for selecting studies: randomised controlled trials (RCTs) of calcium supplementation (including from food, with or without co-intervention of vitamin D) for at least 3 months in lactating women with BMD of the total body, total hip, femoral neck, lumbar spine or forearm, or total body bone mineral content or fracture as an outcome. Data extraction: two authors screened studies, extracted data and assessed the risk of bias and quality of evidence of eligible studies. The percentage of change in BMD at each site for each study group, where possible, was pooled using the random-effects model, in which BMD measures at baseline and the longest time point were used. Pooled results were reported as weighted mean differences (WMD) with 95%CIs.

**Results:** Five RCTs totaling 567 lactating women were included. All included trials had a low certainty of evidence with serious risk of bias. Compared to placebo or blank control, calcium supplementation showed no effect on BMD of either the lumbar spine (WMD 0.7%, 95%CI -0.1% to 1.6%) or forearm (0.5%, -0.4% to 1.4%). BMD at other sites was assessed by only one of the included trials; calcium supplementation had a small to moderate effect on total hip BMD (3.3%, 1.5% to 5.1%) but no effect on the total body or femoral neck.

**Conclusions:** Calcium supplementation in lactating women may have no or small effect on BMD, which is unlikely to translate into an improvement in the prevention of fractures in later life. This suggests that the current recommended calcium intake in lactating women may be appropriate. However, high quality RCTs are needed to confirm these findings.

**Acknowledgement:** PROSPERO registration number CRD42015022092.

## P428

## BUROSUMAB RESULTED IN GREATER IMPROVEMENT IN PHOSPHATE METABOLISM, RICKETS, GROWTH, AND MOBILITY THAN CONTINUATION WITH CONVENTIONAL THERAPY IN CHILDREN WITH X-LINKED HYPOPHOSPHATEMIA (XLH)

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**Objective:** Compare the efficacy and safety of burosumab, a fully human monoclonal antibody to FGF23, to conventional therapy, multiple daily doses of oral phosphate and active vitamin D (Pi/D), in children with XLH.

**Methods:** In this Phase 3 trial (UX023-CL301, NCT02915705), 61 children with XLH (1-12 years old) were randomized 1:1 after a 7-day Pi/D washout to receive burosumab starting at 0.8 mg/kg SC Q2W or reinitiate Pi/D titrated by investigators for 64 weeks. Eligibility criteria included a total Rickets Severity Score (RSS) ≥2.0 despite prior Pi/D treatment. Healing of rickets was assessed by radiologists blinded to treatment using the Radiographic Global Impression of Change (RGI-C).

**Results:** Compliance in both arms was high (>95% based on dosing days). Compared with Pi/D, burosumab demonstrated greater improvement in serum phosphorus, serum $1,25(OH)_2D$, alkaline phosphatase, global RGI-C (primary endpoint), and lower limb deformity (**Table**). Using the generalized estimating equation model, burosumab showed significantly greater increases in recumbent length/standing height Z-score, growth velocity Z-score, and percent predicted distance walked in the 6-minute walk test. The baseline nephrocalcinosis scores in the Pi/D group were 0 for 23 (72%) subjects, 1 for three (9%) subjects, 2 for three (9%) subjects, and 3 for three (9%) subjects. Baseline scores in the burosumab group were 0 in 24 (83%) subjects, 1 in two (7%) subjects, 2 in two (7%) subjects, and 3 in one (3%) subject. At Week 64, nephrocalcinosis score remained the same in 25 (78%) conventional therapy and 26 (90%) burosumab subjects; decreased 1 in five (6%) and two (7%) subjects, respectively; and decreased 2 and 3 in one (3%) subject each with conventional therapy. Adverse events (AEs) of interest were more frequent with burosumab, including hypersensitivity (38% vs. 19% of subjects) and injection site reactions (52% vs. N/A), and were mild to moderate in severity overall. Three serious AEs occurred per group, all unrelated to treatment and resolved. No subject discontinued study drug.

| Endpoint | Week | Change from Baseline | | p value |
|---|---|---|---|---|
| | | Pi/D (N = 32) | Burosumab (N = 29) | |
| **Serum Phosphorus, mmol/L** LS mean (SE) change from Baseline | 40 | +0.06 (0.02) | +0.29 (0.03) | < 0.0001 |
| | 64 | +0.07 (0.02) | +0.29 (0.03) | < 0.0001 |
| **Serum $1,25(OH)_2D$, pmol/L** LS mean (SE) change from Baseline | 40 | +44.19 (8.62) | +71.07 (8.93) | 0.0318 |
| | 64 | +2.85 (6.68) | +23.76 (5.36) | 0.0144 |
| **RGI-C Global Score (primary endpoint at Week 40)** LS mean (SE) (positive values indicate improvement) | 40 | 0.77 (0.107) | 1.92 (0.110) | < 0.0001 |
| | 64 | 1.03 (0.136) | 2.06 (0.072) | < 0.0001 |
| **Lower Limb Deformity Score by RGI-C (primary analysis Week 64)** LS mean (SE) (positive values indicate improvement) | 40 | +0.21 (0.119) | +0.62 (0.123) | 0.0204 |
| | 64 | +0.29 (0.119) | +1.25 (0.170) | < 0.0001 |
| **Serum Alkaline Phosphatase, U/L** % mean change from Baseline (decreases indicate improvement) | 40 | -7% | -24% | < 0.0001 |
| | 64 | -5% | -33% | < 0.0001 |
| **Standing Height/Recumbent Length Z Score (primary analysis Week 64)** LS mean (SE) change from Baseline | 40 | +0.03 (0.031) | +0.16 (0.052) | 0.0408 |
| | 64 | +0.02 (0.035) | +0.17 (0.066) | 0.0490 |
| **Growth Velocity Z Score (primary analysis Week 64)** LS mean (SE) change from Baseline | 40 | +0.73 (0.339) | +1.76 (0.337) | 0.0386 |
| | 64 | +0.41 (0.265) | +1.53 (0.264) | 0.0047 |
| **6-Minute Walk Test (6MWT), % Predicted Distance** LS mean (SE) change from Baseline | 40 | -1.1 (2.2) | +5.6 (2.6) | 0.0633 |
| | 64 | +1.9 (2.8) | +9.2 (2.1) | 0.0496 |

**Conclusions:** Burosumab resulted in significantly greater improvements in phosphate metabolism, rickets, leg bowing, growth, and mobility than continued treatment with Pi/D in 1-12 years old children with XLH.

## P429

## ASSOCIATION OF BODY COMPOSITION, PHYSICAL ACTIVITY AND PHYSICAL PERFORMANCE WITH KNEE CARTILAGE THICKNESS AND SUBCHONDRAL BONE AREA IN YOUNG ADULTS

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**Objective:** To describe associations of body composition, physical activity and physical performance with knee cartilage thickness and subchondral bone area in young adults.

**Material and Methods:** Body composition, physical activity and physical performance were measured 4-5 y prior to knee MRI. Cartilage thickness and bone area were measured quantitatively from MRI. Associations were assessed using linear regressions. Age, gender, height (if fat mass or lean mass was predictor) and BMI (if physical activity or physical performance was predictor) were examined as confounders and included in the regressions. Mediator was identified using mediation analysis (Stata's Medeff command).

**Results:** Participants were aged 31-40 y, 48% were female (n=186). Greater lean mass, but not fat mass, was positively associated with total knee cartilage thickness (β=6.50 μm/kg, 95%CI: 0.86 to 12.13) and bone area (β=13.66 $mm^2$/kg, 95%CI: 5.73 to 21.59). Physical performance measures were positively associated with total knee cartilage thickness (long jump: β=2.36 μm/cm, 95%CI 0.68 to 4.04; hand grip strength: 7.65 μm/kg, 1.53 to 13.77; physical work capacity: 1.04 μm/watt, 0.27 to 1.81) and bone area (long jump: β=4.25 $mm^2$/cm, 95%CI 1.01 to 7.50; hand grip strength: 19.89 $mm^2$/kg, 8.23 to 31.55; leg strength: 3.32 $mm^2$/kg. 1.25 to 5.40; physical work capacity: 3.00 $mm^2$/watt, 1.54 to 4.45). Mediation analysis suggested these

associations were mediated by lean mass (effect mediated: 29-95%). Physical activity measures (including walking, moderate activity, vigorous activity and total activity) were not associated with total knee cartilage thickness or bone area.

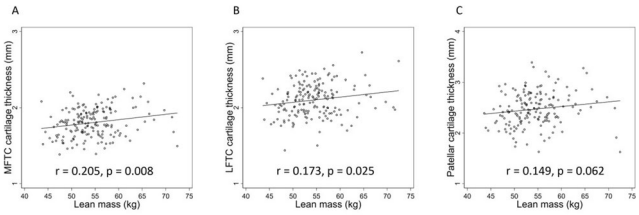


**Figure.** Scatter plots and linear regression lines for associations between lean mass and knee cartilage thickness (A: MFTC; B: LFTC; C: Patella).

R and P values are from models adjusted for age, gender and height.

MFTC, medial femorotibial compartment; LFTC, lateral femorotibial compartment.

**Conclusion:** Greater lean mass and better physical performance measures were associated with greater knee cartilage thickness and subchondral bone area in young adults, and the associations of physical performance were largely mediated by lean mass. These findings suggest lean mass may play an important role in maintaining knee joint health in young adults.

## P430

## ASSOCIATION OF GLUCOSE HOMEOSTASIS MEASURES AND METABOLIC SYNDROME WITH KNEE CARTILAGE DEFECTS AND CARTILAGE VOLUME IN YOUNG ADULTS

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**Objective:** To describe the associations of glucose homeostasis measures and metabolic syndrome (MetS) measures with knee cartilage defects and cartilage volume in young adults.

**Methods:** Australian young adults from the Childhood Determinants of Adult Health Study were selected to undergo knee MRI scans during 2008-2010 (aged 31-41 y). Fasting blood sample, waist circumference and blood pressure measures were collected during 2004-2006 (aged 26-36 y). Glucose, insulin, triglyceride and high-density lipoprotein cholesterol (HDL-C) were measured using serum samples. Homeostatic model assessment 2-insulin resistance (HOMA2-IR), HOMA2-beta cell function (HOMA2-β), HOMA2-insulin sensitivity (HOMA-S) and MetS were calculated or defined. Cartilage defects and cartilage volume were measured from MRI scans. Data were analysed using log binomial or linear regressions and were adjusted for age, gender, BMI and physical activity.

**Results:** Among 328 participants (47.3% were females), 40 (12.7%) had hyperglycaemia and 21 (6.7%) had MetS. Glucose homeostasis measures (except fasting glucose) were associated with tibiofemoral cartilage defects (fasting insulin: relative risk (RR) 1.05/mU/L, 95%CI 1.01 to 1.08; HOMA2-IR: 1.44, 1.08 to 1.92; HOMA2-β: 2.59, 1.33 to 5.07; HOMA2-S: 0.36, 0.18 to 0.72), but not patellar cartilage defects. There were no associations between glucose homeostasis measures and knee cartilage volume. MetS measures were not associated with either cartilage defects or cartilage volume, except the associations between high waist circumference and tibiofemoral cartilage defects (RR 2.32, 95%CI 1.18 to 4.54) and between low HDL-C and tibiofemoral cartilage defects (RR 1.99, 95%CI 1.08 to 3.69).

**Conclusion:** Insulin resistance was associated with higher risk of tibiofemoral cartilage defects amongst young adults. MetS was not associated with neither cartilage defects nor cartilage volume. These suggest that glucose homeostasis, but not MetS, may play a role in cartilage damage in young adults and may lead to knee osteoarthritis in later life.

## P431

## COMPARISON OF TWO DIFFERENT MOBILIZATION TECHNIQUES IN SUBACROMIAL IMPINGEMENT SYNDROME

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**Objective:** To investigate the efficacy of two different manual therapy methods that cervical mobilization and shoulder mobilization in subacromial impingement syndrome (SIS).

**Methods:** A total of 40 patients (18-60 years old, 28 female and 12 male) were included in the study. The patients were randomized into two groups. The effectiveness of the treatments applied in both groups were assessed before and after treatment with Numerical Pain Rating Scale (NPRS), Shoulder Range of Motion (ROM), Disabilities of The Arm Shoulder and Hand (Quick-DASH), Rotator Cuff Quality of Life (RC-QOL). Both groups received physiotherapy program comprised of 15 therapy sessions (5 d/week). Conservative treatment included ultrasound, transcutaneous electrical nerve stimulation, cold pack and therapeutic exercises for SIS. In addition to conservative treatment, Group I received shoulder mobilization

techniques, while Group II received cervical mobilization techniques.

**Results:** Regarding comparisons within the groups, both groups showed statistically significant improvement as determined by NPRS, Quick-DASH, ROM and RC-QOL scores ($p<0.05$), whereas in comparisons between the groups, Group I showed significantly greater improvement compared to Group II for all parameters except resting NPRS and shoulder abduction measurement ($p<0.05$).

**Conclusion:** It can be said that utilization of either of the mobilization techniques in the conservative treatment method will be beneficial. Nonetheless, mobilization techniques that involve shoulder complex are found to be more effective than cervical mobilization techniques in SIS for most of the assessment parameters in terms of reducing patients pain and enhancing functionality, ROM and life quality.

## P432

## CLINICAL, BIOCHEMICAL AND RADIOLOGICAL PROFILE OF NORMOCALCAEMIC HYPERPARATHYROIDISM: A MULTICENTRIC CROSS-SECTIONAL EVALUATION

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**Objective:** Normocalcaemic hyperparathyroidism (NHPT) has been defined as a condition with persistently normal total and ionized calcium levels in the presence of high levels of PTH. The clinical aspects of NHPT have been evaluated in different cohorts but the interpretation of these findings is confounded by differing methods used to rule out secondary hyperparathyroidism and by the small number of NHPT subjects enrolled. Our aim was to assess the clinical, biochemical and radiological profile of NHPT in comparison with primary hyperparathyroidism (PHPT) and control subjects.

**Methods:** We enrolled in a multicentric cross-sectional study patients with NHPT and PHPT diagnosed according to criteria of the "Fourth International Workshop of Asymptomatic Hyperparathyroidism". BMI and age matched control subjects were consecutively recruited. All patients underwent a biochemical examination including calcium-phosphorus metabolism and bone turnover markers. We assess the lumbar spine (L1–L4), total hip, femoral neck, and nondominant forearm BMD and the trabecular bone score. Morphometric vertebral fracture (VF) were assessed by DXA scan.

**Results:** From December 2016 to July 2018, we identified 47 patients with NHPT, 41 with PHPT and 39 control subjects. All study groups had no significant differences in terms of age, BMI and kidney function. NHPT and PHPT patients had significantly higher PTH and 25(OH)vitamin D levels ($p<0.001$) and lower Ca*P ($p<0.001$) than controls. NHPT has lower CTX levels confronted with PHPT ($p=0.039$). NHPT ($p=0.035$) and PHPT ($p=0.003$) group have lower total hip BMD than controls; NHPT showed higher nondominant forearm BMD than PHPT subjects ($p=0.017$), while compared to controls presented similar values. No significant differences in TBS between the three groups have been founded. After adjustment for confounding factors, only PHPT group had an increased risk of VF compared to controls (OR:5.10, 95%CI:1.34 to 21.58). 31% of NHPT and 12% of PHPT patients fulfilled the criteria for asymptomatic hyperparathyroidism.

**Conclusion:** Up to now, our study described the biochemical and radiological profile of the largest cohort of NHPT subjects. Our findings suggest that the profile of NHPT subjects is closer to control one.

## P433

## INFANT FEEDING AND BONE HEALTH IN LATER LIFE: EVIDENCE FROM THE HERTFORDSHIRE COHORT STUDY

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**Objectives:** Research into the relationship between infant feeding and infant growth has determined that different patterns of milk feeding are linked with differences in growth in infancy and adult leg length. As both weight gain in infancy and adult leg length have been associated with higher BMD and BMC in older age, this study aims to examine the associations between type of infant feeding and bone health in later life by comparing spinal and femoral BMD and BMC in 996 older adults, aged 59-73 y, who were breastfed or bottle fed in infancy.

**Methods:** Using data from the Hertfordshire Cohort Study (HCS), this analysis utilized linear regression to examine the relationship between type of infant feeding, and spinal and femoral BMD and BMC. Information on how HCS participants were fed as infants (breastfed, breast and

bottle fed, or bottle fed), in addition to their birth weights (kg) and weights at 1 (kg), was collected by health visitors between 1931-1939 in Hertfordshire. In addition to these early life variables, models adjusted for age, smoking behaviour, alcohol consumption, diet, and adult leg length.

**Results:** While type of infant feeding had no significant association with bone health for women in this sample, it was a significant predictor of bone health in later life for men: type of infant feeding was associated with spinal BMD (b=-.035, 95%CI -.064, -.007, p-value: 0.014) and spinal BMC (b=-2.932, 95%CI -5.641, -.223, p-value: 0.034), with men who were breastfed in infancy being more likely to have higher spinal BMD and BMC measurements. These associations between infant feeding and markers of bone health in men remained significant in fully adjusted models.

**Conclusion:** The observed associations between infant feeding and spinal and femoral BMD and BMC in men indicate that exclusive breastfeeding may be protective for the bone health of male babies as they age. The evidence presented here underscores the potential lifelong benefits of breastfeeding and highlights differences between osteoporotic risk factors for men and women.

## P434

## MOBILE TECHNOLOGIES FOR NUTRITIONAL SUPPORT AND EXERCISE FOR IMPROVING LIFE OF PATIENT WITH HIV: CASE REPORT

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**Objective:** There are a lot of conditions associated with HIV such as lipodystrophy, fat atrophy, insulin resistance, low levels of high-density lipoprotein cholesterol, and hypertriglyceridemia. A diet program combined with exercises can help to treat patients with HIV.

**Methods:** We used an online system for patient education based on video lessons, full of humor, pictures, and cartoons to convey the necessary information on good nutrition and exercises.

**Results:** A 42-year-old white man received the diagnosis of HIV infection in 2014 and was treated with a combination of stavudine, lamivudine, and nevirapine beginning in 2017. In January 2014, his blood HIV RNA level was 2583 copies/mL and subsequently, from January 2014 through the most recent test on June 2018, was <400 copies/mL; The CD4 count was 434 cells/mm3 in January 2014, and 560 cells/mm3 in June 2018. From January 2014 through September 2016, he gained 12 kg and was diagnosed with lipodystrophy. Watching the short movies, the patients formed the habits of good nutrition during the first month already, which includes a moderate-fat, low-glycemic-index, high-fiber diet with an exercise program for home and fitness center and push-notifications through the special online system. At 6 months he decreases his body weight by 6.5 kg. His maximal dynamic strength increased by 58%. His dietary intake of protein increased from 12% to 21% of total calories, and his intake of saturated fat decreased from 20% to 10% of total calories. His intake of dietary fiber more than doubled.

**Conclusion:** So online systems could improve the quality and duration of life of our patients to make motivation and remind about treatment, diet, and exercises. So, we need to improve the quality of information material, including using online technologies to improve the quality and duration of life of our patients.

## P435

## ECTOPIC ADRENOCORTICOTROPIC HORMONE (ACTH-ECTOPIC) SYNDROME AND OSTEOPOROSIS. RARE CASES AND DIFFICULT TREATMENT

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**Objective:** ACTH-ectopic syndrome (EAS) is a rare cause of ACTH-dependent endogenous hypercortisolism. The objective of this study was to analyze the clinical, biochemical, and radiological features, management, and treatment outcome of patients with EAS.

**Methods:** It was a retrospective case-record study of 47 patients with EAS. Clinical, biochemical, and radiological features and response to therapy and survival rate were measured.

**Results:** The median follow-up was 7 y (range, 1-13 y). None of the dynamic tests achieved 100% accuracy. Imaging correctly identified the lesion at first investigation in 80.9% of cases. Bronchial carcinoid tumors were the most common cause of EAS (n=27; 57.5%), followed by other neuroendocrine tumors (n=11, 23.4%). In 19.1% (9) of patients, the source of EAS was never found. Tumor histology and the presence of distant metastases were the main predictors of overall survival ($P<0.05$). It is interesting that 40 patients (85.1%) have steroid osteoporosis. 10 patients were treated with calcium and vitamin D, 35 patients by bisphosphonates, 2 patients by denosumab and 3 by teriparatide.

**Conclusions:** ACTH-ectopic syndrome is a very rare condition with severe complications. There is no significant data and guidelines for osteoporosis treatment in such disease. So we need to improve our to improve the quality of life of such difficult patients.

## P436

## VITAMIN D DEFICIENCY AND POST-STROKE DEPRESSION IN PATIENTS WITH LOW BONE MINERAL DENSITY

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**Objective:** Post-stroke depression is common and has high clinical relevance as it may hinder a full and optimal recovery. Low serum levels of 1,25-dihydroxyvitamin D has been reported in patients with post-stroke depression (PSD). Our aim was to evaluate the frequency of depression and serum vitamin D levels in stroke patients

**Methods:** Our cross-sectional study included 60 (50 women, 10 men) stroke patients (35 with osteoporosis, 25 with osteopenia) of average age of 69.52±9.46 y, who received treatment at the Clinic for Medical Rehabilitation, Clinical Center of Vojvodina in Novi Sad. The inclusion criteria were patients after a first stroke (≤1.5 y from a stroke). Lunar Prodigy Primo densitometer was used to determine the BMD in all participants. DXA measurement was performed at the lumbar spine L2-L4 segment in anteroposterior (AP) position. Serum levels of 25-hydroxyvitamin D [25(OH)D] were measured by competitive protein-binding assay (reference values: >30 ng/dl). Depression severity was quantified using the Hamilton Depression Rating Scale (HDRS), and functional status using Barthel Index (BI).

**Results:** Minor depression (HDRS score 8-15) was found in 25 (41.67%) patients while major depression (HDRS score ≥16) was found in 1(1.67%)% patient after stroke. The study also showed low levels of serum 25(OH) vitamin D [<30 ng/dl ($p<0.001$)] in 8 (23.53%) patients without depression and 20 patients with depression. The mean BI scores were significantly higher in patients without PSD than in those with PSD (<0.001).

**Conclusion:** Low BMD and low levels of serum 25(OH)vitamin D are associated with PSD in stroke patients. Longitudinal studies are required to confirm the causation between risk factors and outcome. Additional research on vitamin D supplementation is also warranted to improve the outcome of patients with PSD.

## P437

## A NOVEL FIVE "I" MODEL OF FRACTURE LIAISON SERVICE: SUCCESSFUL EXPERIENCE IN TAIWAN

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**Objectives:** Fracture liaison services (FLSs) using three "I" model (identification, investigation, and initiation), are effective modules for fragility fracture prevention. Although FLSs are cost-effective, the poor medical adherence, high manpower demands and implementation costs are the caveats of FLS implementation.

**Methods:** The E-Da hospital serving approximately 1,000,000 (outpatients)/40,000 (inpatients) person-times/year is a tertiary referral hospital in southern Taiwan. Its FLS program was successfully implemented using the five "I" model based on three "I" model to improve FLS caveats, especially the low adherence in 2016. The fourth "I" focusing on long-term treatment adherence implies adherence improvement. In the era of artificial intelligence (AI), FLS models established by smart healthcare systems can assist clinicians and case managers to identify, investigate, and initiate treatments and improve adherence efficiently. The role of AI will become increasingly important and comprise a fifth "I"(intelligence).

**Results:** The smart healthcare case management system in this hospital completely satisfies the five "I" model. On an average, the AI system has automatically analyzed 20,480 and 479 reports of X-ray and DXA examinations, respectively, and has identified 967, 803, 87, and 206 patients with hip fractures, vertebral compression fractures, osteoporosis, and low bone mass, respectively, each month at the E-Da hospital. Moreover, the system's data analysis not only save manpower and reduce the rate of omitted patients, but also reach a 93.6% rate of 1-year medication adherence. The FLS of E-Da Hospital was accredited as a 100% golden program by the IOF in 2017.

**Conclusions:** The smart healthcare case management system demonstrates that the novel five "I" model based on the original three "I" model but with the two "I," i.e., "Improvement of adherence" and "Intelligence," can be a novel module to achieve better outcomes in the fragility fracture prevention program of FLSs, especially in a sizable hospital.

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## P438

## ARE THE OTTAWA RULES HELPFUL TO PREDICT ANKLE AND FOOT FRACTURES IN SPORTS ACTIVITIES?

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**Objective:** This instrument (Ottawa rules out) consists of a questionnaire for assessment of the ankle and foot and need for radiography after trauma. Our purpose was to validate the Ottawa ankle rules to predict ankle and foot fractures in sports activities as clinical setting, when they are used in emergency department.
**Methods:** We used a prospective patient survey by emergency physicians in Orthopaedic emergency department of a university hospital. The study group consisted of 356 consecutive patients aged 18 years and older who presented with acute ankle or midfoot injuries during a 8-month period. Radiography was performed in each patient after clinical evaluation findings were recorded.
**Results:** 29 ankle and 12 midfoot fractures were diagnosed. The decision rules had a sensitivity of 0.89, a specificity of 0.34, and a negative predictive value of 0.89 in detecting ankle fractures, a sensitivity of 0.85, a specificity of 0.29, and a negative predictive value of 0.9 in detecting midfoot fractures. The rules failed to predict 4 avulsion fractures in the ankle group. Application of these rules by emergency physicians would have reduced ankle or midfoot radiography requests by 22%.
**Conclusion:** Use of the Ottawa ankle rules by emergency physicians resulted in 85% sensitivity and had a potential of reducing radiography requests by 23%. Since the Ottawa ankle rules is an instrument that is calibrated towards high sensitivity of 100%, in our patients were less sensitive than clinical suspicion alone. In our opinion low sensitivity for all fractures (ankle and midfoot) would not allow physicians to safely reduce the number of radiographs with Ottawa rules.

## P439
## IMPACT OF COMORBIDITIES ON PHYSICAL PERFORMANCE IN LATER LIFE

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**Objectives:** An increase in life expectancy has led to a higher prevalence of chronic, noncommunicable diseases. Physical performance (PP) test score has been linked with nursing home and hospital admissions, and may predict falls and therefore fracture risk. Here we examine the impact of different comorbidities (CM) on PP.
**Methods:** xData were available for 222 men and 221 women who participated in the UK component of the European Project on Osteoarthritis (EPOSA). Participants completed a questionnaire detailing CMs. PP was determined from assessments of walking speed, chair stands and balance to create a composite score (0-12); low PP was defined as ≤9. All findings were adjusted for age, BMI, smoker status, alcohol consumption, social class, and physical activity. Results are reported as regression coefficients, with 95%CI.
**Results:** The mean (SD) ages were 75.5 (2.5) and 75.8 (2.6) years for men and women respectively. The proportion of individuals with a low PP score was high in both women and men (71.2% and 56.9% respectively). Rheumatoid arthritis was associated with weaker grip strength [-4.36 (-8.23, -0.49) kg, p<0.03]; and lower PP score in women [-0.73 (-1.42, -0.04) z-score, p<0.05], but otherwise stronger relationships were generally seen in men. Hence, osteoarthritis was associated with weaker grip strength [-3.69 (-5.72, -1.66) kg, p<0.001] and lower PP score in men [-0.39 (-0.71, -0.08) z-score, p<0.03], and with weaker grip strength in women [-2.61 (-4.22, -0.99) kg, p<0.01]; diabetes was associated with weaker grip strength in men [-2.77 (-5.50, -0.03) kg, p<0.05] but not in women; stroke was associated with lower PP score in men [-0.67 (-1.31, -0.03) z-score, p<0.05], but not in women. Heart disease was associated with a higher risk of a low PP score in men only [OR 2.73 (1.14, 6.58), p<0.05]. No association was found between low PP and hypertension, lung or thyroid disease in either gender. An increasing number of CMs was associated with a higher risk of a low PP score in both men and women [OR 1.40 (1.02, 1.91), p<0.05 and OR 1.35 (1.00, 1.82), p<0.05 respectively].
**Conclusion:** The impact of CMs on PP varied according to gender, and the comorbid disease being reported. Specifically, osteoarthritis, stroke, diabetes and heart disease were more strongly associated with functional impairment in men.

## P440
## BONE INVOLVEMENT IN SYSTEMIC MASTOCYTOSIS: CASE SERIES FROM A SINGLE CENTER

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**Objective:** Systemic mastocytosis is a clonal disease of mast cell progenitors in bone marrow that causes abnormal growth and accumulation of mast cells in different organs. Bone involvement is rare as a form of disease presentation although it occurs in 70% of cases. Our aim was to describe the main demographic and clinical features of patients with systemic mastocytosis, especially focusing on bone involvement.
**Methods:** Review of systemic mastocytosis patients diagnosed in our hospital (by Rheumatology, Allergy and Hematology departments) and description of the main epidemiological and clinical characteristics.

**Results:** 7 cases of systemic mastocytosis diagnosed in a 25-y period in our hospital were registered. The study includes 4 women and 3 men and ages ranged from 27-70 y. Every patient had a bone marrow biopsy compatible with systemic mastocytosis. The disease was presented with respiratory involvement in 2 cases, digestive in 1 case, skin in 1 case and with bone involvement in 3 patients. 4 patients had allergic reactions in some stage of evolution, 3 skin symptoms and 3 patients had hypotension, dizziness, palpitations and syncope. The delay of diagnosis from the onset of symptoms varies between 3-13 y. Regarding the musculoskeletal system 6 patients had bone involvement: 1 patient was previously diagnosed with chronic osteomyelitis and 5 patients with osteoporosis and multiple vertebral fractures. One patient also had multiple rib fractures. Tryptase levels were elevated in 5 patients, whereas urine histamine levels were elevated in all 6 patients. All patients were treated with bisphosphonates and none of them had new bone collapses while in treatment.
**Conclusions:** Systemic mastocytosis is a rare cause of secondary osteoporosis. Although bone involvement can occur, osteoporosis is uncommon as first manifestation of the disease. In our review, 4 of the cases had been admitted to our department for vertebral fractures and we made the diagnosis in 3 of them. Tryptase and histamine levels should be included in the laboratory examinations in patients with osteoporosis and fractures after excluding common causes because up to 9% of "idiopathic" male osteoporosis may be caused by mastocytosis.

## P441
## FACTORS THAT PREDICT ONE-YEAR INCIDENT HIP AND NON-HIP FRACTURES FOR LONG-STAY HOME CARE RECIPIENTS IN ONTARIO, CANADA

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**Objectives:** To determine the factors that predict one-year incident hip and non-hip (spine, pelvis, humerus, distal radius) fractures for home care (HC) recipients in Ontario, Canada.
**Methods:** This is a retrospective cohort study of linked population data for people receiving HC services for more than 60 d. We excluded those with multiple admissions, endstage disease, no one-year reassessment, or receiving hospice care. Potential predictors (e.g., age, sex, cognition) were obtained through the interRAI Resident Assessment Instrument-HC, and one-year incident hip and non-hip fractures in the Discharge Abstract Database and National Ambulatory Care Reporting System. Factors associated with one-year incident hip and non-hip fractures were determined through multivariate logistic regressions. Odds ratios (OR) and 95%CI were calculated.
**Results:** Of the 112,649 HC recipients included, 2743 (2.5%) and 3541 (3.1%) experienced hip and non-hip fractures within one year, respectively. Factors independently predicting hip fracture were (OR, 95%CI): age (1.04, 1.04-1.05), female sex (1.46, 1.34-1.58), moderate cognitive impairment (1.80, 1.39-2.34), fracture in the past year (1.32, 1.19-1.46), fall in the past 180 d (1.20, 1.15-1.26), wandering behaviour (1.64, 1.40-1.92), current smoking (1.64, 1.42-1.90), unexpected weight loss of 5-10% (1.26, 1.12-1.41), morbid obesity (0.44, 0.31-0.62), and Parkinson's Disease (1.31, 1.11-1.54). Factors independently predicting non-hip fracture were: age (1.02, 1.01-1.02), female sex (1.78, 1.64-1.92), mild cognitive impairment (1.20, 1.01-1.43), fracture in the past year (1.71, 1.58-1.86), fall in the past 180 d (1.17, 1.12-1.22), current smoking (1.35, 1.19-1.52), morbid obesity (0.79, 0.65-0.97), and taking a psychotropic medication (1.16, 1.09-1.25).
**Conclusions:** The HC population has unique fracture risk factors, including wandering, unexpected weight loss, Parkinson's Disease, and taking psychotropic medication. The fracture prevalence and risk factors of HC recipients is more similar to those of frail, older adults residing in long-term care than to community-dwelling older adults.
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## P442
## EFFECT OF BUROSUMAB (KRN23), A FULLY HUMAN ANTI-FGF23 MONOCLONAL ANTIBODY, ON OSTEOMALACIA IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA (XLH)

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**Objective:** We evaluated the efficacy of burosumab, a fully human monoclonal antibody against FGF23, on improving osteomalacia in adults with XLH.
**Methods:** In the open-label, phase 3 study, UX023-CL304 (NCT02537431), 14 adults with XLH who had not received oral phosphate and vitamin D therapy within 2 y of enrollment were administered subcutaneous burosumab, 1.0 mg/kg every 4 weeks for 48 weeks. The primary endpoint was

improvement in osteoid volume/bone volume assessed by transiliac bone biopsies obtained at Baseline and week 48.
**Results:** Fourteen subjects enrolled (mean age 40 y, 57% female), 13 completed 48 weeks, and 11 completed paired biopsies. At Baseline, all subjects demonstrated severe osteomalacia. At Week 48, all osteomalacia-related histomorphometric measures improved significantly (**Table**). We observed increases in mean cancellous bone volume/tissue volume (mean [SD]: Baseline 31.12 [7.43]%; Week 48 38.55 [12.77]%), cortical width (Baseline 1056.90 [293.83] μm; Week 48 1150.00 [457.47] μm), eroded surface/bone surface (Baseline 3.36 [2.25]%; Week 48 6.73 [2.72]%), single label surface/bone surface (Baseline 5.64 [4.60]%; Week 48 12.05 [7.84]%), and trabecular thickness (Baseline 150.70 [52.93] μm; Week 48 165.64 [58.86] μm). Mean serum phosphorus concentration also increased. Markers of bone formation and resorption increased at Week 48 (LS mean increase: PINP +77%, CTx +36%; both p<0.0001). Of the 4 pseudofractures detected at Baseline, 3 were healed and 1 was not assessed at Week 48. Scores for Worst Pain in the Brief Pain Inventory (LS mean change -1.86 p=0.0054) and Global Fatigue in the Brief Fatigue Inventory (-1.20 p=0.0359) decreased significantly. All subjects had ≥1 adverse event (AE). Two subjects experienced serious AEs (migraine; paresthesia) that were unrelated to treatment and resolved. Most AEs were mild to moderate in severity. Eleven subjects reported biopsy-related AEs: pain (14 AEs), itch (2), headache (1), and bandage irritation (1). There were no deaths or incidents of hyperphosphatemia; 1 subject withdrew consent at Week 44.

**Table 1. Efficacy Assessments in UX023-CL304**

| Assessment | All Subjects (n = 11)[a] Mean (SD) |
|---|---|
| **Osteoid Volume/Bone Volume**, % | |
| Baseline | 26.1 (12.4) |
| Week 48 | 11.9 (6.6) |
| P value based on percentage change from Baseline | <0.0001 |
| **Osteoid Thickness**, uM | |
| Baseline | 17.2 (4.1) |
| Week 48 | 11.6 (3.1) |
| P value based on percentage change from Baseline | <0.0001 |
| **Osteoid Surface/ Bone Surface**, % | |
| Baseline | 91.7 (3.4) |
| Week 48 | 67.8 (13.7) |
| P value based on percentage change from Baseline | <0.001 |
| **Mineralization Lag Time**, days[b] | |
| Baseline | 1539.8 (1587.1) |
| Week 48 | 195.5 (77.7) |
| P value based on percentage change from Baseline | <0.05 |
| **Serum Phosphorus**, mg/dL | |
| Baseline | 2.24 (0.396) |
| Midpoint of the dose interval between Baseline & Week 24 (ie Weeks 2, 6, 14, and 22) | 3.31 (0.380) |

[a]Baseline Osteoid Volume/Bone Volume and Week 48 Mineralization Lag Time n = 10; Serum phosphorus N = 14. [b]Using imputed results.

**Conclusion:** By normalizing phosphate homeostasis, burosumab significantly reduces osteomalacia in adults with XLH, which may explain observed improvements in skeletal complications of this disease.

## P443
## CHANGING FACE OF SILVER TRAUMA WITH GERIATRIC INPUT

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**Objective:** Major trauma is changing from being young and male to being older with a lower degree of male predominance. A fall of <2 m is now the most common mechanism of injury causing major trauma. On arrival to hospital elderly are more likely to be treated by more junior staff and a low proportion of these patients are assessed in resuscitation. A small but clinically significant group, (3.2% of major trauma patients) either admitted directly to medical ward or sustained injury while inpatient. High quality care for older people with hip fracture has led to sustained improvement in care process and outcome. However, this approach needs to extend beyond patients with fractures of the proximal femur to all types of major trauma. Our aim was to find out the mechanism of major trauma impact on older people with multiple co morbidity and whether regular geriatric input has any role in their outcome.
**Method:** A pilot project was under taken for small sample of 120 patients. a retrospective study of all the notes were done.
**Result:** The patient reviewed by geriatrician were 50% (60/120 patients). There were 53% (32/60patients) female and 47% (28/60 patients) male. Maximum number of patients age between 70-90 36.6% (22/60 patients) had major trauma from falling height of <2 m and out of which 21.6%(13 patients) were above 86. There were 82% (49 patients) referred from other hospitals and only 18% (11/60 patients) had direct admission. Most of the patients 91.6% (55/60 patients) were admitted from their own homes. 93%of patients (56/60 patients) had <5 comorbidity and only 7% (4/60 patients) >5 comorbidity. The patients reviewed once were 55% (33/60 patients) and only one patients was seen 9 times. Majority of the patients 22% (13 patients) had only one investigation requested by geriatrician. Most of the patients 63% (38/60 patients) had Falls assessment done. 63.3% (38/60) of patients were found to have developed one or more complications and out of which respiratory complication was more common. 48% (29/60 patients) had good recovery and only 13% (8/60) patients died mostly due to head injury.
**Conclusion:** Older people living at their own home with relatively less comorbidity suffer a variety of trauma, mainly with low energy mechanism; i.e., fall of standing height in their own home. With geriatric input maximum has good recovery even though maximum patients had developed medical complications. there were fewer investigation requested, and very little referral to other specialties. Most of the mortalities were due trauma. Most of the patients are referred from different hospitals in the region.

## P444

## QUALITY OF LIFE: SYSTEMIC LUPUS ERYTHEMATOSUS AND AEROBIC TRAINING

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**Objective:** Quality of life (QOL) measures have become a vital and often required part of health outcome appraisal. Because lupus causes joint pain and inflammation, muscle pain, and fatigue, the very thought of exercising can be a challenge for patients. Our aim was to determine if supervised aerobic training improves quality of life in patients with SLE.
**Methods:** 30 women with SLE (ages 39.74±10.58), remain of illness 6.8±2.9 y, in steady state (measured by SLEDAI score) comparing to 30 healthy women, were evaluated using Short Form 36 **(SF36)**. Both groups of women had aerobic training on bicycle ergometer for 15 min, 3 times a week for 6 weeks. SF36 were analyzed at baseline and after 6 weeks.
**Results:** Statistical analysis values of SF36 before supervised aerobic training shows significantly worse quality of life in woman with SLE in all parameters of SF36: physical functioning 36.96±7.01 vs. 57.144.64±2.12, physical health 34.12 ±5.74 vs. 56.2±8.74, pain 38.52±5.57 vs. 62.8±6.53, general health35.21±6.97 vs. 41.19±3.62, vitality 44.64±2.12 vs. 68.54±5.12, social functioning33.61±5.57 vs. 67.32±6.97, emotional health 29.69±7.17 vs. 64.52±7.95, mental health 31.08±6.07 vs. 63.6±5.52 in 2 general parameters physical health 36.96±7.01 vs. 60.0±7.05 mental health 33.65±3.93 vs. 64.6±5.32. After aerobic training there is no statistical difference between group of women with SLE and control group except with parameter and general health 41.19±3.62 vs. 68.20±7.64 ($p<0.005$). Exercise did not exacerbate disease measured by SLEDAI score.
**Conclusion:** This study showed significant improvement in QOL after a supervised aerobic training on bicycle ergometer in patients with SLE.

## P445

## PRIMARY KNEE OSTEOARTHRITIS: COMPLEX ASSESSMENT AND COMPLETE MANAGEMENT

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**Objective:** Knee osteoarthritis (KOA) - a progressive, incurable joint disease resulting in the breakdown of cartilage and bone - is an important cause of chronic pain and physical disability (1). Synovitis and joint effusion are secondary phenomena in OA as a consequence of chondrolysis. Goals of complete rehabilitation program in KOA include controlling pain, maintaining and improving the range of movement and stability of affected joints, and limiting functional impairment, for an optimal quality of life (2). Biochemical markers of cartilage and bone degradation are becoming increasingly important in the evaluation of KOA. In our prospective study, we assessed the efficacy of rehabilitation program (TENS, ultrasound and exercise program) over the presence of synovitis or joint effusion in patients with painful primary KOA. We evaluated the correlation between these sonographic aspects, serum C-terminal crosslinking telopeptide of collagen type II (CTX-II) and functional parameters.
**Methods:** We studied 46 patients (29 women, 17 men), aged between 71-82 y. All patients were clinical, functional (VAS scale, Lequesne index and WOMAC scale) and imagistic (X-rays and sonography) evaluated. The complex rehabilitation program (educational, dietetic, pharmacological, physical - kinetic) was performed 5 d/week, 2 weeks. All subjects were evaluated at baseline (T1) and at 2 (T2) and 12 (T3) weeks.
**Results:** The studied parameters had improved, especially in T2 moment ($p<0.05$). The mean value of serum CTX-II was correlated with imagistic aspects. Multivariate analysis showed that sonographic aspects correlated statistically with VAS score, Lequesne index and WOMAC score. The pain improvement is correlated with sonographic aspects. After 12 weeks, improved functional status was maintained.
**Conclusion:** Our results reflected two aspects: the first - the favorable complex effect (clinical, functional and sonographic) of rehabilitation performed in patients with painful KOA; the second - serum CTX-II is a useful biochemical marker for quantify the rehabilitation and patient self-management programs in KOA.
**References:**
1. Traistaru R et al. Rev Chim 2018;69:3205
2. Traistaru R et al, Farmacia 2018;66:507

## P446

## LOW BACK PAIN IN FEMALES WITH SEVERE OSTEOPOROSIS: ASSESSMENT AND REHABILITATION

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**Objectives:** Chronic low back pain (LBP) is one of the most common symptoms in osteoporosis females, leading to complex disability and reduces quality of life significantly (1). The prevalence of vertebral fractures increase the risk of a subsequent vertebral fractures and the recovery of quality of life after a new vertebral fracture is less than after the previous. Various rehabilitation programs have been proposed for chronic low back pain in females with severe osteoporosis. We assessed the effects of a 6 week complex rehabilitation program (pharmacotherapy, educational sessions, multimodal exercise training and Hessing orthotic device) on quality of life and self-control of the complex disorders, in females with severe osteoporosis and low back pain.

**Methods**: 56 females (63.5 y mean age) with severe osteoporosis (mean disease duration 3.5 y), were randomly assigned to a rehabilitation group – RG (n=29) and a pharmacotherapy (bisphosphonates) group – PG (n=27). Clinical evaluation, lab tests, exercise tolerance tests (6-min walking distance - 6MWD), visual analogue scale (VAS) for pain, and Osteoporosis Quality of Life Questionnaire (OQOLQ). BMD was measured by DXA in lumbar spine. Statistical analysis and correlation between data were done with the ANOVA and chi-square tests.
**Results:** All studied females had a value for BMD >2.5 SD and one or more vertebral fragility fractures. We found a significant correlation between the mean of T-score and pain. The RG females were more satisfied with the overall outcome compared with PG subjects, also both groups had an improvement of mean values of studied parameters (6 MWD, VAS and OQOLQ).
**Conclusions:** Severe osteoporosis females with chronic low back pain benefit from strategies to improve their quality of life. Multimodal exercise (based on the coordination aerobic exercise and strengthening lower limb exercises) and Hessing orthotic device represent the adequate mode of recovery and is more effective in improving psychological status. Type and duration of physical training must be individualized to each patient, in accordance with low back pain status.
**References:** 1. Pavel OR et al. Rom J Morphol Embryol 2016;57:121

## P447
## CORRELATION BETWEEN LEVELS OF VITAMIN D AND FALLS IN PATİENTS TREATED IN A PHYSICAL MEDICINE AND REHABILITATION CLINIC

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**Objective:** Vitamin D insufficiency appears as an endemic problem throughout the world, especially in the elderly population and is effective on balance, muscle strength, physical performance, sarcopenia, falls and fragility fractures. The objective of this study was to assess correlation between vitamin D levels and risk of falling in inpatients.
**Methods:** In this clinical study performed in 2017, a total of 395 patients treated in a Physical Medicine and Rehabilitation Clinic, were assessed for the correlation between fall risk ratios and vitamin D levels. According to the fall risk classification patients were divided into three groups; first group with no risk, second with low risk and third with high risk for falling. Also they received a falls risk point according to age and demographic features.
**Results:** Vitamin D level ≥30 ng/ml was detected in 101 patients in high risk group(94.39%), two patients in low risk group (1.87%) and four patients in no risk group (3.74%). Fall risk points were mean 9.07±3.69; median 8.00 respectively. Vitamin D levels 20-29 ng/ml was detected in 84 patients in high risk group (86.60%), one patients in low risk group (1.03%) and 12 patients in no risk group (12.37%). Fall risk points were mean 9.39±5.10, median 9.00. Vitamin D levels 10-19 ng/ml was detected in 107 patients in high risk group(87.70%), seven patients in low risk group(5.74%) and eight patients in no risk group(6.56%). Fall risk points were mean 8.44±4.36, median 7.50. Vitamin D level <10 ng/ml was detected in 46 patients in high risk group (88.46%), six patients in no risk group (11.54%). Fall risk points in this group were mean 8.46±4.90, median 7.00 respectively.
**Conclusion:** The high number of patients with normal vitamin D level and the the reason for vitamin D insufficiency having apparently no effect on falls needed explanation. Inpatients before internalizing procedure received standard vitamin D replacement treatment in the outpatient clinic. The time period following vitamin D replacement treatment although being successful in increasing serum vitamin D level was still not sufficient to show it is efficiency on muscle performance.

## P448
## THE PREVALENCE OF RISK FACTORS FOR OSTEOPOROSIS TO FEMALE PATIENTS WITH TYPE 2 DIABETES

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**Objective:** Many clinical studies showed that patients with diabetes mellitus (DM) had an increased fracture risk, probably due to long-term complications and the association of osteoporosis and type 2 diabetes is common among elderly population. We tried to assess the prevalence of risk factors for osteoporosis to female patients with type 2 diabetes from Rehabilitation Department of Clinical Emergency Hospital Craiova, Romania.
**Method:** We included from 1 January to 1 December 2018 a total of 300 females with type 2 diabetes and we collect demographic data, patients medical history, medication intake, BMI, BMD, smoking, early menopause.
**Results:** Age was a risk factor for a decreased BMD (mean age 51.6 vs. 62.2 y for women without osteoporosis than patients with osteoporosis, P=0.005). 89 women had osteoporosis and 135 female patients had osteopenia. BMD was found to decrease with reduction in BMI. Use of oral hypoglycemic agents increased the risk of decreased BMD in cases with osteoporosis, p=0.013.
**Conclusions:** Age, BMI and oral hypoglycemic agents were significant difference in the distribution of cases with osteoporosis, while other co morbidities, medication, smoking or early menopauses were no significantly different in osteoporosis group compared to normal group.

## P449
## EFFICACY OF TECAR THERAPY TO PATIENTS WITH CHRONIC CERVICAL PAIN SYNDROMES

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**Objective:** This randomized controlled study was aimed to evaluate the efficacy of the Tecar therapy, a capacitive and/or resistive energy transfer system that operates within the long wave radio frequency range for treating chronic cervical pain syndromes compared to conventional physiotherapy.
**Method:** Were randomized a total of 30 subjects (15 patients/group) from the outpatients Rehabilitation Department of Emergency Clinical Hospital of Craiova. The patients assigned to treatment group T received an application of the capacitive electrode for 5 min followed by the application of the resistive electrode for 5 min during the patient has to make active movements, ended with a 5-min treatment capacitive, one session a day for 6 consecutive days. The patients from group C received conventional modalities for six consecutive days. Patients were evaluated baseline and at the end of the study using a visual analogue scale from 0 to 10 cm, where 0 means no pain and 10 means very severe pain and neck pain questionnaire (NPQ).
**Results:** The average decrease of the pain perception in the Tecar group was 65% and 49% in the Conventional modalities group. There was a significant decrease in NPQ score from 33.67% to 15.36% at the end of treatment for group T.
**Conclusions:** Tecar therapy was more effective solution in treatment of chronic cervical pain syndromes painful conditions compared to the conventional physical therapy methods.

## P450
## RELATIONSHIP BETWEEN PHYSICAL PERFORMANCE VARIABLES AND FRACTURE RISK INDEX IN A GROUP OF ELDERLY SARCOPENIC SUBJECTS

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**Objectives:** The purpose of this study was to explore the relationships between physical performance variables and fracture risk in a group of elderly sarcopenic subjects.
**Methods:** This cross-sectional study included 136 women and 64 men whose ages range between 65-85. Body composition and bone mineral content (BMC) of the whole body (WB) were evaluated by bioelectrical impedance analysis and the skeletal muscle mass index (SMI) was calculated. The fracture risk assessment tool (FRAX) was used. A composite physical performance evaluation tool was also used (short physical performance battery, SPPB). Hand grip strength was measured by an electronic dynamometer. Sarcopenia was defined according to the criteria of the European group based on the values of the hand grip strength.
**Results:** In men, hand grip strength was correlated with the 10-y probability of hip fracture and major osteoporotic fracture. Lean mass was significantly correlated with the 10-y probability of hip fracture and major osteoporotic fracture in both sexes. SMI was positively correlated with WB BMC and negatively correlated with the 10-y probability of hip fracture and major osteoporotic fracture in both sexes. The SPPB score was negatively correlated with the 10-y probability of hip fracture and major osteoporotic fracture in both sexes. The SPPB score was a predictor of sarcopenia in both sexes. Based on the results of the logistic regressions, it appears that for every 1 SD increase in SPPB, the risk of sarcopenia decreases by 41.1% in women and 53.5% in men. The presence of correlations between SPPB and bone health parameters suggests a relationship between these parameters. 57% of women and 40% of men had sarcopenia. SSPB scores, the 10-y probability of hip fracture and major osteoporotic fracture, and WB BMC values were significantly different between the two groups (sarcopenic and nonsarcopenic). In sarcopenic women, SPPB score was positively correlated with WB BMC and negatively correlated with the 10-y probability of hip fracture. In sarcopenic men, SPPB score was negatively correlated with 10-y probability of major osteoporotic fracture.
**Conclusion:** This study conducted on a group of elderly sarcopenic subjects reinforces the idea of increasing lean body mass, muscle strength and physical performance to prevent the occurrence of osteoporotic fractures.

## P451
## RISK FACTORS ASSOCIATED WITH FALLS IN INPATIENTS OF A PHYSICAL MEDICINE AND REHABILITATION CLINIC

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**Objective:** Falls are an important public health problem resulting in fragility fractures especially in the elderly population. It is well known that fractures are a cause of mortality, morbidity and disability in the long course. Falls are also encountered during inpatient follow-up in rehabilitation clinics. In the last years it is recommended to assess osteosarcopenia in patients and aim at protective strategies. Therefore our objective was to evaluate risk factors for falls in inpatients of the University Hospital.
**Methods:** A total of 395 inpatients between the dates 1 January to 31 December 2017 were assessed. With regard to age groups, patients <65 comprised 56.7% of the patients (n=224), 65-79 y comprised 32.66% (n=129), patients >80 y

comprised 10.63% (n=42). Mean age was 61.85±14.25 y. Classification of fall risk according to risk factors divided patients into three groups: high risk, low risk and no risk. A standard fall risk assessment was performed by an officially advised scale of the Ministry of Health.

**Results:** 273 (69,11%) patients were female, 122 (30.89) were male. Mean BMI was 28.92±6.01. With regard to clinical diagnosis, degenerative peripheral and spinal joint diseases took the first place in 45.82% (n=181) patients. Neurologic disorders, especially stroke rehabilitation were the second frequent group with 18.22% (n=72). In most of the remaining patients there were multiple diagnosis. Risk factors detected in the patients with highest risk for falls were; fall history in the last month (100%, n=29), history of chronic disease (97.88%, n=277), need for physical assistance during standing or walking (99.15%, n=117), like walker, walking stick, assistance of another person etc., urinary /fecal disorders (98.28%, n=57), poor eye sight (95.24%, n=20), multipharmacy of more than four drugs (100%, n=211) and orthostatic hypotension in the first rank.

**Conclusion:** The high risk for falls in inpatient of PMR clinics makes it recommendable to assess patients carefully according to these risk factors and take effective preventive measures as well as to aim at a careful follow-up of these conditions.

## P452

## IMPACT OF OSTEOARTHRITIS ON ACTIVITIES OF DAILY LIVING: DOES JOINT SITE MATTER?

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**Objectives:** Osteoarthritis (OA) is the most common joint disorder affecting older people, but the impact of the condition has been little studied in individuals not awaiting joint replacement surgery. Here we consider the relationships between a clinical and radiological diagnosis of knee or hip OA and activities of daily living (ADL) in older men and women.

**Methods:** Data were available for 222 men and 221 women who participated in the UK component of the European Project on Osteoarthritis. Participants reported if they had difficulties with mobility, self-care, usual activities and movement around their house. Hip and knee radiographs were taken and graded for overall Kellgren-Lawrence score, with a positive definition defined as a 2 or above. Clinical OA was defined using American College of Rheumatology criteria.

**Results:** The mean (SD) age of study participants was 75.5 (2.5) and 75.8 (2.6) years in men and women respectively. 3.2% of men and 6.0% of women had a clinical hip OA. Radiographic hip OA was more common affecting 46.3% of men and 40.6% of women. Knee OA was overall more common than hip OA in both sexes with the radiographic diagnosis again being more prevalent (50.2% of men and 58.7% of women) compared with the clinical diagnosis (12% of men and 19% of women). In men, a clinical diagnosis of hip or of knee OA were both associated with difficulties in mobility, ability to self-care and perform usual activities (hip OA: OR 17.6, 95%CI 2.07, 149 p=0.009; OR 12.5, 95%CI 2.51, 62.3 p=0.002; OR 4.92, 95%CI 1.06, 22.8 p=0.042 respectively. Knee OA: OR 8.18, 95%CI 3.32, 20.2 p<0.001; OR 4.29, 95%CI 1.34, 13.7 p=0.014; OR 5.32, 95%CI 2.26, 12.5 p<0.001 respectively). Very similar relationships were seen in women, where in addition a radiological diagnosis of knee OA was associated with similar, though less marked, reported difficulties (OR for difficulties performing ADL 3.25, 95%CI 1.61, 6.54 p=0.001). In general, men reported stronger associations between moving around the house, specifically around the kitchen (clinical hip OA: OR 13.7, 95%CI 2.20, 85.6 p=0.005; clinical knee OA OR 8.45, 95%CI 1.97, 36.2 p=0.004) than women with OA.

**Conclusions:** Clinical OA is strongly related to ability to undertake ADL in older adults, particularly men. It is important to consider this in clinic consultations when seeing patients with OA.

## P453

## BONE MASS IMPROVEMENT AFTER GLUCOCORTICOID WITHDRAWAL AND DISEASE CONTROL IN CROHN'S DISEASE

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Patients with inflammatory bowel disease (IBD) are at increased risk for osteopenia or osteoporosis and fractures. Glucocorticoid excess, endocrinological disturbances, vitamin D deficit and chronic inflammation are well known risk factors. Disease control and withdrawal of glucocorticoid have important impact on increase of BMD.

**Case report:** We report the case of a 22-year-old, male, nonsmoker, diagnosed with Crohn's disease in 2012. In 2017, he performed a DXA scan who revealed BMD L1-L4 spine=0.932 g/cm$^2$, T-score=-2.4 DS, Z-score=-1.8 DS and left hip BMD=0.906 g/cm$^2$, T-score=-0.8 DS, Z-score=-0.5 DS. At the moment, his Crohn disease activity index CDAI=250, he was on methyl prednisolone high

dose (2015-2017, 32 mg/d), and since therapy with anti-TNFα was not efficient in his case, he started etrolizumab (anti-b7 integrins). He was lost for follow-up and further endocrinological checkup was not done at that moment. In November 2018, as he was admitted in our department for evaluation, DXA revealed BMD spine 1.046 g/cm$^2$, T-score=-1.2 DS, Z-score=-1.5 DS and left hip BMD 1.068 g/cm$^2$, T-score=-0.2 DS, Z-score=0.1 DS. His blood evaluation showed 25 hydroxyvitamin D=19.8 ng/ml, normal count blood cells, normal inflammation markers, normal gonadal and thyroid function. His current CDAI index activity was 0, receiving at the moment etrolizumab (anti-b7 integrins) since the last examination and ASA. He was initiated vitamin D 4000 UI/d for 6 weeks and then repeat 25 hydroxyvitamin D.

**Conclusion:** Bone mass improvement is associated with glucocorticoid withdrawal and control of disease in IBD. Recent studies show that anti-TNFα can have a beneficial role on bone, but for newer drugs for Crohn's disease there are no data. Further follow-up is needed.

## P454
## EFFICACY OF COMBINED TREATMENT WITH CINACALCET AND LOW DOSE OF ALFACALCIDOL IN PREVENTION OF FRACTURES AND BONE LOSS IN CHRONIC KIDNEY DISEASE PATIENTS ON HEMODIALYSIS

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**Objective:** To study the safety and efficacy of a combined cinacalcet and low-dose alfacalcidol therapy in the prevention of bone loss and fractures in chronic kidney disease (CKD) patients on hemodialysis with secondary hyperparathyroidism (SPTH).

**Methods:** We analyzed data on 97 adults (48 men and 49 women) CKD 5 stage on hemodialysis and SPTH, mean age 48.2±14.5 y from a single dialysis center. The laboratory investigations included evaluation of PTH, serum total and ionized calcium, serum phosphate, serum level of alkaline phosphatase concentrations. PTH level in serum was evaluated by solid phase chemiluminescent immunoassay. BMD was measured at 2 sites: lumbar spine ($L_1$-$L_4$) and femoral neck using DXA. Laboratory examination and BMD evaluation were performed at baseline and after 12 months of treatment. Patients were randomized into two groups: in first group 47 patients were prescribed low phosphate diet and sevelamer as phosphate binder in individual doses to control hyperphosphatemia. All patients in this group received fixed dose of cinacalcet 30 mg daily orally and alfacalcidol 0.25 μg once daily. In second group (50 patients) a low phosphate diet and sevelamer were prescribed.

**Results:** In cinacalcet and alfacalcidol group the mean iPTH level declined significantly and achieved target levels according KDIGO recommendations 85.1% CKD patients (587.67±67.33 vs. 1876.89±94.62, p<0.01), both the phosphorus level and alkaline phosphatase activity declined significantly after 12 months of treatment. In the control group the levels of iPTH and alkaline phosphatase activity increased significantly. In cinacalcet and alfacalcidol group BMD at lumbar spine increased in 4.12 ±0.68% from baseline. In the control group the mean BMD at lumbar spine decreased in – 5.57±0.56% from at baseline (p<0.01). No patients in combined treatment group had new low energy fractures compared to control group were 4 (8%) patients were diagnosed new (1 hip and 3 forearm) fractures. No patients had side effects of the therapy.

**Conclusion:** Combined treatment with Cinacalcet and low-dose of alfacalcidol shows benefits in prevention bone loss and fractures in CKD patients on hemodialysis with SPTH and reduced BMD.

## P455
## VITAMIN D-RELATED GENETIC VARIANTS PREDICT CIRCULATING VITAMIN D LEVELS BUT NOT BONE DENSITY IN THE HERTFORDSHIRE COHORT STUDY

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**Objectives:** Studies have shown that vitamin D deficiency is associated with increased fracture risk. While single-nucleotide polymorphisms (SNPs) in genes related to vitamin D metabolism have been shown to be associated with serum 25-hydroxyvitamin D (25(OH)D) concentration, no previous studies have related these SNPs to bone density. In the current study we consider relationships between previously identified SNPs and (i) circulating vitamin D levels and (ii) bone density in late adulthood, using participants from the Hertfordshire Cohort Study (HCS).

**Methods:** Fasting blood samples were taken and 25(OH)D levels were measured using a DiaSorin Liason automated chemiluminescent assay. Bone mineral content (BMC), bone area and BMD were measured by DXA at the lumbar spine and proximal femur using a Hologic QDR 4500 instrument. SNPs at rs12785878 (DHCR7), rs10741657 (CYP2R1), rs6013897 (CYP24A1), and rs4588 (GC) were genotyped by LGC Genomics (Hoddeston, UK) using KASP competitive allele-specific polymerase chain reaction. Associations between 25(OH)D and the SNPs were assessed by linear

regression using an additive model (β represents the change in 25(OH)D per additional common allele (nmol/l)). The results presented are adjusted for confounders (season of blood collection, age, BMI, social class, smoking, alcohol, activity, calcium and vitamin D intake).

**Results:** Data were available for 495 men and 488 women. The mean age (SD) was 64.3 (2.5) years for men and 65.6 (2.5) for women. DHCR7 was associated with 25(OH)D levels in men (ß=0.16; 95%CI, 0.02 to 0.31; p=0.027) and women (ß=0.16; 95%CI, 0.02 to 0.30; p=0.030), whereas GC was associated with 25(OH)D levels in men only (ß=0.16; 95%CI, 0.02 to 0.29; p=0.025). No significant associations were observed between any of the SNPs and BMC, bone area or BMD.

**Conclusions:** Genetic variation in DHCR7, which encodes 7-dehyrocholesterol reductase in the epidermal vitamin D biosynthesis pathway and GC, which may affect vitamin D binding protein synthesis or metabolite affinity, appears to modify 25(OH)D levels in a cohort of older adults. This increase in circulating 25(OH)D levels was not, however, associated with improved bone density.

## P456
## EVALUATION OF BALANCE FUNCTION IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES

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**Objective:** To estimate the change in static and dynamic balance function in osteoporotic patient with vertebral fractures (VF).

**Methods:** 90 patients aged 43-80 with primary osteoporosis were enrolled. Study group comprised of 56 women and 4 men (age 65.4±7.1 y) with at least 1 VF confirmed by X-rays. Control group included 28 women and 2 men (age 62.0±5.2 y) with the same BMI, BMD and without any osteoporotic fracture. Stabilometry, Fukuda-Unterberger test and one-leg-standing test were performed.

**Results:** Study group was characterized by change vs. control group of balance coefficient (BC) (77.2±7.6 vs. 85.7 ±9.4% with opened eyes, p=0.002, 67.1±9.8 vs. 73.4±9.9% with closed eyes, p=0.03), pressure center of media-lateral (PCML) deviation in sagittal plane (1.2 [-1.1;1.5] vs. -1.2 [-1.5;1.2] mm, p=0.025) and PCML displacement in sagittal plane (6.8 [3.1;37.7] vs. to 4.8 [1.8;10.7] mm, p=0.01). BC correlated with age (r=0.41 with opened eyes, r=0.40 with closed eyes, p=0<0.01) and BMI (r=0.16 with opened eyes, p=0<0.05). PCML deviation in sagittal plane correlated with age (r=-0.42, p=0<0.01), number of VFs (r=0.40, p=0<0.001) and femoral neck BMD (r=-0.43, p=0<0.05), and in frontal plane only with age (r=-0.27, p=0<0.05). PCML displacement in sagittal plane correlated with age (r=-0.29, p=0<0.01), number of VFs (r=0.22, p=0<0.01) and femoral neck BMD (r=-0.38, p=0<0.05) and in frontal plane only with BMI (r=-0.15, p=0<0.05). Fukuda-Unterberger test results showed greater side dislocation in patients with VF vs. controls (40° [25.0;45.0] vs. 30° [10.0;45.0], p=0.02). Side dislocation correlated with number of VFs (r=-0.30, p<0.05). Patients with VF lose their balance measured with One-leg-standing test faster vs. controls with open eyes (5.0 [1.0;10.0] vs. 7.5 [5.0;10.5] sec, p<0.05) and with closed eyes (2.0 [0;3.0] vs. 3.5 [3.0;5.0] sec, p<0.05). One-leg-standing test results correlated only with age (r=-0.35, p<0.001 with open eyes, r=-0.42, p<0.01 with closed eyes).

**Conclusions:** VFs negatively effect on static and dynamic balance function. Age, high BMI, low BMD and number of VFs are the main factors of balance dysfunction in patients with osteoporosis.

## P457
## ANTI-OSTEOARTHRITIS AND ANTI-DIABETIC PROPERTIES OF CITRUS LEAF EXTRACT IN STREPTOZOTOCIN-INDUCED RATS

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**Objective:** Diabetes accelerates osteoarthritis development due to enhanced oxidative stress and inflammation. Citrus leaf is an important south Asian culinary ingredient with anti-oxidant, anti-inflammation, and cardioprotective properties. This study investigated the effects of citrus leaf extract on diabetic osteoarthritis development.

**Methods:** Streptozotocin (~70 mg/kg) induced diabetic rats were treated with 150 and 300 mg/kg BW citrus leaf extract (CLE) or metformin 250 mg/kg for 8 weeks and compared nontreated diabetic control and normal healthy rats (n=6). Fasting blood glucose, body weight, walking function test, serum oxidative stress, and inflammation biomarkers levels and osteoarthritis development were monitored.

**Results:** The CLE reduced the average osteoarthritis scores and walking function tests compared to the nontreated control diabetic group and Metformin group. The CLE significantly lowered the fasting blood glucose level, oxidative stress and inflammation biomarkers levels that were elevated in the diabetic rats. There was no significant difference in rats' body weight increase between groups throughout the study suggesting no toxic effects. The 150 mg CLE /kg body weight dose was apparently better than the 300 mg/kg dose.

## P458
## MEDICAL MANAGEMENT OF ATYPICAL FEMUR FRACTURES: A SYSTEMATIC LITERATURE REVIEW

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Atypical femur fractures (AFFs) are considered serious side effects of bisphosphonates and often show delayed or non-healing. After an AFF, bisphosphonates are usually discontinued. It is unclear if certain osteoporosis drugs can promote healing and how patients at high risk of fragility fractures should be treated after AFF. We performed a systematic literature review to evaluate the effect of teriparatide, raloxifene and denosumab both on healing and occurrence of AFF in order to advise on medical treatment after AFF. We retrieved 910 references and reviewed 66 papers, including 31 case reports, eight retrospective cohort studies and three prospective studies that reported the effect of teriparatide, but no randomized controlled trials. We pooled data on reported fracture union from these articles and found that radiological healing occurred within six months of teriparatide use in 13 of 29 conservatively treated incomplete AFFs (45%), nine of 10 incomplete AFFs with surgical intervention (90%) and 41 of 55 complete AFFs (75%). In nine of 29 incomplete AFFs on conservative treatment (31%) no union was achieved after 12 months of teriparatide and progression to complete fractures occurred in 4 patients. New AFFs occurred in six patients during or after teriparatide, but always after prior use of antiresorptives. AFF on denosumab was reported in 21 patients, including 11 patients treated for metastatic bone disease and seven without prior bisphosphonate exposure. Continuation or initiation of denosumab after AFF was associated with recurrent incomplete AFFs in one patient and two cases of contralateral complete AFF. Eight patients had used raloxifene prior to AFF, including one patient without prior bisphosphonate use. We conclude that teriparatide may lead to faster healing of surgically treated AFFs, but not of conservatively managed incomplete AFFs and we present options for treatment of osteoporosis after AFF in different scenarios.

## P459
## IS THE "PEDIATRIC" ORIGIN OF IDIOPATHIC OSTEOPOROSIS POSSIBLE IN MEN?

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**Objective:** There is a point of view that idiopathic osteoporosis begins at the age of formation of peak bone mass, but is clinically (fractured) manifested at an older age. It was clarified the contribution of age in the formation of BMD deficiency in the primary osteoporosis in men.
**Methods:** The study included 231 patients with primary osteoporosis. The reason for the diagnosis of idiopathic osteoporosis in men was the presence of low-energy fractures of the vertebral bodies or peripheral skeletal bones or loss of BMD corresponding to <-2.5 SD by the T-criterion for people over 50 or <-2.0 SD by the Z-criterion for individuals younger than 50 y. The inclusion in the analysis of patients aged 17-19 y was based on the data that in the population of healthy Russian men the formation of peak bone mass in the lumbar spine and neck of the femur is completed by 15 y. Patients with hypogonadism, osteomalacia, hypophosphatemia, and pathology that could affect bone tissue metabolism were excluded from the study. IPC in g/cm$^2$ was estimated at L1-L4 and Neck (Lunar Prodigy, NHANES database used). **Statistics:** contingency tables were used for the analysis of interval variables. The presence of a relationship between the studied parameters was assessed using Fisher's exact test.
**Results:** The values of BMD in g/cm$^2$ are presented in Tables 1 and 2.

Table 1. BMD in L1-L4 of various age groups.

| Age groups | Number of patients | BMD L1-L4 (g/cm$^2$) |
|---|---|---|
| 17-20 years | 26 | 0.87±0.09 |
| 21-50 years old | 103 | 0.93±0.16 |
| 51 and older | 102 | 0.95±0.18 |

Kruskal-Wallis test p=0.066

Table 2. The magnitude of the BMD in the neck of the femur of different age groups.

| Age groups | Number of patients | BMD neck (g/cm$^2$) |
|---|---|---|
| 17-20 years | 26 | 0.87±0.09 |
| 21-50 years old | 103 | 0.93±0.16 |
| 51 and older | 102 | 0.95±0.18 |

Kruskal-Wallis test p=0.032

It was revealed that differences in BMD deficiency in the lumbar spine (in absolute values in g/cm$^2$) in the selected age groups are only close to reliable (p=0.032). In the femoral neck, differences were significant (p=0.032), but only between the age group of 21-50 years old and the group over 51 years old, while there were no differences between the groups of 17-20 years old and the group over 51 years old.
**Conclusion:** The lack of a clear relation between BMD deficiency and age of patients calls into question the postulate that the number of patients with osteoporosis increases with increasing age. It gives us a reason to consider the primary forms of osteoporosis in some men over 50 years old, as a result of the juvenile osteoporosis that was not diagnosed in a timely manner (impaired peak bone mass formation).

## P460

## FORTIFICATION OF DIET WITH VITAMIN D AS A POTENTIAL FOR REACHING PHYSIOLOGICAL VALUES IN THE REGION OF EASTERN MORAVIA, THE CZECH REPUBLIC

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**Objectives:** Epidemiological data of vitamin D in the region of eastern Moravia with approx. 1.5 mil inhabitants and a terrain of 200-1300 m above the sea level with regular winter seasons of 4 to 5 months. Values of vitamin D from the years 2016 and 2017 were used. Evaluation of the sunshine intensity: fluctuating decrease of the sunshine in winter months is from 70 to 80% and index of UV on the cloudless days of the winter season is degree of 2.

**Methods:** Cohorts of patients: Group 1: patients from osteological clinics (n=25742, average age 68) 1.25(OH)2D3 (n=3073, average age 67.2); Group 2: patients from other clinics (n=1042, average age 66) as a control group. PTH polymorphisms of vitamin VDR (FokI, ApaI, BsmI, TagI), D-binding protein and its variants DBP rs7041and DBP rs4855. Laboratory methods: determination of 25-OH for vitamin D and determination of 1.25-(OH)2 for vitamin D. These examinations are carried out on Liaison XL analyser. PTH is measured with analysis (ECLIA) using Cobas e 411 equipment. Vitamin D binding protein was determined with help of Immundiagnostic AG method ELISA. Detection of all the polymorphisms was carried out with real-time PCR device LC 480 II.

**Results:**

25(OH)D3 Group 1**:** total value 68.9 nmol/l,1Q (January to March) 61.9 nmol/l 3Q (July-September) 69.68. Difference between 1Q-3Q=p<0.005. Group 2**:** total 57.43 nmol/l, 1Q - 48.6 nmol/l.3Q -56.11 nmol/l. Difference between 1Q and 3Q p<0.001. 1.25(OH)2D3 Group 1**:** total value 119.60 pmol/l, 1Q -121.46 pmol/l,3Q- 118.57 pmol/l – statistically irrelevant. Group 2: total 108.21 pmol/l, 1Q-101.1.6pmo/l 3Q-109.2 pmol/l - statistically irrelevant. PTH in total – 53.56 pg/ml, 1Q - 48.50 pg/ml, 3Q -49.49 pg/ml- statistically irrelevant. In Group 1 the frequency of polymorphism VDR was given in% (only Mut) FokI - 30.8% ApaI - - 21.3 TagI - Mut-13.5 BsmI - Mut - 45.1 D-binding protein average value 343.3 mg/l. Variants of DPB in% - rs 4588-CC-38.4%, AC-49.6%, AA-12.0%, rs 7041 –CC-38.4% AC 54.0% AA-21.6%

**Conclusion:** For both cohort groups there is a statistically relevant difference between the 1st and 3rd quarter for values of 25(OH)D. When detailed stratification of values for vitamin 25(OH)D in both groups, shows values between 10-20 nmol/l. The values of 1.25 (OH)2D and PTH do not show these changes. One possible option how to approach desired physiological values is an implementation of food fortification, specifically in milk, margarine, and baked goods.

## P461

## ASSOCIATIONS OF PREFRACTURE PSYCHOLOGICAL RESILIENCE AND PREFRACTURE GENERAL MENTAL HEALTH WITH PHYSICAL FUNCTION AFTER HIP FRACTURE SURGERY

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**Objective:** To examine the associations of prefracture psychological resilience and prefracture general mental health with physical function among older adults with hip fracture surgery.

**Methods:** Using data from Singapore General Hospital Hip Fracture Registry, we performed multiple linear regressions with generalized estimating equations to examine the associations of psychological resilience (10-item Connor-Davidson Resilience Scale) and general mental health (Short-Form 36 mental health subscale) with physical function (Short-Form 36 physical functioning subscale) measured at four time points – prefracture (based on recall), 1.5-, 3- and 6-month after surgery. Our analyses adjusted for age, gender, ethnicity, chronic disease counts, type of fracture, type of surgery and past fall. We performed sensitivity analyses by applying the final regression model on patients with complete and incomplete physical function data at follow-up, separately.

**Results:** Of 152 patients, majority were females (72.4%), of Chinese ethnicity (91.4%), experienced neck of femur fracture (66.4%), treated with internal fixation (50.7%) and had no falls in the past 1 year (73.7%). The average age of the patients was 75.5±8.8 years old; the average prefracture psychological resilience score was 28.1±6.7; the average prefracture general mental health scores 87.2±15.1. Follow-ups were 90.8%, 82.9% and 76.3% at 1.5-, 3- and 6-month respectively. Prefracture psychological resilience had an association with physical function; one unit increase in prefracture psychological resilience score was associated with 1.15 units (95%CI 0.71,1.59) higher physical function score across four time points. In contrast, the association between prefracture general mental health and physical function varied over time; one unit increase in prefracture general mental health score was associated with 0.42 units (95%CI 0.18, 0.66) higher physical function score at prefracture, 0.02 unit (95%CI -0.22, 0.18) lower at 1.5-month, 0.23 unit (95%CI -0.03,0.49) higher at 3-month and 0.39 unit (95%CI 0.09,0.68) higher at 6-

month after surgery. Sensitivity analyses yielded estimates with similar direction and strength.
**Conclusion:** Prefracture psychological resilience is associated with physical function among older adults with hip fracture surgery, independent from prefracture general mental health. The magnitude of this association suggests the potential for interventions aimed at strengthening psychological resilience to improve physical function among those undergoing hip fracture surgery. Our findings also call for more studies on psychological factors affecting physical function recovery after hip fracture surgery.

## P462
## BONE MINERAL DENSITY AND ITS RELATIONSHIP WITH MINERAL BONE METABOLISM PARAMETERS IN CHRONIC KIDNEY DISEASE

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**Objective:** The determination of BMD reliably determines the presence of bone fragility and predicts the risk of fracture in most clinical scenarios. The identification of modifiable factors that contribute to an accelerated loss of bone mass and risk of fracture could suggest new therapeutic strategies that would reduce fracture rates in this high-risk population. Our aim was to determine the relationship of BMD with bone mineral metabolism (BMM) parameters in patients with advanced chronic kidney disease (ACKD).
**Methods:** Prospective descriptive study of a cohort of patients with CKD from 2015-2017. Demographic data, smoking, history of fractures, diabetes mellitus (DM), renal disease etiology, BMI were collected. Analytical data such as calcium, phosphorus, magnesium, sodium bicarbonate (HCO3), eGFR measured by MDRD-4 IDMS, PTH, 25(OH)vitamin D3, 1,25(OH)vitamin D3, FGF-23 (Liaison XL chemiluminescence Diasorin) and in urine proteinuria, phosphaturia and calciuria, albumin creatinine ratio (CAC). Measurement of BMD was performed by DXA (QDR 4500A, Hologic). Treatments with nutritional and active VitD, binders (calcium/noncalcium). Statistical analysis using SSPS 22.0.
**Results:** We analyzed data from 183 patients with a median age of 64 (21) years. 53.5% males. Etiology more frequent with 23.1% diabetic nephropathy. DM 35.9%. Arterial Hypertension 90.4%. 42.1% smokers. 9.7% history of fractures. Use of phosphorus binders 25.5%, nutritional VitD 27.1%, VitD active 35.2%. eGFR 21.5 (7.9) ml/min. IMC 28.5 (8). ICharlson without age: 3 (3). Analytical data: Calcium 9.5 (0.6) mg/dl. Phosphorus 3.9 (1.3) mg/dl. Magnesium 2.1 (0.4) mg/dl. CAC 496 (1587). PTH 139 (82) pg / ml. Vit D25OH 22.4 (15.32) ng/ml. Vit D 1.25OH 52 (46) pmol/L. FGF-23: 213. Hb 11.5 (1.5) g/dl. HCO3 23. Phosphaturia 529 (320), calciuria 39.1 (47.9). Data BMD: BMD column 0.955 (0.228). BMD femoral neck 0.720 (0.217). T-score column -1.1. T-score femoral neck -1.3. Z-score column -0.3. T-score femoral neck -0.3. Osteoporosis column 19.9%. Femoral neck osteoporosis 24.2%. Between 60-80% of our patients have a decrease in BMD. The BMD correlates with sex and age, if we eliminate these variables, in hip it does so in a positive and significant way with BMI and negative with PTH and eGFR. PTH correlates negatively and significantly with eGFR and 25 (OH)vitD, and there is a significant correlation between BMD and vitD deficit. PTH increases with the decrease in BMD, although it is only significant in femoral neck osteoporosis. Patients with greater proteinuria have more osteopenia. We found association with renal function in a significant way only in Z-score femoral neck although not with the rest of the BMD parameters.
**Conclusions:** In our study, the use of BMD is of limited utility in relation to other BMM parameters in patients with CKD, probably due to the influence of hyperparathyroidism in this patient profile. However, vitamin D deficiency continues to be a factor that negatively influences BMD. Advanced stages of CKD have a negative influence on BMD, especially in the hip, although more studies are needed to establish this relationship.

## P463
## BONE DENSITOMETRY: IS IT USEFUL IN THE MANAGEMENT OF MOM IN PATIENTS WITH ADVANCED CKD?

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**Objective:** The presence of bone fragility and the prediction of fracture risk is reliably established by the measurement of BMD. On the other hand, in advanced chronic kidney disease (ACKD), the excess of FGF23, phosphaturia and calcitriol deficiency cause significant bone loss and fractures such as clinical presentation The relationship between alterations in bone mineral metabolism (MOM) in CKD and the risk of fracture is not clear. Our aim was to evaluate the situation with respect to BMD in patients with CKD incidents, determining their relationship with parameters of bone mineral metabolism (BMM).
**Methods:** Prospective descriptive study of a cohort of patients with ACKD from May 2015 to January 2018. We analyzed demographic data, smoking, history of fractures, diabetes mellitus (DM), etiology kidney disease, BMI, eGFR measured by MDRD-4 IDMS, calcium, phosphorus, magnesium,

phosphaturia and calciuria in urine 24 h, PTH, 25(OH)vitamin D3, 1,25(OH)vitamin D3, FGF-23, (chemiluminescence Liaison XL by Diasorin), BMD (DXA) (QDR 4500A; Hologic). Nutritional and active VitD use, phosphorus binders. Statistical analysis using SSPS 22.0.

**Results:** We analyzed 191 incident patients with ACKD from May 2015 to January 2018. 54.4% were males. Age: 63 y. The most frequent etiology of CKD was that associated with diabetes (23.3%). 9.1% had a history of fractures and 43% were smokers. BMD: BMD lumbar spine 0.929 g/cm$^2$. BMD femoral neck 0.671 g/cm$^2$. T-score lumbar spine -1.3. T-score femoral neck -1.8. Z-score lumbar spine -0.3. T-score femoral neck -0.6. 35.3% had osteoporosis either in the spine (18.7%) or the femoral neck (22.3%), being more frequent in women ($p<0.027$) and in the hip and in those with a deficit of 25(OH)vitD ($p<0.034$). 78% of patients have osteopenia, increasing with age ($p<0.007$). Only 16.1% had normal levels of 25(OH)vitD. PTH was correlated with 25OHvitD, 24-h phosphaturia, FGF-23 and Z-score lumbar spine. They were not found correlations between parameters of BMD and FGF-23, although there is a nonsignificant positive association between high levels of FGF-23 and BMD (Z-score). In those with no history of fractures, the T-score of the lumbar spine correlates with the highest quartile of FGF-23 (p 0.023).

**Conclusions:** In our study, the use of BMD is of limited utility in its relationship with other BMM parameters in patients with CKD, probably due to the influence of secondary hyperparathyroidism in this patient profile, finding no relationship between FGF 23 levels and risk of fracture, although increased values of FGF-23 could indicate early onset of BMD loss. Vitamin D deficit continues to be one of the factors that negatively influence BMD and its correction becomes a priority in patients with ACKD.

## P464

## 43 PATIENTS WITH MONOCLONAL GAMMOPATHY OF UNDETERMINED SIGNIFICANCE (MGUS) PRESENTING WITH SYMPTOMATIC VERTEBRAL COMPRESSION FRACTURES (SVCF)

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**Objective:** The presence of MGUS has been associated with vertebral fracture, is more prevalent among patients with SVCF, and is associated with an increased risk of fracture. A clinical description of patients with MGUS and SVCF is lacking. The objective of this study is to describe and compare the clinical details and circumstances of fracture in a cohort of patients with MGUS who presented with SVCF to a cohort with SVCF and no MGUS.

**Methods:** The clinical details of 43 patients with SVCF found to have MGUS was compared to those of 143 SVCF patients without MGUS. All patients were seen in a community based outpatient fracture clinic. All patients had a complete history and physical, review of past medical records and radiographs, CBC, sedimentation rate, chemistry profile, TSH. urinalysis, vitamin B12, PTH, 25-OH vitamin D, serum protein electrophoresis (SPE) and immunofixation.

**Results:** Among the patients with MGUS there were 23 females and 20 males ranging in age from 66-96 (mean 80.8 y), with a BMI of 19-36 (mean 26.0) and an average of 1.45 comorbid conditions. 18 patients had previous fractures. 2 patients were on steroids. 24 fractures occurred after falling, 14 spontaneously, 7 while lifting, and 1 with bending. 4 patients with pernicious anemia and one each with primary biliary cirrhosis, Kaposi sarcoma, CAPS, Schnitzler's and hepatitis C were diagnosed at the time of presentation. 14 patients had peripheral neuropathy. There were 53 fractures including 11 patients with 2 fractures. 66% of fractures were distributed from T-11 to L-2. M-spike ranged from 0.1- 2.0% composed of IgG -25, IgM -7, IgA-5, with lambda light chains in 21 and kappa in 18. SPE failed to detect a paraprotein found on immunofixation in 6 patients as well as in 5 with lambda light chain MGUS. There were more men ($p=0.029$) among the MGUS patients but all other clinical, laboratory, and fracture comparisons to non MGUS SVCF patients did not reach statistical significance.

**Conclusions:** Other than a higher percentage of males, MGUS patients presenting with SCVF did not differ from those without MGUS. Immunofixation is a better screening test for MGUS than SPE in patients with SCVF. Even with the understanding of the deleterious effect of MGUS on bone, the fact that MGUS is asymptomatic makes preemptive therapeutic intervention a challenge.

## P465

## EFFECT OF ULTRASOUND-GUIDED POPLITEAL NERVE BLOCK COMBINED WITH COCKTAIL THERAPY ON POSTOPERATIVE PAIN OF ANKLE FRACTURE

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**Objective:** To explore the effect of ultrasound-guided popliteal nerve block combined with cocktail therapy on postoperative pain of ankle fracture.

**Methods:** 30 patients with ankle fracture were divided into experimental group (ultrasound-guided popliteal nerve block +cocktail therapy group) and control group, according to the order of admission, 15 cases in each group. Ankle fractures were perfected by routine surgical

approach. Ultrasound-guided popliteal nerve block was used before operation and cocktails were injected around the wound after operation. VAS scores (rest and activity), incidence of adverse reactions, patients 'functional compliance, time to start functional exercise and ankle passive mobility were compared between the two groups at each time point after operation.

**Results:** Compared with the control group, the VAS score and the incidence of adverse reactions in the experimental group were significantly lower at each time point after operation, the patients' functional compliance was increased, the time of starting functional exercise was shortened, and the range of motion of ankle joint was increased.

## P466

## USING ARTIFICIAL INTELLIGENCE TECHNOLOGY TO IMPROVE CASE FINDING FOR VERTEBRAL FRACTURES IN THE FRACTURE LIAISON SERVICE (FLS) SETTING

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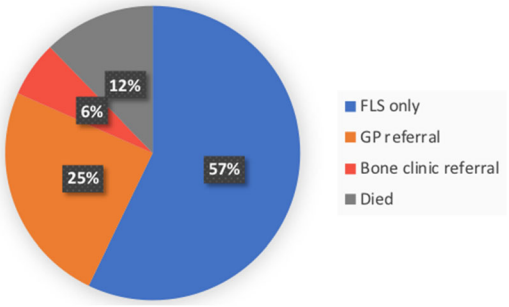
**Objective:** To evaluate the impact of semi-automatic artificial intelligence technology for identification of vertebral fractures in the FLS setting.

**Method:** We tested the implementation of a novel artificial intelligence technology embedded in tertiary hospital radiology system. All CT scans including thoracic or lumbar spine were automatically were analysed by the Zebra platform to identify those with a potential vertebral fracture. The results are outputted in a spreadsheet with a visualisation of the sagittal reconstruction to permit rapid verification by the FLS nurses (RE/SC), who have attended national and local training. Patients were classified as having definite vertebral fractures, nonfracture deformities or where the visualisation was not clear enough to decide. Patients with definite fractures were assessed for antiosteoporosis therapy. A consecutive series of 55 negative scans were checked for vertebral fractures.

**Results:** In 4 weeks, 4623 scans were sent to Zebra. Of these, 3318 (72%) were classified as negative. Of the 1305 positive scans, 633 (49%) required more detailed analysis using the PACS system, leaving 683 scans of which 279 (41%) were identified by the FLS nurses as definite fractures and 393 (58%) as negative. None of the Zebra negative scans sampled were found to have a vertebral fracture; if true for all negative scans, this gives an expected sensitivity of 100% and specificity of 89% excluding suboptimal scans. By age, 50% of screen positive scans were confirmed as definite vertebral fractures in those aged of 75 years and older vs. 32% in those aged 50-74 y ($p<0.01$).

**Figure: Clinical outcomes for 50 patients who completed FLS assessment following identification by the Zebra AI technology**




**Conclusion:** Using the Zebra AI system, 73% of eligible CT scans did not require further clinical review, a significant saving in terms of FLS time. The positive predictive value of screen positive scans was higher in those aged over 75 y vs. those aged 50-75 y, despite concerns that older patients would have more degenerative changes. Work is ongoing to improve the visualisation of the sagittal reconstruction and assess the impact of the pathway on anti-osteoporosis treatment recommendations and healthcare savings.

## P467

## CLINICAL OBSERVATIONAL STUDY OF OSTEOPOROSIS RISK FACTOR ASSOCIATION IN TYPE I DIABETIC PATIENTS AND MANAGEMENT

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**Objective:** Type 1 diabetes has detrimental effect on bone quality and has an association with increased fracture risk. We studied the association of risk factors for osteoporosis and management of bone health.

**Methods:** Design- Prospective observational cohort study. Setting- patients attending a large teaching hospital in UK. Subjects - randomly selected patients. Inclusion criteria-age >18 y, type 1 diabetes >5 y duration. Data was collected on structured proforma from patient questionnaire and medical records.

**Results:** 100 Patients included in the study. 55% were females. Age range 18-85 y, median age 40 y. Risk factors noted were family history of osteoporosis (30%), smoking (20%), excess alcohol (35%), steroids (12%), low BMI (22%), high BMI (35%), previous fragility fracture (15%), poor glycemic control (75%), nephropathy (18%), neuropathy (35%), falls history (5%), hypoglycemic episodes (65%), vitamin D deficiency (45%). Management-DXA scan done in 15% eligible patients out of which showed osteopenia (25%), osteoporosis (35%). Prescription for eligible patients- vitamin D (5%), calcium (5%), antiresorptive treatment (7%).

**Conclusions:** Our clinical real world observational data shows that risk factors for fractures and falls are widely prevalent in diabetics. Bone health management is not being adequately recognised and addressed by professionals. Appropriate measures aimed at risk factor control and fracture prevention needs to be considered by general practitioners and specialists as part of a routine care for diabetic patients. Further large studies are needed to allow risk stratification and targeting treatments for especially high risk patients which can reduce the economic burden associated with diabetes and its complications.

## P468

## ASSOCIATION OF CLINICAL RISK FACTORS FOR OSTEOPOROSIS AMONGST TYPE 2 DIABETIC PATIENTS AND MANAGEMENT: AN OBSERVATIONAL STUDY

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**Objective:** Type 2 diabetes has detrimental effect on bone quality and has an association with increased fracture risk. We studied the association of clinical risk factors for osteoporosis in diabetic patients and current practice of management of bone health.
**Methods:** Design- Prospective observational cohort study. Setting- patients attending a large teaching hospital in UK. Subjects - randomly selected patients. Inclusion criteria- type 2 diabetes >10 y duration. Data was collected on structured proforma from patient questionnaire and medical records.
**Results:** 120 Patients included in the study. 75% were females. Age range 50-90 y, median age 72 y. Risk factors noted were family history of osteoporosis(20%), smoking (20%), excess alcohol (15%), steroids (12%), low BMI (22%), high BMI (35%), previous fragility fracture (25%), poor glycemic control (65%), nephropathy (18%), neuropathy(45%), falls history (45%), hypoglycemic episodes (45%), vitamin D deficiency (65%) poor mobility (65%). Management- DXA scan done in 25% patients out of which showed osteopenia (45%), osteoporosis (68%). Antidiabetic drugs used metformin (75%), thiazolidinediones (0%), sulfonylurea (45%), SGLT2 and DPP4 inhibitors (25%), insulin (25%). Prescription for eligible patients- vitamin D (20%), calcium (55%), antiresorptive treatment (27%).
**Conclusions:** Our clinical real world observational data shows that risk factors for fractures and falls are widely prevalent in diabetics. Bone health management is not being adequately recognised and addressed by professionals. Appropriate measures aimed at risk factor control and fracture prevention needs to be considered by general practitioners and specialists as part of a routine care for diabetic patients. Further large studies are needed to allow risk stratification and targeting treatments for especially high risk patients which can reduce the economic burden associated with diabetes and its complications.

## P469

## VALIDATION OF THE 10-YEAR RISK OF OSTEOPOROTIC FRACTURES SCORE (FRAX) FOR THE CAUCASIAN POPULATION OF SIBERIA

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**Objective:** To validate the FRAX scale of the 10-y risk of osteoporotic fractures in Siberian population.
**Method:** The study was based on a population cohort (the HAPIEE Project, Novosibirsk) examined at baseline in 2003-2005, n=9360 men and women aged 45-69 y. In 2017-2018 during the repeated examination (n=828), we collected retrospectively the incident cases of osteoporotic fractures over the 10-y follow-up and calculated the 10-y risk of fractures by the FRAX scale. Totally, 574 subjects who were 50-69 years old at baseline survey (2003-2005) and only postmenopausal women were included for analysis. FRAX scale validation was carried out using ROC-analysis.
**Results:** Among studied 574 subjects (mean age 59.0±5.2) there were 234 men and 340 women. During the 10-y follow-up, osteoporotic fractures occurred in 9.6% subjects, women had fractures 4.5 times more often than men (13.2% and 4.3%, respectively, $p=0.001$). In studied sample the mean value of the risk of major osteoporotic fractures on the FRAX scale was 7.3±3.6% and in women it was significantly higher than in men, $p=0.001$. Observed FRAX values were higher then so called 'intervention point' (according to Russian FRAX version) in 3.5% individuals (3.2% - women, 0.4%- men). When validating the FRAX scale, the sensitivity (Se) was calculated as the proportion of those who had an incident fracture and a risk above the Russian intervention point by FRAX among total group with a fracture; Se comprised 9.1%. Specificity (Sp) was determined as the proportion of those with a risk of fracture below the intervention point among total group without fracture over the 10-y period; Sp comprised 97.1%. When using the ROC model for osteoporotic fractures, the area under the AUC curve was 0.65, which corresponds to the average quality of the model. In the range of risk distribution according to FRAX (from 2.2% to 26.0%), the cutoff point is defined by maximal Se and Sp and was of 7.65% (Se=61.8%, Sp=66.3%). The cutoff values for FRAX in the age subgroups (50-54, 55-59, 60-64, 65-69 y) were 6.15-7.65-7.65-7.85% respectively.
**Conclusions:** In studied Siberian population sample we observed a rather low sensitivity and high specificity of the Russian version of FRAX model in defining the risk of

fracture. The cutoff point identified in the study has a good diagnostic potential for identifying subjects with a high risk of fractures.

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## P470
## ENERGY EXPENDITURE OF NURSING HOME RESIDENTS AND PARTICIPATION IN EXERCISE CLASSES: AN ANALYSIS OF THE SENIOR COHORT

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**Objective:** Despite the positive effects of regular physical activity on health, the majority of nursing home residents spend most of their time inactive. However, data are lacking as to whether physical activity programs, organized in nursing homes in the form of exercise classes, increase weekly energy expenditure (WEE) of residents. This study aims at comparing, in Belgian nursing homes, the WEE generated by leisure physical activity of residents involved in group exercise classes to the WEE of residents who do not take part in such exercise classes.

**Methods:** We conducted a cross-sectional analysis of the baseline data collected from the SENIOR (Sample of Elderly Nursing home Individuals: An Observational Research) cohort. Self-reported energy expenditure over the last 7 days was assessed through the Minnesota Leisure Time Physical Activity (MLTPA) questionnaire. Residents were considered having participated in the exercise classes if they attended all exercise classes organized by the nursing home in the last two weeks prior to the evaluation.

**Results:** Among the 649 subjects (aged 83.2±9 y, 72.7% of women) with complete data, 25.3% (n=164) took part in all exercise classes. Taking into account the WEE related to such leisure physical activity (i.e., walking, climbing stairs and exercise classes), residents who participated in the exercise classes spent more energy per week compared to nonparticipants (respectively, 1230.92±811.37 vs. 740.67±734.83 kcal/week, $p<0.001$). After adjusting for potential confounding variables (i.e., age, sex and frailty status), the difference between the two groups remained statistically significant ($p<0.001$). Moreover, when we compared the WEE without the energy spent in exercise classes, there was no significant difference between the 2 groups (P=0.12).

**Conclusion:** Residents who participate in regular exercise classes generally spend more energy related to leisure physical activity during the week than those who do not participate. This means that residents who participate do not tend to be less active than the nonparticipating residents outside exercise classes. However, the self-reported nature of the MLTPA questionnaire justifies some cautions in the interpretation of the results.

## P471
## JUMPING JOINTS: THE COMPLEX RELATIONSHIP BETWEEN OSTEOARTHRITIS AND A JUMPING MECHANOGRAPHY

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**Objectives:** Jumping mechanography is a novel technique which has been validated for lower limb muscle assessment. We investigated the relationship between lower limb osteoarthritis (OA) and jumping mechanography outcomes in the Hertfordshire Cohort Study, comprised of UK community dwelling older adults.

**Methods:** We recruited 249 older adults (144 males and 105 females). OA was assessed clinically by a qualified healthcare professional according to ACR criteria and radiographically via X-ray. Two-footed jumping tests were performed using a Leonardo Mechanography Ground Reaction Force Platform (Leonardo software version 4.2; Novotec Medical GmbH) to assess maximum muscle force, power and Esslinger Fitness Index. Linear regression was used to assess the relationship between OA and jumping outcomes in models adjusted for anthropometric, dietary and social factors, grip strength (in all participants), pain (when examining associations with radiographic OA), years since menopause and hormone replacement therapy use (in females).

**Results:** The mean age of participants was 75.2 y (SD 2.6). There were no significant sex differences in the prevalence of clinical or radiographic OA at the knee or hip ($p>0.1$). In terms of jumping mechanography, males had a significantly higher maximum total power during lift off (mean 25.7 W/kg vs. 19.9 W/kg, $p<0.001$) and maximum total force during lift off 21 N/kg vs. 19.9 N/kg, $p<0.001$) than females. We found significant associations between maximum total power and clinical knee OA in males (-1.32 (-1.90, -0.73) z-score $p<0.001$) and clinical hip OA in females (-1.07 (-1.96, -0.18) z-score $p<0.02$). Esslinger fitness index was significantly associated with clinical knee OA in males (-1.31 (-1.89, -0.73) z-score $p<0.001$) and clinical hip OA in females (-1.09 (-1.98, -0.20) z-score $p<0.02$). No significant associations were observed for maximum total force.

**Conclusions:** We observed significant negative associations between maximum total power and Esslinger

Fitness Index and clinical OA in both sexes. The absence of associations with force concords with findings from leg dynamometry. Our findings provide an insight into the complex relationship between a novel measure of muscle function and OA in older adults.

## P472
## CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE ARABIC VERSION OF THE INTERMITTENT AND CONSTANT OSTEOARTHRITIS PAIN QUESTIONNAIRE

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**Objective:** To translate and evaluate the validity and reliability of the Arabic version of the intermittent and constant osteoarthritis pain questionnaire (ICOAP-AR) in Egyptian knee osteoarthritis (OA) patients.
**Methods:** The study included 210 patients who fulfilled the ACR criteria for knee OA. History taking, clinical examination and plain x-ray on both knees were done for diagnosis and grading of knee OA according to Kellgren-Lawrence scale. Questionnaire translation was conducted in 2 stages; forward translation from the original English version into Arabic, backward translation into English, face validation, and validation of the consolidated version. All the patients answered the questionnaire twice with an interval of 2-3 d. For test-retest reliability, intraclass correlation (ICC) was used and ICC of ≥0.70 was considered acceptable. Internal consistency was assessed by Cronbach's alpha coefficient and a Cronbach's alpha of ≥0.70 was considered satisfactory. Criterion validity was tested against the Arabic version of Knee Injury and Osteoarthritis Outcome Score (KOOS) and the severity of relevant clinical symptoms measured by 10-cm visual analog scales (VAS). Construct validity was analyzed using Spearman's rank correlation.
**Results:** The study included 75 males (35.7%) and 135 females (64.2%). The mean age was 54.2±10 y. According to Kellgren-Lawrence grading scale, 81 patients (38.5%) were grade 3, 66 patients (31.4%) were grade 2, and 60 patients (28.6%) were grade 4.The ICOAP-AR was well accepted in the face validity phase and satisfactorily understandable by the patients. Test-retest reliability yielded strong ICC of (0.99) for the total score, (0.992) for constant pain, and (0.995) for intermittent pain. Internal consistency using Cronbach's alpha was (0.904 for total score), (0.986 for constant pain), and (0. 980 for intermittent pain). The validity of ICOAP-AR was confirmed by negative correlations that existed between total score of ICOAP-AR and total KOOS (r=- 0.682) (p=0.0001), KOOS Symptoms (r=-0.658) (p=0.001), and KOOS Pain (r=-0.650) (p=.001). There was a significant weak positive correlation between the total score of ICOAP-AR and VAS (r=0.339) (p=0.004).
**Conclusion:** The ICOAP-AR is a reliable and valid instrument to be used with Egyptian patients with knee OA.

## P473
## ANTIRESORPTIVE PATIENTS IN RHUMATOLOGY: INTEREST OF PREVENTION IN ORAL MEDICINE: ABOUT TWO CASES

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Antiresorptive and Antiangiogenic agents have clearly been shown to be effective anti-osteoporotic drugs with a specifically bone mechanism of action, nevertheless they have a major side effect which is osteonecrosis of the maxillae, which despite its rarity in osteoporotic patients compared to those treated for malignant diseases must be taken into consideration, particularly by multidisciplinary support between rheumatologist and stomatologist by applying a prevention strategy for patients in pre-treatment or after finishing the treatment.
We illustrate two clinical cases; the first represents the restoration of the oral cavity before the initiation of bisphosphonate therapy through intravenous in SAPHO syndrome, the second case, an osteoporotic patient on oral bisphosphonate therapy who benefited from dental extraction without precautions.

## P474
## ASSOCIATED ALCOHOLISM EATING DISORDERS: AN INCREASED RISK FOR OSTEOPOROSIS DISEASE

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**Objective:** The present study aims to confirms how alcoholism and eating disorders are often associated and how this gives a greater chance of manifesting osteoporosis.
**Methods:** We analyzed meta-analysis studies from the search engine PubMed concerning eating disorders associated with alcohol use disorders. Only studies of the last 3 y have been analyzed. Subsequently, the data relating to the patients admitted for an alcoholic rehabilitation cycle have been analyzed.
**Results:** Food and alcohol disturbance, colloquially coined "drunkorexia," is a set of behaviors that encompasses restriction of calories, and other compensatory behaviors before, during, or after alcohol use to offset caloric intake or maximize intoxication. Many studies conclude that BMD in patients with alcohol dependence was significantly lower than that in healthy controls, and the rates of osteopenia and osteoporosis are higher. Importantly, abstinence from alcohol increases bone density. Alcoholic patients therefore have an increased risk of

developing osteoporosis compared to the general population. The association between eating behavior disorders and osteoporosis is equally well known. 1145 patients admitted for an alcoholic rehabilitation cycle were considered: they were for 71% males and for 28.2% females. Of these 1145.36 (3.14%) presented eating disorders declared; they were all females, they had an average age of 42.35. The association of these risk factors amplifies the possibility of developing osteoporosis.

**Conclusions:** Our data show how alcoholism and eating behavior disorders can often be associated. Scientific studies show that this can lead to an increased risk of developing osteoporosis.

## P475

## APPLICATION OF QUANTITATIVE BONE SCAN USING KBONE VALUES FOR THE ASSESSMENT OF REGIONAL BONE METABOLISM IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN TREATED EITHER WITH ALENDRONATE OR TERIPARATIDE

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**Objectives:** To compare and analyze the visual changes in the whole body 99mTc-MDP bone scan images in patients receiving either alendronate (AL) or teriparatide (TP) with bone scans at baseline, 3rd, 12th and 18th months of treatment and also to analyze these bone scan changes with bone turnover markers level in serum as well.

**Methods:** A total of 36 postmenopausal women with osteoporosis were included followed by written consent. Diagnosis of osteoporosis was made by DXA scan (T-score <-2.5 or below). Patients were categorized in two treatment groups (group 1 & 2) by random allocation methods. Group 1 and 2 were designated as AL arm and TP arm respectively. The changes recorded in patients were observed at baseline, 3rd, 12th and 18th months of therapy either with AL or TP. Patients were injected with 600 MBq 99mTc-MDP and diagnostic bone scan images were assessed at 3.5 h. Additionaly, whole-body scans at (10 min, 1, 2, 3 and 4 h), further analyzed for 99mTc-MDP skeletal plasma clearance (Kbone). Regional Kbone differences were obtained for the whole skeleton and following six regions (calvarium (CL), spine (S), pelvis (P),) lower extremities (LE), upper extremities (UE) and whole skeleton (WS) sites. Bone turnover markers such as urine NTx, BCTx BSAP and PINP were also measured with standard methods and were further correlation with bone scan values. Two-sample Wilcoxon rank-sum (Mann-Whitney) test was used. Data were represented in median (min-max) values and p value was considered significant as <0.001.

**Results:** The mean age, height and weight of patients were 59.68±8.01 y, 149.17±6.00 cm, and 54.88±9.40 kg respectively. The BMD, PTH, vitamin D, calcium, ALP and phosphorous were -3.9±0.8 g/cm$^3$, 49.23±17.30 pg/ml, 48.40±34.33 ng/ml, 9.17±0.54 mg/dl, 194.62±73.38 Ka/IU and 4.05±0.98 mg/dl respectively. Upon comparison at different regional bone changes in two groups, values were analyzed within and between groups at scheduled follow-ups. The between group p values of two bone resorption and formation markers were not statistically significant. Upon comparison the values of bone scan at different skeletal sites such as calvarium, spine, pelvis and upper extremity were not statistically significant. However, at lower extremity and whole skeleton sites the values were p .080 and p. 022 respectively and were found statistically significant.

**Conclusion:** By enlarge, TP & AL provides a comparable results for the treatment of osteoporosis but TP therapy appears moderately better than AL for the improvement at specific bone regions . However, it would be too early to frame a conclusion due to small sample size studied and thus a further large sample size based non-inferior trial is needed. Meanwhile, oral bisphosphonate (AL) being effective and affordable may remain a first line of therapy for the treatment of osteoporosis.

## P476

## CUTOFF OF LOW BONE MINERAL DENSITY IN β-THALASSEMIA MAJOR PATIENTS

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**Objective:** As different cutoff point for low BMD in thalassemia patients reported and low BMD is more treatable in early periods, it is very desirable if we find cutoff age for its incidence and help patients before that it is too late. In this study we tried to find such cutoff point via statistical analysis.

**Method:** Data from 741 major β-thalassemia patients, extracted from questionnaires of a BMD department. Questionnaires filled during a face to face interview by BMD operator. All of BMD measurements did only by one device Mean age of patients was 19.7±7 y/o and female to male ratio: 384/357. Children (<20 y/o) formed 49% of participants.

**Results:** Medical records of 741 patients used in this study. Prevalence of low BMD of neck and spine was 27% and 31% respectively. Negative significant correlations found between age, sex, diabetes, levothyroxine and Z-score BMD of femur (P values, <0.001, 0.003, <0.001 and 0.027, respectively). This significant correlation found also with Z-score BMD of spine (P values, <0.001, <0.001,<0.001 and 0.032, respectively). Male sex was a risk factor for low BMD in both regions (P values, <0.039 and 0.001, respectively). Being 17 and older increased the risk femur low BMD more than other ages and 40 times compared to younger patients (P values <0.001). Being 17 and older increased the risk spine low BMD more than other ages and 52 times compared to younger patients (P values <0.001). Being 17 and older also increased the risk femur and spine low BMD significantly and more than other ages, even when men and women analyzed separately.

**Conclusion:** On the basis of our results, we suggest that awareness about Low BMD and monitoring for it in thalassemics, should be done in their late childhood, for example in patients as young as 11 y/o.

## P477

## PREVALENCE OF VERTEBRAL FRACTURES IN POST LIVER TRANSPLANT PATIENTS

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**Objective:** To determine the prevalence of radiological vertebral fractures in post liver transplant patients.
**Methods:** We performed a prospective study of 84 consecutive patients aged >18 y who had undergone liver transplant from 2010-2017. Vertebral fractures were assessed semiquantitatively from lateral spine X-rays using Genant scoring.
**Results:** The prevalence of vertebral fractures was 46.4% patients. Thoracic fracture was seen in 26.2% patients (Grade 1- 18.3%, Grade 2- 8.3%, Grade 3- 3.6%) and lumbar fractures in 28.6% patients (Grade 1- 22.6%, Grade 2- 4.8%, Grade 3- 1.2%). There was no significant difference in the prevalence of fracture in patients with history of diabetes, smoking, alcohol, previous history of vertebral or upper limb fractures and receiving calcium and vitamin D supplementation however fractures were more common with increasing age. There was no significant differences in blood parameters like S.calcium, S.phosphorus, S.PTH, Vit D levels between patients with and without vertebral fractures. Vertebral fractures were also more prevalent in patients who had undergone transplant in the previous 1 year.
**Conclusions:** Bone status of the patients should be evaluated before and within 1 year after liver transplantation. Hence prevention of pre- and post-transplant fractures should focus on optimizing bone mass prior to transplant and prevention of further bone loss in the early post-transplant period.

## P478

## RELATIONSHIP BETWEEN OSTEOCALCIN, OSTEOPOROSIS AND ABDOMINAL AORTIC CALCIFICATION IN CHRONIC KIDNEY DISEASE PATIENTS

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**Objective:** Osteocalcin, a bone formation marker, is associated with arteriosclerosis and osteoporosis. We aimed to investigate the relationships among osteocalcin, abdominal aortic calcification (AAC), and BMD in chronic kidney disease (CKD) patients.
**Methods:** A total of 95 CKD patients, stage 2 to 5, were enrolled in our study. Serum osteocalcin was tested by electrochemiluminescence immunoassay. BMD was measured by DXA and AAC by lateral lumbar radiographs findings.
**Results:** 23 (24.2%) of CKD patients were found with osteoporosis and 43 (45.2%) with osteopenia. Compared with normal subjects (N=29) or osteopenia patients, osteoporosis group had older age (p=.001), more female (p<.0001), lower hemoglobin (p=.003), higher urine protein creatinine ratio (UPCR) (p=.001), higher osteocalcin (p<.0001), higher intact PTH (iPTH) (p=.0001), higher AAC score (p=.0002). and higher phosphorus (p=.032). Multivariate logistic regression showed age (b=1.156, p=.012), osteocalcin (b=1.11, p=.012) and female gender (b=12.05, p=.032) are independent risk factors for osteoporosis in CKD patients. Osteocalcin was positively correlated with Na (r=.23, p=.028), phosphorus (r=.263, p=.013), HbA1c (r=.259, p=.021), UPCR (r=.214, p=.038), AAC score (r=.225, p=.029), iPTH (r=.402, p<.0001), calcium channel blocker (CCB) use (r=.273, p=.007), Erythropoietin (EPO) use (r=.24, p=.019), while negative correlated with pulse rate (r=-.26, p=.011), eGFR (r=-.334, p=.001), hemoglobin (r=-.298, p=.005), BMD (r=-0.462, p<.0001), female gender (r=-.328, p=.001). After stepwise multivariate regression analysis, lower BMD (b=-4.684, p=.001), higher iPTH (b=.114, p=.014), EPO use (b=19.499, p=.022) were independently correlated with osteocalcin level.
**Conclusions:** We observed higher serum osteocalcin level is an independent risk factor for osteoporosis in CKD patients. Hyperparathyroidism, EPO use were positively correlated with serum osteocalcin level in CKD patients.

## P479

## XANTHINE OXIDASE AND XANTHINE DEHYDROGENASE ACTIVITIES IN RHEUMATOID ARTHRITIS AFTER GLUCOCORTICOID TREATMENT

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**Objective:** to assess the changes of xanthine oxidase and xanthine dehydrogenase activities in plasma and lysed lymphocytes of rheumatoid arthritis (RA) patients when average therapeutic doses of methylprednisolone and betamethasone were administered.
**Methods:** 47 RA patients (verified with ACR/EULAR criteria (2010)) with moderate disease activity in accordance with DAS28 were included in the study. The control group consisted of 30 healthy individuals. RA patients were divided into 2 groups comparable by sex, age and clinical manifestations. Patients of the first group were treated with methylprednisolone (metipred, Orion Corporation (30 mg)). Patients of the second group were treated with betamethasone (diprosan, Schering-Plough Labo N.V. (7 mg)). Glucocorticoids were administered intramuscularly in both groups. The changes of xanthine oxidase (XO, EC 1.2.3.2) and xanthine dehydrogenase (XDG, EC 1.2.1.37) activities were studied in plasma and lysed lymphocytes in RA patients when average therapeutic doses of methylprednisolone and betamethasone were administered as previously described [1].
**Results:** Mean age of patients (±SD) was 41.8±1.05 y, mean RA duration (±SD) was 7.9±0.21 years. Decreased XO activity and increased XDG activity were observed in plasma of RA patients just after the injection of the average therapeutic doses of glucocorticoids, as well as in lysed lymphocytes just after the injection of metipred. While enzymatic patterns did not reach the level of healthy controls. The switchover of the final stage of purine metabolism along the way of utilization of hypoxanthine and xanthine under the catalysis of XDG leads to decrease in the production of active forms of oxygen (AOS). It can be considered that a decrease in the production of AOS along with the characteristic ability of glucocorticoids to stabilize lysosomal and cell membranes also helps to reduce the formation of neutrophil extracellular traps.
**Conclusion:** The increase of XDG activity and the decrease of XO activity were observed in plasma and in lysed lymphocytes of RA patients after methylprednisolone (metipred) treatment. The increase of XDG activity and the decrease of XO activity were observed in plasma of RA patients after betamethasone (diprospan) treatment. XO-mediated AOS production during glucocorticoid treatment is decreased, and this effect can exert beneficial influence on autoimmune inflammation in RA.
**Reference**: 1. Zborovsky AB et al. Terapevticheskiy Arkhiv 2010;82:48

## P480
## OSTEOID OSTEOMA: IMAGING DIAGNOSIS

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**Objective:** Osteoid osteoma represents 10 to 12% of all benign bone tumors. Jaffe described in 1935 by first, usually presenting a typical clinical and radiological picture. It arise in children, adolescents, and adults up to the age of 35 y, consulting with a history of pain occurring mostly at night and which is relieved by salicylates. The diagnosis of osteoid osteoma hinges upon detection of the nidus, a focus of bone tissue showing variable mineralization, embedded in a highly vascular connective tissue stroma. The nidus represents the tumor with the zone of sclerosis representing the host bone's response to the presence of the lesion. Our aim was illustrating the imaging aspects of osteoid osteoma.
**Method:** the study included 6 patients who performed radiography, CT and RM in the Oradea County Hospital with histopathological confirmation.
**Results:** Our series comprise six patients with osteoid osteoma(4 M/2 W). The nidus was seen in all six cases: a radiolucent focus known as the nidus surrounded by reactive sclerosis; an area of low attenuated with a central high attenuation component; a ringlike or rounded area of intermediate SI on T1 and of relatively high SI on T2. Central calcification of the nidus present in two cases, and peripheral hyperostosis in all cases were seen as areas generating no signal on both SE-sequences on MR. Surrounding medullary involvement had an intermediate SI on T1 and a relatively high SI on T2 and was seen in three cases. Synovial thickening or fluid at the adjacent joints was seen only once.
**Conclusions:** The radiologist'duty is to recognize the imaging features, exclude mimics. CT is the most useful imaging modality to confirm a suspected osteoid osteoma.

## P481
## CT ASPECTS IN TRAUMATIC CONDITIONS OF THE COXO-FEMORAL JOINT IN PATIENTS WITH OSTEOPOROSIS

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**Objectives:** Osteoporosis is a metabolic bone disorder characterized by a reduction of the BMD below the normal limit, resulting in an increased bone fragility that is associated with an increased risk of bone fracture caused by microtraumatism or moderate intensity trauma [1]. The aim of our paper was to correlate computed tomography (CT) data from patients with traumatic lesions of the femoral head or congenital disorders of the femur (femoral head avascular necrosis, malformations etc.), with the patient's medical history and data obtained from DXA performed after the initial examination [2].
**Methods:** The clinical study was performed on a group of 183 patients (114 women, 69 men), aged between 47-82 y, who

presented to the Emergency Department of the County Clinical Emergency Hospital of Craiova during 2017-2018. The CT examinations were performed on a 16-slice Toshiba Astelion machine.

**Results:** Out of 183 patients included in the study group, 76 had a displaced fracture of the femoral neck and associated an ascension of the distal fragment. Also, structural bone changes like demineralisation of the bone tissue in the proximal part of the femur as well as thinning of the cortical bone were reported. Subsequent evaluation of patients with fractures included in the study during hospitalization through DXA test revealed incipient osteoporosis in 24 patients and advanced osteoporosis in 52 patients. In 8 patients, the DXA test did not reveal osteoporotic changes but other bone pathologies were described (femoral head avascular necrosis – 2 cases and genu varum/genu valgum type malformations – 6 cases).

**Conclusion:** The subsequent evolution and medical recovery of these 8 patients required hospitalization for a longer duration and complex medical procedures compared to the group of patients with fractures caused by osteoporosis.

**References:**

1. Link TM. Radiology 2012;263:3.
2. Trăistaru MR et al. Rom J Morphol Embryol 2015;56:1447.

## P482

## THE ROLE OF MAGNETIC RESONANCE IMAGING IN ASSESSING VERTEBRAL BONE PATHOLOGY IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS UNDERGOING CORTICOTHERAPY TREATMENT

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**Objectives:** Osteoporosis in patients with rheumatoid arthritis can often be asymptomatic and patients are most frequently diagnosed based on the associated risk factors or fractures caused by an increased bone fragility [1]. MRI can be used to evaluate the trabecular structure of the bones thus offering additional information regarding the structure of the bone marrow. Some of the structural bone changes that affect the spine in patients with osteoporosis include: intravertebral disc herniations (Schmorl nodes), bone edema associated with asymptomatic microfractures and, in some cases, vertebral body collapse and fractures [2].

**Methods:** The study included 50 female patients diagnosed with rheumatoid arthritis and undergoing corticotherapy, aged between 59-76 y, who underwent musculoskeletal MRI examinations on a Philips Ingenia 3 Tesla device in the Medical Imaging Department of the University of Medicine and Pharmacy of Craiova.

**Results:** Out of 50 patients included in the study group, 20 had intravertebral disc herniations, 12 had bone edema affecting the vertebral plates adjacent to one or more intervertebral discs, 3 had vertebral body compression fractures and only one patient presented noninfectious spondylodiscitis caused by osteoporosis.

**Conclusion:** The technological progress allowed MRI bone examinations to establish an accurate and early diagnosis of axial lesions caused by osteoporosis.

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## P483

## INCIDENCE OF HEPATIC OSTEOPATHY IN PATIENTS WITH LIVER CIRRHOSIS

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**Objective:** Hepatic osteopathy refers to the changes that occur in the bone structure in patients with liver cirrhosis and mainly includes osteopenia, osteoporosis and osteomalacia.

**Methods:** The study included 150 patients diagnosed with liver cirrhosis caused by various etiological factors. We evaluated the bone structural changes through DXA and determined the bone density through computed tomography (CT) and correlated this data with parameters of the bone metabolism (serum levels of vitamin D, calcium, calcitonin, PTH) and biochemical parameters that reflect the liver function. The study also included a control group (150 patients without any liver pathology) in which we evaluated the exact same parameters.

**Results:** The results of the study highlighted a decrease of the bone density affecting the spine in 20 patients (13.3%) and the peripheral regions in 38 patients (25.3%), compared to the control group where osteoporosis recorded an incidence of 5% and 7%, respectively. Osteopenia was described in 60 patients (40%). Regarding the etiology of liver cirrhosis, osteoporotic changes were more frequently encountered in alcoholic patients, rather than in patients with hepatitis B or C viral infections. This was caused mainly because of the reduced enteral absorption of calcium due to the prolonged cholestasis. The changes affecting the bone structures remain asymptomatic for a long period of time; however, in time, they can generate fractures that affect the vertebral bodies or the femoral neck.

**Conclusion:** Hepatic osteopathy occurs relatively frequently in alcoholic liver cirrhosis and is correlated with the severity of the liver disease. Clinical manifestations are caused by an alteration of the phosphocalcic metabolism generated by the malabsorption process and are associated with an increased risk of developing bone deformities and bone fractures in these patients.

## P484
## ROLE OF BONE MARKERS IN EVALUATING THERAPEUTIC RESPONSE IN PATIENTS WITH OSTEOPOROSIS

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**Objective:** Osteodensitometry is the most commonly used method for diagnosing osteoporosis. However, regardless of the treatment, measuring BMD for assessing treatment efficiency is only suitable after one year of proper treatment. Therefore, bone markers are considerably more useful in monitoring treatment efficiency and in estimating the risk of osteoporotic fractures.
**Methods:** We studied a group of 50 female patients diagnosed with postmenopausal osteoporosis. We evaluated the initial grade of osteoporosis using DXA and serum levels of β-CrossLaps (β-CTx) and osteocalcin. One year after following osteoporosis specific treatment, the patients included in the study group were re-evaluated using the same protocol as before treatment.
**Results:** After one year of proper treatment with bisphosphonates and bone matrix fixators, the DXA test performed in all 50 patients included in the study revealed an improvement of the T-score in 42 patients (84%), while the serum levels of the bone markers were elevated in 44 patients (88%). This aspect suggested an increased efficiency of the treatment and was associated with an increased bone formation rate.
**Conclusion:** The sensitivity of serum bone markers is superior to osteodensitometry in assessing the effectiveness of the osteoporosis treatment after one year.

## P485
## EFFECT OF BIOLOGICAL THERAPY ON BONE MINERAL DENSITY IN PATIENTS WITH SPONDYLOARTHRITIS

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**Objective:** To investigate the effect of biological DMARD (disease modifying antirheumatic drugs) therapy to BMD in patients with spondyloarthritis.
**Methods:** The research included 96 male patients with ankylosing spondylitis and psoriatic spondyloarthritis. The respondents were divided into two groups: group A (64 patients) received treatment with biological medicines (etanercept-50 mg/week; adalimumab-40 mg/2 weeks and infliximab 5mg/kg/8 weeks) and the group B control group (32 patients) was not given the biological therapy. In both groups there were litlle patients who were treated with nonbiological DMARD therapy and none of them received systemic glucocorticoids in the last year. For measuring of BMD we used DXA method with Hologic. Measuring was performed on hip at the beginning of the research and repeated after 24 months. Responders did not receive therapy for osteoporosis, except supplements. Appropriate statistical methods were applied using SPSS.
**Results:** The groups were comparable by age (group A: 38.2 ±11.4 y, group B: 40.2±10.6 y), duration of illness (group A: 7.3±6.4, group B: 8.5±6.7 y) and number of patients who received non biological DMARD therapy (group A: 29.5%, group B: 24.4%). The average value BMD (g/cm$^2$) was not significantly different between groups at the beginning of the research (group A: 0.972 g/cm$^2$, group B: 0.957 g/cm$^2$, p=0.424). After 24 months, we recorded significant increase of BMD in the group A (1.015 g/cm$^2$, p<0.05) and significant decrease in the group B (0.897 g/cm$^2$, p<0.05). At the end of this research we detected statistically significant increase in the group treated by biological DMARD drugs in comparison to the control group (p<0.05). Five osteoporotic fractures in group A and 11 osteoporotic fractures in group B were recorded, which was a statistically significant difference (p<0.05).
**Conclusion:** 24 months long treatment with biological DMARD therapy at our patients with spondyloarthritis caused significant improvement of BMD and reduction in frequency of osteoporotic fractures.

## P486
## FRACTURE RISK ASSESSMENT (FRAX) IN WOMEN THROUGH RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY

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**Objective:** Due to the global burden of the osteoporotic fractures, FRAX model was released in 2008 by the WHO Collaborating Centre at Sheffield to compute 10-y probabilities of major osteoporotic and hip fractures. Country specific FRAX models have been developed based on both incidence of fractures and mortality. The aim of this study was to assess the fracture risk in women through radiofrequency echographic multispectrometry (REMS).
**Methods:** FRAX tool of the University of Sheffield was used to assess the 10-y probability of major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture) and hip fracture. Following risk factors were investigated: previous fractures, parent fractured hip, current smoking, rheumatoid arthritis, glucocorticoids, secondary osteoporosis, alcohol three or more units/d and BMD. Patients between 40-90 y were included in the study. Due to the lack of country specific FRAX model for Bulgaria, FRAX model of Romania was used. BMD values of lumbar spine and femoral neck were measured through REMS technology.
**Results:** 97 women with mean age 62.9±11.1 y (range 40-84) were included in the study. According to the BMD assessment of the lumbar spine, the mean 10-y absolute fracture risk for major fractures was 15.4±11.3%, and for hip fractures 4.6 ±6.1%. According to the BMD assessment of the femoral neck, the mean 10-y absolute fracture risk for major fractures was

17.7±13.5%, and for hip fractures 5.9±8.4%. The prevalence of some major risk factors for osteoporosis was as follows: previous fractures – 39.2% of all women, parent fractured hip – 2.1%, smoking – 21.6%, rheumatoid arthritis – 30.9%, glucocorticoids – 18.6%, secondary osteoporosis – 0% and alcohol three or more units/d – 6.2%. The factors associated with significantly increased fracture risk were previous fractures (p=0.000) and use of glucocorticoids (p=0.008).
**Conclusion:** This is the first study which reported 10-y absolute fracture risk for major fractures and hip fractures through REMS technology. In this study, we could identify that previous fractures and use of glucocorticoids were significantly associated with increased fracture risk.

## P487

## COMPARISON OF THE IMPROVEMENT OF T-SCORE IN SENILE PATIENTS WITH OSTEOPOROSIS BETWEEN THE GROUPS WITH DENOSUMAB/NANDROLONE DECANOATE AND IBANDRONIC ACID/NANDROLONE DECANOATE

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**Objective:** In some patients with severe osteoporosis, a lack of change in T-score measured with DXA method after one year could be observed, despite the administration and good tolerance of the main medications. After assessing the risk factors and clinical evaluation in these cases, nandrolone decanoate could be included in the main therapy. Anabolic steroids are an effective remedy for the treatment of postmenopausal and senile osteoporosis in the absence of contraindications. They increase both bone and muscle strength and muscle volume.
**Methods:** A total of 51 senile patients with osteoporosis were included in the study. Inclusion criteria was previous therapy either with denosumab or with ibandronic acid in patients with osteoporosis without any improvement of the T-score within the first year of the main treatment. 47% (24/51) of the patients were treated with combination of denosumab and nandrolone decanoate and 53% of the patients (27/51) were treated with combination of ibandronic acid and nandrolone decanoate. Baseline T-score values of lumbar spine and T-score values of lumbar spine after one year were measured using DXA method.
**Results:** The mean age of the patients treated with denosumab/nandrolone decanoate was 72±6.6 y and 69±2.2 y of those treated with ibandronic acid/nandrolone decanoate. The mean baseline T-score value of the patients treated with combined therapy of denosumab and nandrolone decanoate was -3.02±0.42 SD and the mean T-score value after one year was -2.71±0.36 SD. The mean baseline T-score value of the patients treated with combined therapy of ibandronic acid and nandrolone decanoate was -2.92±0.25 SD and the mean T-score value after one year was -2.76±0.60 SD. Improvement of the T-score with 0.31 SD after one year has been achieved with denosumab/nandrolone decanoate and with 0.16 SD with ibandronic acid/nandrolone decanoate.
**Conclusion:** Combined therapy with denosumab and nandrolone decanoate in senile patients showed better improvement of the T-score value after one year compared to those treated with ibandronic acid and nandrolone decanoate.

## P488

## MINODRONATE IS MORE EFFECTIVE THAN RALOXIFENE IN PREVENTING FRACTURES IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN WITH MODERATELY DECREASED BMD: SUBGROUP ANALYSIS OF JAPANESE OSTEOPOROSIS INTERVENTION TRIAL (JOINT-04)

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**Objective:** To clarify clinical factors affecting the therapeutic effectiveness of the antifracture agents, minodronate (MIN) and raloxifene (RLX), against osteoporosis in a subgroup analysis of JOINT-04.
**Methods:** JOINT-04 is a multicenter, open-label randomized controlled, head-to-head comparison of MIN and RLX in Japan. The participants comprised postmenopausal women aged >60 y with at least one risk factor for fractures (age >70 y, at least one previous vertebral fracture, low BMD and T-score <-3.0). The incidence of clinical vertebral and major osteoporotic femur, radius and humerus fractures was assessed during a period of 2 y. Both MIN and RLX were essentially equally effective in preventing overall fractures (presented at IOF Regional Sydney 2018). Therefore, we compared the antifracture effects of both agents among subgroups of participants based on fracture risk at baseline.
**Results:** Osteoporotic fractures occurred in 211 of 1623 and in 226 of 1624 participants in the MIN and RLX groups, respectively, during the observation period. These values did not significantly differ. In contrast, among participants with vertebral fractures stratified according to age, number of previous vertebral fractures and baseline BMD, risk was significantly reduced in those with BMD T-scores ≥-3.0 (IRR 0.47; 95%CI 0.30-0.75; p=0.0012), but not in those with BMD T-scores <-3.0 within the MIN group. A significant effect modification was not found in interaction tests. The incidence of vertebral fractures did not differ between MIN and RLX subgroups stratified by age or number of previous vertebral fractures. The results were similar for major osteoporotic fractures.

**Conclusion:** The incidence of osteoporotic fractures was lower in MIN, than in RLX subgroups with BMD T-scores of ≥-3.0. Therefore, MIN might prevent fractures more effectively than RLX in postmenopausal women with moderately, but not extremely decreased BMD.

## P489

## VITAMIN D DEFICIENCY AMONG PATIENTS WITH METFORMIN INDUCED B12 DEFICIENCY

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**Objective:** Metformin produce low vitamin B12 levels by mechanisms related to alterations in gut absorption [1-10]. The objective of this study is to evaluate if patients with metformin induced vitamin B12 deficiency have higher prevalence of vitamin D deficiency.
**Methods:** Cross sectional study. 156 patients were included. Patients were classified in three groups according to B12 levels, low, <200 pg/ml and borderline, 201-300 pg/ml or normal, >300 pg/ml. Vitamin D status was obtained from the records of the patients and was classified as deficiency, <20 ng/mL, insufficiency, 20-30ng/mL, or normal, >30 ng/mL. The prevalence of vitamin D insufficiency and deficiency was evaluated in the three groups.
**Results:** 156 patients were collected. Low level of vitamin D was found in 27% (CI95%:21-35%) and deficient level of vitamin D in 16% of the total population (CI 95%: 11 – 22%). In patients with low levels of B12, 42% (CI95% 21-67%) had low levels of vitamin D, in patients with borderline B12 levels, 27% (CI 95% 15-44%) had low levels of vitamin D and patients with normal B12, 25% (CI 95% 18-34%) had low levels of vitamin D. There was a positive correlation between B12 levels and Vitamin D levels.
**Conclusion:** Low level of vitamin D is frequent among metformin treated patients in the studied population. Patients with low and borderline levels of vitamin B12 have a higher prevalence of low levels of vitamin D. There were a positive correlation between B12 levels and vitamin D levels. More studies are needed to confirm if there is any association between metformin use and vitamin D deficiency.
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## P490

## CORRELATION OF SARCOPENIA WITH EARLY FUNCTIONAL OUTCOME AND 1-YEAR MORTALITY IN HONG KONG CHINESE GERIATRIC PATIENTS WITH HIP FRACTURE

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**Objective:** Hip fracture is common in elderly after fall, causing disability, lower quality of life, mortality and increase in healthcare burden. Annually, over 8000 patients were admitted to Hospital Authority due to traumatic hip fracture while Queen Elizabeth Hospital (QEH) accounted for 13.7%. Hip fracture is mostly treated operatively, followed by rehabilitation. Rehabilitation plan and prognosis can be determined by early functional outcome. Meanwhile, 1-y mortality of hip fracture patients is high, approximately 18% in Hong Kong. Numerous factors are shown to be significant prognostic predictors; however, limited studies have investigated the contribution from Sarcopenia on functional outcome and 1-y mortality. Our aim was to investigate the correlation among sarcopenia, early functional outcome and 1-y mortality in geriatric ambulatory patients with hip fracture.
**Methods:** A retrospective study was conducted. Patients aged 65 years old or above and admitted to QEH due to acute hip fracture after fall with DXA received within 1 month from April 2016 to March 2017 were reviewed. Outcome measures on 1) relative appendicular skeletal muscle mass index (RASM) measured by DXA, 2) handgrip strength (HGS), 3) elderly mobility scale (EMS) at first ambulation (EMS-1), 4) EMS at discharge from QEH (EMS-DC) and 5) 1-y mortality were retrieved for analysis. Definition of sarcopenia developed by the Asian Working Group for Sarcopenia, analyzing RASM and HGS, was adopted. Correlation between sarcopenia and EMS was evaluated by rank-biserial correlation analysis. Correlation between sarcopenia and 1-y mortality was evaluated by Pearson's chi-square test. Prediction model of 1-y mortality was evaluated using logistic regression analysis.
**Results:** 219 patients (mean age=83.0±7.2 y) (82 males, 137 females) were reviewed. Prevalence of sarcopenia was 51.6%. 1-y mortality rate was 12.8%. There were significant correlations between sarcopenia and EMS-1 ($r_{rb}$=-0.160, $p$=0.023), and between sarcopenia and EMS-DC ($r_{rb}$=-0.269, $p$<0.001). Sarcopenia was associated with 1-y mortality ($\chi^2$=5.290, $p$=0.021). 1-y mortality rate of patients with sarcopenia and without sarcopenia was 18.0% and 7.5% respectively. Patients with sarcopenia were more likely to face mortality within 1 y ($R^2$=0.046, OR=2.692, $p$=0.025).
**Conclusion:** Early detection of sarcopenia is crucial for early implementation of appropriate rehabilitation and treatment in Hong Kong Chinese geriatric ambulatory patients with hip fracture.

## P491

## IMPACT OF ORAL VITAMIN D SUPPLEMENTATION ON SERUM CARBOXYPEPTIDASE N AND NITRIC OXIDE LEVELS IN SAUDI ADULTS

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**Objective:** Vitamin D deficiency is highly prevalent in Saudi Arabia. It is therefore important to recognize which biochemical markers are modulated by vitamin D status in response to vitamin D supplementation in such a population. The study aimed to determine the associations of carboxypeptidase N (CPN) and nitric oxide (NOx) levels with serum 25(OH) D in response to vitamin D supplementation in a Saudi population.
**Methods:** A total of 111 vitamin D deficient (25OHD <50nmol/l) adult Saudis aged 18-50 years old (57 females & 54 males) were enrolled in this 6-month interventional study and were given 50000 IU cholecalciferol given weekly for first 2 months, then twice a month for next 2 months, followed by daily 1000 IU for the last 2 months. Serum NOx concentration was measured, using the Griess method, concentration of carboxypeptidase N was measured using ELISA according to the standard protocols and manufactures guidelines. 25(OH)vitamin D was analyzed using COBAS e-411 automated analyzer (Roche Diagnostics, Indianapolis, USA). All parameters were measured at baseline and after intervention.
**Results:** Postsupplementation median 25(OH) D was significantly higher ($p<0.001$) in all females [58.3 (50.6-71.2)] and males [57.8 (51.0-71.8)]. HDL-cholesterol significantly increased ($p=0.05$) while NOx significantly decreased ($p=0.02$) in males postsupplementation. The postsupplementation serum levels of CPN2 did not differ significantly among male subjects. CPN2 was significantly inversely correlated with NOx ($r=-0.218$, $p=0.05$) among the male subjects postsupplementation.
**Conclusion:** Vitamin D supplementation reduces NOx, particularly in males. Inhibition of NOx synthesis may be one mechanism responsible for the anti-inflammatory effects of vitamin D supplementation.

## P492

## EROSIONS AND SYNOVITIS: ASSOCIATED OR NOT WITH LOW BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS?

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**Objectives:** To assess the correlation between BMD of the wrist and the presence of wrist erosions and synovitis determined by ultrasound in a group of patients with rheumatoid arthritis (RA).
**Methods:** The study included 40 females diagnosed with RA according to ACR/EULAR 2010 criteria with mean age of 52.4 (±11.2) y and average disease duration of 3 y (1-14). The BMD was measured using DXA of the nondominant forearm and lumbar spine. Erosions and synovitis were assessed through musculoskeletal ultrasound (MUS) of the wrist with both longitudinal and transverse scans. Mandatory laboratory tests consisted of C reactive protein (CRP) and erythrocyte sedimentation rate (ESR) [1, 2].
**Results:** Rheumatoid factor (RF) was positive in 77.5% of cases, while anticitrullinated protein antibodies (ACPA) were positive in 70% of patients. Disease activity determined by disease activity score (DAS) 28 with CRP was low in 17.5%, moderate in 40% and high in 42.5% of cases, respectively. 45% of patients had osteoporosis, while osteopenia was encountered in 47.5% of cases assessed by both wrist and lumbar spine DXA. The percentages of erosions (72.22% vs. 63.15%) and synovitis (61.11% vs. 52.56%) in the osteoporosis group were higher than in the osteopenia group. Positive RF and ACPA rates were also higher in osteoporosis group. DAS 28 proved a strong correlation with wrist BMD ($p<0.05$).
**Conclusions:** Disease activity has an important impact on the development of wrist osteoporosis in RA patients. Also, the presence of RF and ACPA predict the risk of low BMD. Erosions and synovitis determined by MUS are more frequent findings in patients with wrist osteoporosis.
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## P493

## RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY TO COMPARE THE EFFICACY OF COMBINATION OF LIDOCAINE WITH KETOROLAC OR TRIAMCINOLONE VS. LIDOCAINE ALONE FOR SOFT TISSUE INJURIES

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**Objectives:** Corticosteroids injections and local anesthetics are commonly used in sports medicine. It showed superior short-term pain relief (6 weeks) but potentially serious complications such as skin discoloration, chronic tendinopathy, infections and tendon rupture. Ketorolac tromethamine (ketorolac) is a short-term pain-reducing nonsteroidal anti-inflammatory drug (NSAIDs. Different injection techniques have previously been tested but no studies have yet compared the efficacy of the ketorolac and steroid injection. Our primary objective is to evaluate the pain intensity scores among lidocaine, ketorolac 30, mg 60 mg, and triamcinolone 10 mg, 20 mg, 40 mg. We tested the hypothesis that ketorolac should reduce the pain as same as steroids.

**Methods:** 144 patients were recruited. A randomized, double-blind, parallel-group, placebo-controlled 6 arms study, we divided in 1:1:1:1:1:1 ratio to receive either one of lidocaine (control), ketorolac 30 mg, 60 mg, and triamcinolone 10mg, 20 mg, 40 mg (experimental). 18 subjects were excluded due to decline to participate. We randomized 126 subjects in 6 group. In each 5 experimental group we had 1 loss follow-up. Discontinued 1 subject in control group. 20 subjects in each group were accessed. The primary endpoint evaluated by the pain intensity scores (scale from 0-100 mm). The time intervals were accessed at 10 min, 30 min, 1 h, 2 h, 6 h, 1 d, and 7 d. Secondary endpoints were the ability to return to normal activity within 30 min, time to have the first pain medication, assessment of patient satisfaction levels on pain control at 2 h and at 24 h after intervention and adverse event effect.
**Results:** For the primary objective, in 1 h the pain significantly decreased in ketorolac 30 mg (p=.022), 60 mg (p=.017) as the same as triamcinolone 10 mg (p=.003) and 40 mg (p=0.008). For secondary objective, the ability to return to normal activity within 30 min was the highest in ketorolac 60 mg, ketorolac 30 mg, and triamcinolone 20 mg, respectively. Average time to normal activity was the lowest in triamcinolone 20 mg (12.35 min) and the highest in triamcinolone 40 mg (20.65 min). Time of having first pain medication was the lowest in ketorolac 30 mg for 9 h. The highest satisfaction average score at 2 h and 24 h were ketolac 30 mg and ketorolac 60 mg. 1 adverse event in control group. Subject had more pain intensity.
**Conclusions:** It is well established that ketorolac had a short-term benefit. It confirms that ketorolac had the same efficacy as triamcinolone. But less complication and safer than triamcinolone. Findings in this study may help the practitioners who want to avoid the side effect of steroids. However, the larger study focus on the role of ketorolac in local soft tissue injection may need to proof the concept of this study.

## P494
## KNEE OSTEOARTHRITIS IN PATENTS WITH HYPOTHYROIDISM: AN ULTRASOUND STUDY

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**Objectives:** To evaluate the musculoskeletal ultrasound (MUS) findings in knee osteoarthritis (OA) in patients with hypothyroidism.
**Methods:** Our study group included 26 females with mean age of 57.4 (±9.54), diagnosed with hypothyroidism, undergoing hormonal substitutive treatment. All patients had history of mechanic knee joint pain with morning stiffness lasting up to 30 min. Clinical assessment of both knees and MUS using a linear multi-frequency array probe were considered mandatory tests for inclusion in the study.
**Results:** Clinical examination of the knee joint showed crepitations during flexion and extension of the knee in 61.53% of patients, tenderness at palpation in 50% of cases and bulge sign in 11.53% of patients. Uni and bilateral knee pain was present in 20.77% and 69.23% of cases, respectively. Ultrasound evaluation of both knees assessed irregularities of the margins of the articular cartilage in 69.23% of cases, with the loss of hyperechogenicity in the same percentage. "Step-up" bone cortical irregularities with femoral and tibial osteophyte aspect were described in 46.15% of patients, predominantly in the medial compartment. Protrusion of the medial meniscus with the elongation of the medial collateral ligament was discovered in 38.46% of cases. Joint effusion and Baker cysts were assessed in 26.92% and 19.23% of patients, respectively.
**Conclusions:** Hypothyroidism is associated with the risk of osteoarthritis and more ultrasound changes upon examination due to the fact that thyroid hormones have known effects at the cellular level on proliferation and differentiation of bone and cartilage.

## P495
## THE ENIGMA OF FRAGILITY FRACTURE WITH NORMAL BONE MASS: EXPERIENCE OF A LIAISON SERVICE FRACTURE UNIT

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**Objectives:** Fragility fracture with normal bone densitometry (DXA) is controversial. The hypothesis varies between the fragility and a lower quality of bone. Our aim was to describe the characteristics of patients with fragility fracture and normal DXA treated in an FLS unit.
**Methods:** Prospective 6-y observational study of a FLS fracture unit. Demographic variables, FRAX items, DXA and TBS were collected. The characteristics of patients with normal and abnormal DXA are described. The statistical analysis was performed by means of a descriptive, comparing the normal DXA / osteopenia / osteoporosis groups by means of contingency tables, Fisher's exact test, Student's t-test or ANOVA, as appropriate, as well as regression analysis.
**Results:** 1631 patients were included, 205 with normal DXA (12.5%), 747 with osteopenia (45.8%) and 680 with osteoporosis (41.6%). Patients with normal DXA were characterized by a higher percentage of males, a younger age and a higher BMI. Hip fracture was less frequent in patients with normal DXA, while the frequency of other fractures was higher. The frequency of previous fracture, history of hip fracture of the parents and secondary osteoporosis was lower in patients with normal DXA. The TBS and FRAX values were higher in the cases of normal DXA compared to osteopenia and osteoporosis. In the multiple regression analysis, excluding TBS, remained significant associated

with abnormal DXA age (OR 1.04; 1.03-1.06), sex (OR 2.48; 1.71-3.58), BMI (OR 0.91; 0.89-0.94)) and parent hip fracture (OR 1.99; 1.11-3.58). Including TBS <1,230 as a dichotomous variable (N=451 cases) remained significant age (OR 1.03; 1.00-1.06), sex (OR 3.58; 1.81-7.10) and TBS (OR 5.23; 1.55-17.68).

Table.

| | Bone densitometry | | |
|---|---|---|---|
| | Normal | Osteopenia | Osteoporosis |
| N | 205 | 747 | 680 |
| Sex (male), N (%)** | 54 (26) | 140 (19) | 84 (12) |
| Age in years, mean (DE)** | 68,8 (10) | 71,3 (9) | 74,2 (10) |
| BMI, mean (DE)** | 31,4 (10) | 29,4 (5) | 27,1 (7) |
| Type of fracture, N (%) | | | |
| Forearm** | 75 (36) | 284 (38) | 206 (30) |
| Hip** | 21 (10) | 188 (25) | 148 (22) |
| Humerus** | 44 (21) | 111 (15) | 168 (25) |
| Spine* | 14 (7) | 61 (8) | 79 (11) |
| Others** | 51 (25) | 102 (13) | 76 (11) |
| FRAX items, N (%) | | | |
| Previous fracture** | 18 (8) | 111 (14) | 145 (21) |
| Parent's hip fracture** | 14 (7) | 73 (10) | 98 (14) |
| Smoking | 23 (11) | 92 (12) | 80 (13) |
| Corticoids | 14 (7) | 51 (7) | 42 (6) |
| Rheumatoid arthritis | 3 (1) | 16 (2) | 16 (2) |
| Secondary osteoporosis** | 24 (12) | 117 (15) | 150 (22) |
| Alcohol | 10 (5) | 40 (5) | 28 (4) |
| >1 fall in the last year, N (%)$ | 65 (43) | 211 (40) | 200 (41) |
| TBS, mean (DE) ** | 1,220 (469) | 1,166 (426) | 1,115 (435) |
| Degraded TBS, N (%)**& | 3 (5) | 38 (18) | 47 (25) |
| FRAX, mean (DE) | | | |
| Major fracture** | 5 (3) | 9 (5) | 18 (10) |
| Hip fracture** | 1 (1) | 3 (3) | 9 (8) |

*P<0,05; **P<0,01; $ analyzed in 1.161 patients; & analyzed in 451 patients

**Conclusions:** Patients with fragility fracture and normal DXA are younger, with more frequent males and with BMI and higher TBS values.

## P496

## CHEILECTOMY AND MOBERG-AKIN OSTEOTOMY OF THE PROXIMAL PHALANX AS TREATMENT FOR MILD AND ADVANCED OSTEOARTHRITIS OF THE FIRST METATARSOPHALANGEAL JOINT OFFERS A BENEFICIAL CLINICAL AND RADIOLOGICAL EFFECT AFTER 6 AND 12 MONTHS: A PROSPECTIVE STUDY

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**Objective:** This study assessed the clinical and radiological outcome after cheilectomy and proximal phalangeal biplanar osteotomy in a large cohort of patients with mild and advanced stages of hallux rigidus.

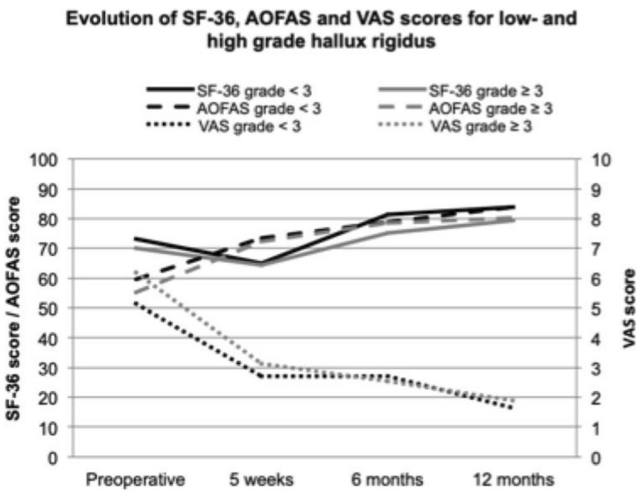
**Methods:** A total of 105 feet (Coughlin and Shurnas grade 0 to 4) were prospectively included in this study and were treated with cheilectomy and a Moberg-Akin osteotomy of the proximal phalanx. All patients were clinically assessed preoperatively and followed up for 12 months by range of motion, VAS pain score, American Orthopaedic Foot and Ankle Society (AOFAS) score, Short Form 36 (SF-36) score, and weight-bearing radiographs. All parameters were analysed at different points in time and results for low-grade (grade <3) and high-grade (grade ≥3) hallux rigidus were compared.

**Results:** We observed a statistically significant ($P<0.001$) improvement of mobility, pain, function and quality of life for all patients and both subgroups. No significant differences in VAS scores, AOFAS scores and SF-36 scores were observed between subgroups at 12 months.

**Table 1:** SF-36 score, VAS pain score, AOFAS score and ROM for hallux rigidus grade < 3 and grade ≥ 3 at different points in time. Results of the overall scores are presented as mean values and standard deviations.

| | *n* | Preoperative | 5 weeks | 6 months | 12 months |
|---|---|---|---|---|---|
| SF-36 grade < 3 | 63 | 73.12 ± 15.78 | 64.93 ± 15.04 * | 81.52 ± 12.64 * | 84.03 ± 10.79 * |
| SF-36 grade ≥ 3 | 38 | 70.11 ± 15.77 | 64.41 ± 14.98 * | 75.27 ± 18.81 | 79.48 ± 12.85 * |
| VAS grade < 3 | 63 | 5.14 ± 2.13 | 2.71 ± 2.23 * | 2.71 ± 2.21 * | 1.64 ± 1.44 * |
| VAS grade ≥ 3 | 38 | 6.18 ± 1.76 | 3.13 ± 2.17 * | 2.55 ± 2.15 * | 1.89 ± 2.02 * |
| AOFAS grade < 3 | 63 | 59.62 ± 9.74 | 73.51 ± 8.70 * | 78.98 ± 12.71 * | 84.07 ± 10.94 * |
| AOFAS grade ≥ 3 | 38 | 55.24 ± 10.36 | 72.26 ± 10.18 * | 78.71 ± 10.85 * | 80.38 ± 15.05 * |
| Active ROM gr < 3 | 63 | 44.90 ± 13.69 | 42.25 ± 12.98 | 56.14 ± 13.79 * | 62.34 ± 18.68 * |
| Active ROM gr ≥ 3 | 38 | 36.41 ± 14.42 | 35.61 ± 10.71 | 47.50 ± 11.09 * | 51.35 ± 12.98 * |
| Passive ROM gr < 3 | 63 | 55.29 ± 14.13 | 52.41 ± 13.19 | 65.32 ± 14.03) * | 71.32 ± 17.59 * |
| Passive ROM gr ≥ 3 | 38 | 45.03 ± 14.56 | 44.82 ± 14.36 | 57.32 ± 14.15 * | 61.57 ± 13.34 * |
| Passive dorsiflexion gr < 3 | 63 | 21.54 ± 9.66 | 24.63 ± 10.41 * | 33.41 ± 13.94 * | 36.59 ± 16.27 * |
| Passive dorsiflexion gr ≥ 3 | 38 | 13.08 ± 7.92 | 18.76 ± 6.67 * | 27.26 ± 11.80 * | 30.76 ± 12.69 * |

*Significant difference compared to preoperative situation ($P < 0.05$).



**Conclusion:** Cheilectomy and biplanar osteotomy of the proximal phalanx is a safe and effective procedure with a positive effect on clinical and radiological outcome after 6 and 12 months and offers an attractive alternative for arthrodesis, even in advanced stage hallux rigidus.

## P497

## INTRA-ARTICULAR PTH(1-34) IMPROVED KNEE FUNCTION IN A PRECLINICAL AGING-RELATED OSTEOARTHRITIS MODEL WITHOUT AFFECTING SUBCHONDRAL BONE

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Osteoarthritis (OA) is prevalent in geriatrics and incurable. Intra-articular PTH(1-34) improved OA in papain-induced OA model. Subcutaneous PTH(1-34) is a potent agent for osteoporosis treatment and high dose of subcutaneous PTH(1-34) can alleviate OA progression. Thus, we examined the roles of PTH treatment on aging-related OA. The purposes of this study were to study whether PTH can alleviate OA progression in an aging-related knee OA in Dunkin Hartley (DH) strain guinea pigs. Specifically we set out to determine (1) whether PTH improves knee function; (2) PTH can alleviate OA progression in histological study; and (3) the effects of PTH is related to subchondral bone change or not. Fifteen 6-month-old male guinea pigs were divided into the 9M group (n=7) and the 9M+PTH group (n=8) and twelve 7-month-old male guinea pigs were divided into the 11M group (n=6) and the 11M+PTH group (n=6). The treatment right knees were intra-articular injected with 40 μl of 10nM PTH (1-34) or vehicle once weekly for 3 months until 9 month-old at both 9M and the 9M+PTH groups and till 10 month-old at both 11M and the 11M+PTH groups. Another eight 6-month-old guinea pigs and 7-month-old guinea pigs were served as young control groups, 6M and 7M respectively. The time of the guinea pigs can withstand in the treadmill were evaluated before sacrifice. The bone mass of tibia plateaus were analysis by μCT and histological study. PTH(1-34) increased the endurance in the treadmill test and GAG stain. In addition, PTH(1-34) decreased OARSI score and chondrocyte apoptosis rate. In μCT, there was no difference in subchondral plate bone density and trabecular bone volume at metaphysis between control and treatment group both at 9 and 11 months. In this study, we further found PTH(1-34) could improve aging-related OA in guinea pig in histology by increasing GAG and decreasing OARSI score and knee function by increasing the endurance in the treadmill test. Subchondral bone plays a crucial role in the initiation and progression of OA. Previous study showed subcutaneous PTH(1-34) improved knee OA via improving subchondral and metaphyseal bone mass. In this study, we demonstrated low dose intra-articular injection PTH(1-34) improved spontaneous OA via direct cartilage effect rather than subchondral and metaphyseal bone effect.

## P498

## INFLUENCE OF FEMORAL NECK BONE MINERAL DENSITY ON FRACTURE RISK ASSESSMENT USING THE COUNTRY-SPECIFIC FRAX TOOL IN REPUBLIC OF MOLDOVA

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**Objective:** To compare 10-y major and hip fracture risk, using the local country-specific FRAX assessment tool, with and without femoral neck BMD in Republic of Moldova.
**Methods:** A total of 162 women and 75 men were included in the study. A careful medical history was taken, followed by physical examination, in order to assess 10-y fracture risk using the country-specific FRAX assessment tool for Republic of Moldova. Bilateral hip DXA scan was performed, followed by repeated fracture risk assessment, with added femoral neck T-score to the FRAX tool. Mean fracture risk comparison was performed, both between study groups, as well as between assessments before DXA and after DXA scan, with subsequent femoral neck T-score input.
**Results:** 10-y probability risk was higher in women than men. For major fractures this was true before DXA evaluation (10.9% vs. 5.4%, $p<0.05$), as well as after DXA evaluation (8.0% vs. 6.5%, $p<0.05$). A similar situation was found for hip fractures before DXA (3.9% vs. 1.2%, $p<0.05$), as well as after DXA (2.4% vs. 1.9%, $p<0.05$). When comparing mean fracture risk in women, a higher probability of fracture was determined before input of femoral neck T-score (10.9% vs. 8.0% for major fracture and 3.9% vs. 2.4% for hip fracture, $p<0.05$). In men, an opposite result was found, with higher fracture risk after input of femoral neck T-score (5.4% vs. 6.5% for major fracture and 1.2% vs. 1.9% for hip fracture, $p<0.05$).
**Conclusion:** Preliminary studies show that the use of the country-specific FRAX tool for Republic of Moldova, without input of femoral neck T-score values, tends to yield a slightly higher, but significant, fracture risk in women, and a slightly lower fracture risk in men, compared to the fracture risk assessment using the femoral neck T-score.

## P499

## ASPECTS OF RECOVERY OF LOW BACK PAIN IN THE ELDERLY PATIENT

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**Objective:** Low lumbar pain caused by musculoligamental imbalance produces static and kinetic behavior inadequate to daily

demands. In a person over 60, persistence of pain can be a risk factor for his ability to cope with self-care needs. There is a correlation between age, pain, fragility, comorbidity, and later disabilities. Physical therapy is an important therapeutic tool in the prophylaxis, therapy and recovery of these painful syndromes. Most of the studies conducted and published reveal the benefits of acquiring and systematically practicing a physical exercise program and joint hygiene corresponding to the etiology, diagnosis and stage of the lumbar pain syndromes. This study aimed to measure the therapeutic effects on the quality of life and lower lumbar pain in patients over 60 years of age, with or without the genetic predisposition of fragility syndrome.
**Methods:** We tracked two groups of patients relatively homogeneous from the point of view of the demographic and clinical characteristics but between them in the presence of the genetic predisposition of the elderly fragility syndrome between November 2017 and November 2018. At the introduction of the study, the patients had algomatic and functional symptoms in the lumbosacral column with at least one year of age. Both groups have performed balneotherapy-based spa programs in Felix Resort, thermotherapy, masotherapy, electrotherapy and last but not least kinesitherapy and occupational therapy, applied over three decades over a 1-y period. Physical therapy was continued at home at a rate of three sessions per week. We evaluated pain, static and dynamic rash syndrome, root, dural and myofascial, global physical performance, inventory of Beck anxiety and quality of life. Data was processed statistically.
**Results:** The results evaluated before and at the end of the monitoring showed improvement in the statistical significance ($p \leq 0.05$) in physical performance scales, in patients with "active and healthy aging" in those with equilibrium disorders of easily controllable causes (high blood pressure, alcohol consumption, sedatives) and who have had an increased complement to the program. Patients with a poor initial physical condition with the genetic predisposition to fragility syndrome and who had anxiety with worrying potential had temporary improvements.
**Conclusions:** The persistence of pain in an elderly person may become a future deficit in the picture of fragility syndrome. Identifying genetic predisposition and changing lifestyle leads to improved physical condition and prevents the early appearance of fragility syndrome. Medical recovery (e.g., early mobilization, avoidance of prolonged bed rest), physical exercise and occupational therapy maintain functional and cognitive status. Completion of treatment depends on prophylaxis and professional therapy with a full team engagement

## P500
## LOW ONE- AND TWO-YEAR MORTALITY RATE IN ELDER HIP FRACTURE BY FRACTURE LIAISON SERVICE PROGRAM

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**Objectives:** Hip fractures cause acute pain and loss of function, and often lead to hospitalization. After acute hip surgery, in-hospital mortality may be as high as 9.5% and 1-y mortality as high as 14-36%. Therefore, care to reduce mortality after hip fracture is an important task for orthopedic surgeons. Orthogeriatric management in patients with hip fracture can reduce mortality rates as well as institutional costs through reduced length of inpatient stay. Fracture liaison services (FLS) are coordinator-based, secondary fracture prevention services implemented by healthcare systems for the treatment of osteoporotic patients. The FLS is designed to close the care gap for fracture patients and enhance communication between healthcare providers by providing a care pathway for the treatment of fragility fracture patients. This study reported one year medical effectiveness of a care model of hip fracture patients cared by orthopaedic surgeon and some complicated patients cared by with orthogeriatricians with subsequent FLS program.
**Methods:** This prospective cohort study was conducted at a tertiary referral hospital and a secondary referral hospital approved by the institutional review board of the hospital. All patients with fragile hip fracture who were aged ≥60 y and who underwent surgery between Jan 2014 to May 2016 were included in this study. When the patients had complicated medical conditions unsuitable for surgery or unstable condition after surgery, orthogeriatricians were consulted for co-care in the Orthopedic ward or they will take over the patients for further care in Geriatric ward if the patients were highly complicated for care in the Orthopedic ward. FLS was conducted after patients signed inform consent following the 13 'Capture the Fracture Best Practice Standards'. Core strategies include BMD, FRAX estimation, lifestyle consultations, screening for secondary osteoporosis, medications, and fall assessments (high risk only) provided mainly by coordinators. The FLS system is set up to remind patients to take their medications at home or to return to clinic for regular injections of medications. Major outcomes included the completion rates of BMD, vertebral fracture examination, secondary causes of osteoporosis, treatment initiation rate, and medication review. Each patient would be assessed at baseline, and every 3 months for the first year.
**Results:** We screened 224 patients to enroll 207 of them. Mean age was 75.12±10.11 y, 73.7% were women. BMD <-2.5 were found in 184 patients. 137 (66.2%) had previous vertebral fracture. 37 patients were co-cored by orthogeriatricians with mean Charlson comorbidity index (CCI) of 3.7. Ten of them were transferred to geriatric ward for further care. We had 100% completion rate for fall prevention services, lifestyle assessments and medication review. 191 of the 207 patients had anti-resorptive pharmacological treatment, 8 with anabolic agent and 8 with calcium and vitamin D supplement only. Among the antiresorptive medication, denosumab was use in 134 patients due to its convenience. There was no in hospital mortality in patients participate in FLS. After during the first

year, 6 patients withdraw from the study due to leaving from the care hospital or inconvenience to come back for follow-up. At the end of study, 201 patients finished the study with 196 patients survived. One-year mortality rate was 2.49% (5/201). Two-year mortality rate was 3.98% (8/201).

**Conclusion:** High incidence of previous vertebral fractures (66.2%) before hip fracture occurred. The results indicated treatment of vertebral fractures with antiresorptive medication such as alendronate, zoledronate or denosumab may decrease the subsequent hip fractures. The previous data of one year mortality after hip fracture was 18% in male and 11.2 in female on 2009 in Taiwan which was lower than many previous reports. Orthogeriatric management in patients with hip fracture can reduce mortality rates; however, the care capacity by orthogeriatricians was limited due to few orthogeriatricians available. Therefore careful selection of patients for orthogeriatricians co-care or transfer to Geriatric ward for further care is important. In our care model, most of the patients co-cared by orthogeriatricians had multiple comorbidities. Previous studies have demonstrated that CCI higher than 3 leads to 2.4 times higher mortality rate. When the patients were more complicated and required frequent visits by doctors and nurses, transferring the patients to Geriatric ward were suggested. Not only doctors but also nurses in Geriatric ward are more capable of caring patients having multiple medical underlying diseases than doctor and nurse in Orthopedic ward. Experienced nurses in Geriatric ward are alert and able to find the medical situation changes of patients than nurses in Orthopedic ward. With the co-care of patients with multiple comorbidities by with orthogeriatricians with subsequent FLS program, the one year mortality rate decrease to 2.49% (5/201) and two year mortality rate was 3.98% (8/201).. FLS was able to increase the rates of assessment of BMD for bone health and the rates of osteoporosis treatments in elderly with high fracture risks. This co-care model with orthogeriatricians in high risk patients who usually had multiple comorbidities with subsequent FLS program increased the treatment rate of underlying disease and therefore reducing mortality after hip fracture. Co-care care with orthogeriatricians program also can enhance the ability of orthopedic surgeons for the management of medical condition of patients. With meticulous reviews of medical underlying disease, the patients were advised to receive follow-up at geriatric or medical clinic after discharge. Keeping treatment of comorbidities after discharge may be the important factor to reduce mortality. FLS program can efficiently follow not only the treatment of osteoporotic fractures, but also encourage patients to keep treatment of their comorbidities at geriatric or medical clinic.

## P501
## LOW BONE QUALITY IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES WITH OR WITHOUT ANTIRESORPTIVE THERAPY

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**Objective:** Type 2 diabetes is a risk factor for osteoporotic fracture. In addition to increased falling risk due to various diabetic complications, decreased bone quality such as bone microstructure is thought to be an important contributing factor. Trabecular bone score (TBS) is a novel texture index that evaluates the pixel gray-level variations in lumbar spine DXA images and is related to bone microarchitecture independent of BMD.

**Methods:** We investigated lumbar spine TBS as an indicator for skeletal microarchitectural deterioration in type 2 diabetes. We included 86 type 2 diabetic and 212 nondiabetic Korean postmenopausal women older than 50 y with or without antiresorptive medications who visited the Chonnam National University Hospital. Medical records were reviewed retrospectively. Serum 25OHD, CTX, osteocalcin and other laboratory data were acquired after overnight fasting. BMD was measured at the lumbar spine using DXA (Hologic Discovery-Wi). All TBS measurements were performed retrospectively using the TBS iNsight Software, ver. 3.0.2.0 (Med-Imaps) using spine DXA files from the database.

**Results:** The number of patients with antiresorptive drugs and duration of medication use were not significantly different between diabetic and nondiabetic women. Lumbar spine BMD was higher in type 2 diabetic women (0.828±0.170 vs. 0.750±0.107 g/cm$^2$, $P<0.01$) than in nondiabetic women, whereas lumbar spine TBS was not significantly different between two groups (1.329±0.077 vs. 1.328±0.071). Both serum osteocalcin (14.40±7.11 vs. 17.11±8.30 ng/ml, $p<0.01$) and CTX (0.250±0.135 vs. and 0.300±0.186 ng/ml, $p<0.05$) levels were significantly lower in diabetic women than in nondiabetic women. Serum 25OHD level was similar between two groups (22.5±11.2 vs. 24.7±10.2 ng/ml).

**Conclusion:** Although lumbar spine BMD was higher in diabetic women, lumbar spine TBS was not different between diabetic and nondiabetic women with or without antiresorptive medications. It suggest deterioration of bone microarchitecture in diabetic women when considering the higher BMD status.

## P502
## CORRELATION OF VITAMIN D STATUS AND NEWLY DEVELOPED OSTEOPOROTIC FRACTURES IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS DURING A YEAR OF BISPHOSPHONATE THERAPY

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**Objectives:** Vitamin D, its active metabolites and analogues represent the group of compounds with numerous functions

within the organism. The primary role of vitamin D is in the metabolism of phosphorus and calcium. It is also known that vitamin D helps with bone formation. Osteoporosis is a generalized bone disease characterized by disordered bone stiffness increases causing a predisposition to fractures. Vitamin D status within the organism is determined by measuring the level of 25(OH)D in the serum. The purpose of this research was to determine the status of vitamin D in women with newly diagnosed postmenopausal osteoporosis and to determine the correlation of vitamin D status and newly developed osteoporotic fractures after 12 months of bisphosphonate therapy.

**Methods:** The research included 104 women with newly diagnosed postmenopausal osteoporosis and who haven't taken vitamin D as prevention of osteoporosis. The examinees were prospectively followed for 12 months, during which they were at the following therapies: bisphosphonate (alendronate 70 mg weekly or ibandronate 150 mg monthly), vitamin D 800 IU daily. All the examinees were determined with the level of 25(OH)D by ELISA method. All of the examinees were defined with their BMD on the lumbar spine and hip, measured with DXA on the Hologic Discovery machine. New fractures were confirmed by a radiographic image.

**Results:** The examined group consisted of 104 women with newly diagnosed postmenopausal osteoporosis and with insufficiency. deficiency and normal status of vitamin D. Average age of the examinees was 63.56±7.35, average duration of menopause was 13.74±8.35 y and average value of 25(OH)D was 47.46±10.52 nmol/L. With all examinees the level of Ca, P and ALP in serum and level of Ca and P in 24-h old urine were in reference limits. A normal vitamin D status was found in 12 examinees (11.54%), deficiency of vitamin D in 81 (77.89%) and insufficiency of vitamin D in 11 (10.57%). In the group of 11 examinees with vitamin D insufficiency, 4 of them (36.36%) had fractures, before the start of therapy; in the group of 81 women with vitamin D deficiency 18 of them (22.22%) had fractures; in the group of 12 women with normal vitamin D status fractures had 2 of them (16.67%). The difference between compared groups was statistically significant ($p<0.01$). After 12 months of bisphosphonate therapy, in the group of examinees with vitamin D insufficiency, 2 of them (18.18%) received new osteoporotic fractures (in total 54.54%); in the group with vitamin D deficiency, new osteoporotic fractures received 2 of them (2.47%) (in total 24.69%); in the group with normal vitamin D status, not even one examine did not receive a new osteoporotic fractures. The difference between compared groups was statistically significant ($p<0.01$). Univariate and multivariate logistic regression analysis showed that the initial level of 25 (OH) D as an important predictor of the presence of new fractures occurred during the 12 months of bisphosphonate therapy and that any initial increase in 25 (OH) D for 1 nmol/l was associated with a reduction in the risk of new fractures by 1.6%.

**Conclusion:** Our results show that the insufficiency and deficiency of vitamin D in women with postmenopausal osteoporosis represent a significant risk factor for osteoporotic fractures. The initial vitamin D status was significantly associated with the newly developed osteoporotic fractures after 12 months of bisphosphonate therapy.

## P503

## COMPARISON OF OSTEOPOROSIS IN SAUDI FEMALE PATIENTS WITH BRONCHIAL ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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**Objectives:** Comparison of osteoporosis in Saudi female patients with bronchial asthma and chronic obstructive pulmonary disease. To compare the degree of osteoporosis in Saudi females with bronchial asthma (BA) and those with chronic obstructive pulmonary disease (COPD) who had never received systemic corticosteroids.

**Methods:** A total of 176 Saudi female patients with bronchial asthma (n=96) and COPD (n=80) or who had not received systemic corticosteroids were enrolled in the study with (mean age, 54.6±4.2 y). All patients received chest physiotherapy, at Saudi German Hospitals, Jeddah. Medina, Riyadh, KSA. Total body and lumbar BMD were measured by DXA, and the data were compared between the two groups. Serum levels of osteocalcin and total urinary deoxypyridinoline were measured in urine samples. Blood calcium, phosphate, total protein, albumin, BUN, creatinine, alkaline phosphatase, and urinary concentration of calcium, phosphate and creatinine were measured. BMI was calculated in all patients. In addition, the association between bone mass and clinical variables was determined.

**Results:** When lumbar BMD was expressed as a Z-score, the Z-scores of patients with COPD were significantly lower than those of patients with BA ($p<0.01$). The T-scores of patients with chronic obstructive pulmonary diseases (-2.54 ±0.32) were significantly lower than those of patients with bronchial asthma (-1.01±0.35) ($p<0.01$). The prevalence of osteoporosis was also significantly higher in patients with COPD ($p<0.05$). In patients with COPD, BMI was positively correlated with BMD in the lumbar spine ($p=0.02$) and total body ($p<0.03$).

## P504

## BCOR SARCOMA: BREAKING THE NEW GROUND

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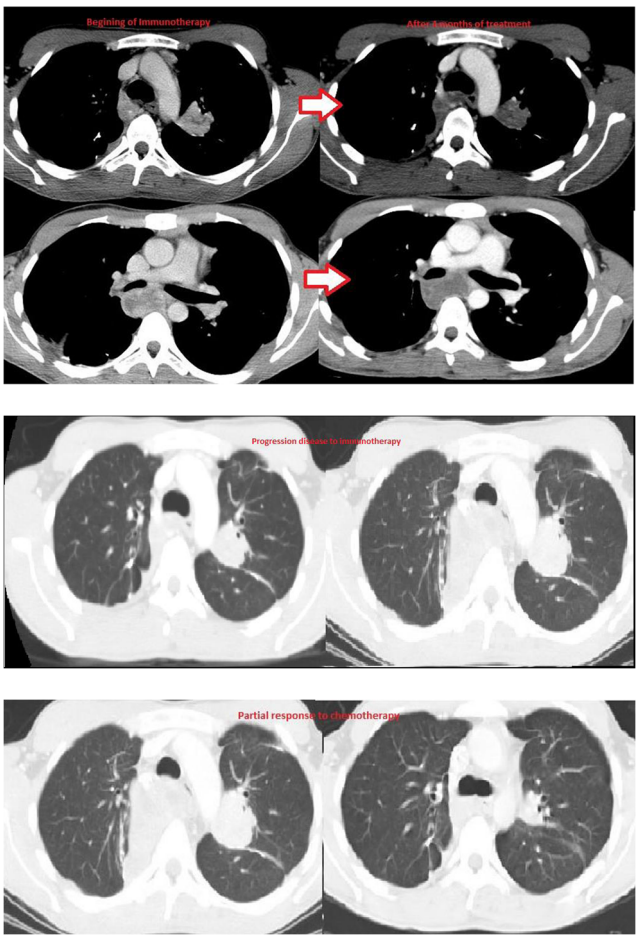
**Objective:** To review BCOR sarcomas and the main clinical, histological, prognostic and treatment options.

**Methods:** We present a review of a clinical case of a 19-year-old male diagnosed of BCOR-CCNB3 Ewing-like sarcoma, who was treated with immunotherapy. This led to a review of this emerging entity.

**Results:** A 19-year-old male who underwent an infracondylar amputation for an undifferenced fusiform and round cell sarcoma, pT1apNXpMX. He was treated with adjuvant chemotherapy and he was followed up. Five months later a CT revealed 4 lung nodules, the FDG - PET CT was positive for metastatic disease; therefore he underwent thoracic surgery. A year later the CT demonstrated a mass in the superior left lung, a paratracheal implant and another subcarinal mass. He was enrolled in the phase I-II trial (GEIS 52) with the combination of sunitinib plus nivolumab. In the clinical trial, there was a histologic review with NGS (next generation sequencing) and a genetic fusion BCOR-CCNB3 was identified. After 8 months of treatment, during which imaging changes were acknowledged, CT revealed progression disease. He was started on chemotherapy. Actually, the patient has responded to chemotherapy and presents partial response.




The sarcoma classification is very complex. The discovery of genomic alterations has added an important biologic perspective and has expanded the spectrum of some diagnostic subgroups. Ewing sarcoma represents the prototypical round cell sarcoma. Approximately 90% of Ewing sarcomas harbor t(11;22)(q24;q12) leading to EWSR1-FLI1 fusion. BCOR is associated with the BCL6 oncoprotein and with a variety of histone modifying enzymes, suggesting that it acts as a gene expression suppressor, through epigenetic mechanisms. BCOR rearranged sarcomas arise most frequently in bone and soft tissue of children with a mean age of 13-15 y and are more common in male patients. BCOR-rearranged sarcomas are usually treated following Ewing sarcoma therapeutic guidelines. The prognosis has been difficult to determine. In some series the survival of BCOR-CCNB3 sarcoma is 75% at 5 years.

**Conclusions:** BCOR sarcomas are an infrequent pathology from which little is known. Is immunotherapy an effective treatment? Are they more sensitive to chemotherapy retreatment?

## P505
## OVERWEIGHT/OBESITY IN CHILDHOOD AND ADOLESCENCE DOES NOT NEGATIVELY AFFECT BONE MASS ACCRUAL IN ADOLESCENCE. THE TROMSØ STUDY: FIT FUTURES – A NORWEGIAN LONGITUDINAL COHORT STUDY

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**Objective:** The implication of increasing prevalence of overweight and obesity among children is still a concern regarding future bone health. The objective was therefore to study the relationship between childhood and adolescent BMI and bone accrual in adolescence, in absolute terms.

**Methods:** This longitudinal study included 633 adolescents (48% girls) from The Tromsø Study - Fit Futures, a population-based cohort study conducted in 2010-2011 and 2012-2013 in Norway. From childhood health records, we retrospectively collected height and weight at two ages. BMI were calculated and categorized according to International Obesity Task Force cutoff values for children. Bone mineral content (BMC, g) and areal BMD (aBMD, g/cm$^2$), was measured at total hip (TH) by DXA At mean age 16.5 and 18.5 y. By fitting linear mixed models, we evaluated associations between BMI categories: underweight, normal weight and overweight/obesity and repeated measurements of BMC and aBMD as continuous outcomes. All sex stratified analyses were adjusted for height and bone area, additionally at 16.5 y, for pubertal maturation and physical activity.

**Results:** The prevalence of overweight/obesity combined was 11.4%. 17.6% and 22.2% in girls, 8.0%, 10.4% and 22.0% in boys at 2.5, 6.0 and 16.5 years of age, respectively. Compared to normal weight, overweight/obesity at 6.0 and 16.5 y of age were associated with higher TH BMC and aBMD at 16–18 years of age. Girls: TH BMC (95%CI): 1.87 (0.76, 2.98), 2.99

(1.97, 4.01), aBMD (95%CI): 0.06 (0.02, 0.09), 0.09 (0.06, 0.13) at 6.0 and 16.5 y of age, respectively. Boys: TH BMC (95%CI): 0.87 (-0.99, 2.73), 3.11 (1.88, 4.34), aBMD (95%CI): 0.02 (-0.03, 0.07), 0.08 (0.05, 0.12). We found no significant association between BMI category at 2.5 y of age and BMC and aBMD in adolescence.

**Conclusion:** Overweight/obesity at 6.0 and 16.5 y of age were positively associated with higher BMC and aBMD in adolescence. No negative effect of overweight/obesity was observed on TH bone mass accrual in adolescence.

**Acknowledgment:** This work was supported by a grant from the Northern Norway Regional Health Authority (grant number SFP1226-15).

## P506

## EFFECTS OF EXERCISE ON QUALITY OF LIFE AND MOOD IN ELDERLY WITH SARCOPENIA: A RANDOMIZED CONTROLLED TRIAL

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**Objective:** To investigate the effects of a 12 week group-based vs. home-based exercise programme on quality of life (QoL) and mood (anxiety and depression) among Greek sarcopenic individuals 60 years old and over.

**Methods:** 54 elderly (47 women, 7 men; aged 72.87±7 y) were randomly assigned to one of three interventions: supervised group exercise (n=18), individualized home-based exercise (n=18) and control group (n=18). Participants were diagnosed sarcopenic based on the algorithm developed by the European Working Group on Sarcopenia in Older People. Body composition was determined using bioelectrical impedance analysis, Handgrip strength (HGS) was measured using a standard hydraulic hand dynamometer and gait speed with the 4m test. QoL was assessed with Greek Sarcopenia Quality of Life (SarQoL_GR) questionnaire while mood via Hospital and Anxiety and Depression scale (HADS). All participants were assessed at baseline, immediately post-intervention (week 12), and at 3 months post-intervention (week 24). Ethical approval was given by the Ethics Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece. The study has been registered at www.isrctn.com following identification number: ISRCTN92538100.

**Results:** Comparison between pre- and post- intervention changes in QoL and mood (at 12 and 24 weeks) showed significant group x time interactions ($p<0.001$). Participants on the group-based programme improved in QoL by 12.77% while participants in the home-based programme improved by 6.05%. Participants in the group programme improved in domains: 'Physical and Mental Health' ($p\leq0.05$), 'Locomotion' ($p\leq0.05$), 'Functionality' ($p\leq0.05$), 'Fears' ($p\leq0.05$) and 'Activities of Daily Living' ($p\leq0.001$). Additionally in the questionnaire's domains, group-based exercise programme was superior to home-based exercise only in the 'Activities of Daily Living' domain. In terms of depressive and anxiety symptoms (HADS questionnaire), greater improvements in mean scores favored the group-based program compared to the home-based program (at 12 and 24 weeks).

**Conclusions:** Results suggest that exercise is beneficial for sarcopenic elderly. Supervised group-based exercise seems to be superior to home-based exercise therapy for QoL and anxiety and depression.

## P507

## MUSCLE STRENGTH AND BODY COMPOSITION IN OSTEOPOROTIC PATIENTS WITH VERTEBRAL FRACTURES

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**Objective:** To evaluate the degree of muscle dysfunction and relationship of trunk muscle strength and body composition in patients with osteoporotic vertebral fractures (VFs).

**Methods:** Study comprised 90 men and woman 40-80 years old with primary osteoporosis. Study group (n=60) included patients with at least 1 VF (confirmed by X-rays), control group (n=30) consisted of osteoporotic patients of the same age, BMI and BMD without any fracture. Trunk muscles strength was measured with tensodynamometry at Back-Check Dr. Wolff diagnostic unit. Body composition was evaluated by DXA Total Body. Muscle function was evaluated with up-and-go test, 10m walk test, testa for static and dynamic of back and abdomen muscles.

**Results:** Patients with VFs had a significant muscle strength deficiency in trunk flexors (TF) -40.9% and extensors (TE) -18.1% with an adequate function of the left (LLF) and right lateral flexors (RLF). Patients in study group had lower muscle strength vs. controls in TF (15.6±9.8 vs. 27.7±9.9 kg, $p<0.001$), TE (14.6±8.9 vs. 21.3±8.4 kg, $p<0.001$), LLF (13.1±7.2 vs. 24.1±8.9 kg, $p<0.001$) and RLF (13.4±7.4 vs. 24.3±7.7 kg, $p<0.0001$). No significant difference in functional tests results were registered ($p>0.05$). Body composition analyses showed differences between study and control groups in relative skeletal muscle index (RSMI, 6.5±1.2 vs. 7.5±2.1 kg/m$^2$, $p=0.02$) and fat mass (29717±8367.4 vs. 35464±9127.4 g, $p=0.01$). There was no significant difference in soft tissue mass and lean (muscle) mass between groups. Strength of all studied trunk muscles strongly negatively correlated with the number of VFs ($p<0.001$) and positively

correlated with femoral neck BMD (g/m$^2$), fat mass, soft tissue mass and lean mass ($p<0.001$), but not with age and RSMI ($p>0.05$).

**Conclusions:** Patients with VFs have a decrease in trunk muscles strength and lower RSMI, mass and% of body fat in compared with patients without fractures. Number of VFs, low BMD, fat mass, soft tissue mass and lean mass are the main factors of trunk muscle dysfunction in osteoporotic patients. Functional tests showed less specificity for estimation of muscle function than tensodynamometry.

## P508
## MULTIPLE BONE INFARCTS WITHIN THE PPP SYNDROME CONTEXT: A HARDLY KNOWN BONE AFFECTATION – A CASE REPORT

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**Objectives:** The triad formed by polyarthritis, panniculitis and pancreatitis is known as PPP syndrome. The typical patient is a middle-aged man who starts with low limbs polyarthritis and has previous history of alcohol abuse and pancreatitis. Laboratory findings include elevation of acute phase reactants (APR) and pancreatic enzymes. MRI typically shows intraosseous fat necrosis and lytic lesions are usual in plain radiography in late stages. Our aim was to review and describe 2 PPP syndrome cases and their main epidemiological and clinical characteristics diagnosed in our hospital.

**Results:** First patient was a 65 years old man with history of heavy alcohol abuse, chronic pancreatitis and panniculitis. He developed acute ankle arthritis. He denied fever, trauma or skin involvement. Laboratory examination showed elevated erythrocyte sedimentation rate, C-reactive protein and lipase. Amylase and white blood cells rates were normal. In plain radiography multiple osteolytic lesions in tibia, peroneal malleolus and calcaneus could be seen. MRI showed multiple foci of serpiginous peripheral low signal due to granulation tissue within the marrow of the affected bones compatible with multiple bone infarcts. Gammagraphy revealed an increased uptake at periphery of calcaneus, ankles and distal left femur with granular pattern. Given the previous pancreatitis and panniculitis diagnosis and current diagnosis of arthritis due to bone infarct he was diagnosed with PPP syndrome. Treatment with steroids and NSAIDs was started with complete resolution. Second patient was a 60 years old woman. She had alcohol abuse history, chronic pancreatitis and panniculitis. The patient developed acute swelling of the left knee. MRI showed multiple bone infarcts in distal femur, tibia and patella. Amylase, lipase and APR were elevated.

**Conclusions:** PPP syndrome is a rare cause of multiple bone infarcts and arthritis. Differential diagnosis includes other infarcts causes as corticoids, post-radiation, sickle cell disease, Caisson disease, etc. Most patients have none abdominal symptoms, leading to a delay in diagnosis. An early treatment of pancreatitis is necessary to prevent the release of enzymes to the systemic circulation and avoid bone involvement. Despite being an infrequent syndrome, physicians should consider it.

## P509
## EFFECTS OF WEIGHT LOSS ON FUNCTIONAL TESTS IN PATIENTS WITH OBESITY

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**Objective:** To estimate the changes in functional tests in patients with obesity after the weight loss.

**Methods:** 80 patients aged 21-69 (52.4±11) y, with obesity (BMI>30 kg/m$^2$) were enrolled in the study. The average weight was 111.3±24.5 kg, BMI was 40.3±8.1kg/m$^2$, waist girth (WM) was 113.4±16 cm, hip girth (HG) was 124.2±16 cm. All patients undergo height and weight measurements, BMI calculation, WG and HG measurements; walking speed (WS) was estimation by 10m walk test; lower extremities strength was estimated by up-and-go test; tests for back and abdomen static and dynamic muscle endurance were performed. Measurements and tests were performed at baseline and past 21 d, after the rehabilitation program. The rehabilitation program included 4 methods: 1) interactive sensomotor trainings on COBS platform (Physiomed, Germany), daily, 15 min, #10; 2) kinesiohydrotherapy in a pool, daily, 30 min, #10; 3) complex of physical exercises in a gym, daily, 30 min, #10; 4) Ergocycle trainings, daily, 20 min, #10.

**Results:** In comparison with baseline data, after the rehabilitation program there was significant reduction in body weight (111.32±24.48 kg vs. 107.96±23.13 kg, p=0.000), reduction of BMI score (40.3±8.13 kg/m$^2$ vs. 39.14±7.7 kg/m$^2$, p=0.000), thinning of WG (113.42±15.97 cm vs. 109.29 ±15.14 cm, p=0.000) and HG (124.17±15.55 cm vs. 119.75 ±14.17 cm, p=0.000). There was great improvement in WS (0.84±0.15 m/s vs. 0.88±0.17 m/s, p=0.000) according to 10m walk test; increase in lower extremities muscle strength (8.43 ±2.18s vs. 7.9±2.1s, p=0.000) according to up-and-go test. Higher static endurance of abdomen muscles (13.09±9.71 s vs. 16.49±12.8 s, p=0.000) and back muscles (14.84±11.93 s vs. 18.67±14.9 s, p=0.000) were stated. Higher dynamic endurance of abdomen muscles (29.92±11.24 times vs. 34.84 ±11.93 times, p=0.000) and back muscles (9.07±7.42 times vs. 12.18±9.23 times, p=0.000) were stated.

**Conclusions**: Body weight loss in patients with obesity is associated with improvement in walking speed, static and dynamic muscle endurance, increase in lower extremities strength. Those changes improve balance function and decreases risk of falling.

## P510
## OSTEOPOROSIS AND RISK OF LOW BONE MINERAL DENSITY IN UNTREATED FEMALE PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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**Objective:** Systemic lupus erythematosus (SLE) is an autoimmune disease characterized by chronic inflammation and multisystem damage. Studies in various parts of the world have shown osteoporosis and low BMD in patients with SLE, especially in female patients. In several incisions, osteopenia is found in 7% to 62% of patients with SLE and osteoporosis in 3% to 28% of patients with SLE. BMD reduction was observed in patients with SLE. **Purpose** of this study was to investigate the incidence of osteoporosis and osteopenia in untreated female patients with SLE using DXA and to identify the possible risk factors associated with low BMD in patients with SLE.
**Methods:** 11 untrained patients with SLE for 2 y. In this follow-up, osteoporosis was defined as the T-score or Z-score ≤-2.5 in the lumbar spine or total hip and osteopenia as a T-score or Z-score <-1, but> -2.5.
**Results:** Osteopenia was present in 6 patients with osteoporosis in 3 patients with SLE untreated. 2-y follow-up of patients confirmed that the incidence of nonvertebral and vertebral fracture in patients SLE was 1.26 and 0.94. The prevalence of spinal fracture in SLE ranged between 10% and 20%. These fractures can cause disability and contribute to a significant reduction in quality of life.
**Conclusion:** Patients with SLE are at increased risk of bone loss and fractures for many reasons. Old age, postmenopausal status and low BMI have been found to be possible risk factors for osteoporosis in SLE. Furthermore, chronic inflammation, immobility, and vitamin D deficiency due to a lack of sun exposure and glucocorticoid treatment may be frequent factors that significantly increase the risk of osteoporosis in these patients being either treated or untreated.

## P511
## HIP FRACTURES AND MEDIATORS OF LOW BONE MINERAL DENSITY IN MULTI-ETHNIC SINGAPORE WOMEN

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**Objective:** Hip fractures result in increased morbidity, disability and mortality risks amongst elderly women. Menopausal osteoporosis as identified by BMD measurement correlates closely with risk of hip fractures. Studying hip fracture trends amongst Singapore's multi-ethnic population of Chinese, Malays and Indians enable a comparison of hip fracture incidence and BMD across three major ethnic groups of rapidly ageing Asian women. The aim of this study was to identify those at highest risk of hip fractures in Singapore using nationwide inpatient databases, and determine mediators for antecedent low BMD in Chinese, Malay and Indian women.
**Methods:** Hip fractures in Singapore from 2000-2017 were examined using national medical insurance claims among female residents aged ≥50 y. Mediators for low BMD were studied in a prospective cohort (n=1201) of midlife Singaporean women (45-69 y) where information on variables affecting bone health were collected using standardized questionnaires, physical measurements and validated performance tests (Thu, 2018). BMD of the hip was measured using DXA.
**Results:** During the years 2000-2017, 24,902 first hip fractures in women were recorded in Singapore. Chinese women had 1.4- and 1.9-fold higher age-adjusted rates than Malay and Indian women: 264 (95%CI; 260, 267) vs. 185 (95%CI; 176, 193) and 141 (95%CI; 132, 150) fractures/100,000/year, respectively. Despite their higher fracture rates, Chinese women were the only ethnic group exhibiting a decline in age-adjusted fracture rate of -5.3 (95%CI; -6.0, -4.5) fractures/100,000/year. In contrast, no significant changes in hip fracture rates were observed in Malay or Indian women over the same period. In a prospective cohort of midlife women, Chinese had significantly lower femoral neck BMD than Malay and Indian subjects. Of the more than 20 variables examined, age, BMI, and height accounted for almost all the observed ethnic differences in femoral neck BMD between Chinese and Malays.
**Conclusions:** Although the absolute number of fractures increased, steep drops in elderly Chinese, but not Malay or Indian, women drove a reduction in overall age-adjusted hip fracture rates. BMD in middle-aged Asian women differ by ethnicity. Particular attention should be paid to underweight women of Chinese ethnic origin, who are at highest risk of osteoporosis at the femoral neck and hence hip fractures. Increases in the older population will lead to a rise in total number of hip fractures, requiring budgetary planning and new preventive strategies.
**Reference:** Thu WPP et al. Int J Epidemiol 2018;47:389

## P512
## PROSPECTIVE, MONOCENTRIC, POST-CE MARK STUDY TO ASSESS EFFICACY AND SAFETY OF HYMOVIS® ONE (32MG/4 ML) INTRA-ARTICULAR INJECTION IN ACTIVE PATIENTS AFFECTED BY KNEE OVERUSE SYNDROME

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**Objective:** Knee chondropathy is often a pathological manifestation of a joint overload in people who play sports involving strong mechanical stress to the lower limbs. In this context, the management of osteoarthritis (OA) is

crucial, especially considering the impact of this disease in terms of functional limitation and disability. Nowadays, the intra-articular (i.a.) injections of chemical modified hyaluronic acid (HA) (Hymovis) is increasingly widespread. This innovative MO.RE. (mobile reticulum) technology acts both from a biological and i.a. physical level. Hymovis (24mg/3ml) given as 2 weekly i.a. injections has been shown to be efficacious and well tolerated for the treatment of pain associated with knee OA[1]. However, sport players require a quick return to play and are rarely compliant in long term treatments and in long time of rest. On this view, a single injection is justified to improve patient compliance and convenience and to increase the safety. Up to date, no available studies analysed the changes in knee pain correlating this parameter with knee function and biomechanics, in regular casual sport players affected by knee overuse syndrome that underwent a single i.a.-HA injection. The aim of this study is to evaluate the efficacy and safety of Hymovis ONE (32 mg/4 ml) single i.a. injection, in the management of pain caused by knee osteochondral lesions.

**Methods:** 31 patients (23 male, 8 female), were enrolled and treated at the Physical Medicine and Rehabilitation Outpatient Clinic of our Department. All patients enrolled performed a clinical (VAS, WOMAC, KOOS) and biomechanical (Gait Analysis) evaluation at the baseline. At this stage all the patients underwent a single i.a. injection of Hymovis ONE (32 mg/4 ml). The same evaluations were repeated through 4 follow-up visits (1, 3, 6 and 12 months after injection). Primary outcome was to demonstrate that a single i.a. injection of Hymovis ONE (32 mg/4 ml) decrease the difficulties in sport and recreational activity. The outcome measure is represented by the fourth item (SP1-SP5) of the KOOS questionnaire 90 days after injection. An objective secondary outcome was used to assess biomechanical parameters through gait analysis system.

**Results:** 23 patients completed the 12 months follow-up. However, after 1 month each patient resumed the sport activity practiced according to (SP1-SP5) KOOS item ($p<0.001$), from this point of view the primary outcome of the study was completely achieved. Furthermore, after 1 month follow-up there was a statistical improvement of VAS ($p<0.001$), WOMAC A ($p<0.001$) and C ($p<0.001$) subscales values. These results have been maintained also at the final follow-up visit after 12 months ($p<0.001$). Biomechanical results show a statistically significant improvement of spatial-temporal parameters (step and stride length, walking velocity, cadence). No patients reported adverse events.

**Conclusions:** Results suggest the efficacy and safety of Hymovis ONE (32 mg/4 ml) single i.a. injection, in the management of knee pain caused by osteochondral lesions in young active patients, representing a valid therapeutic strategy in the treatment of this kind of patients.

**Reference:** 1 Benazzo F et al. Eur Rev Med Pharmacol Sci 2016;20:959

**P513**

## EPIDEMIOLOGY OF OSTEOPOROTIC NONVERTEBRAL FRACTURES IN MOLDOVA. POPULATION-BASED LONGITUDINAL STUDY

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**Objective:** The osteoporosis (OP) and the colossal medical and economic consequences of fragile fractures is a challenge to modern healthcare systems due to the people aging and the growth of social and health problems associated with it. The purpose of the study was to investigate the incidence of major nonvertebral fragile fractures (hip, distal forearm) in Republic of Moldova and to compare it with the OP fracture rate in neighbor's country Romania as well as with some other Eastern European and Central Asian Russian-speaking countries where the epidemiologic data are robust and the osteoporotic fractures has been studied well.

**Methods:** The investigation was the part of the Multicenter Multinational Study in Eurasia Countries (EVA study). Its methodology provides precise definition of all major nonvertebral osteoporotic fractures quantity for further FRAX model creation for each country. The Republic of Moldova since 2010 has significantly facilitated the development of injury data surveillance systems It allowed us to carried out the retrospective population-based study covered 24-month period (from 1 January 2011 to 31 December 2012). In both settings, the medical records of all fractures in men and women aged 40 years or older were provided from the central city hospital registers, the outpatient trauma unit data, and emergency service data according to ICD-10 codes. The data on the following low energy fractures were collected: hip (ICD-10 codes S72.0, S72.1, S72.2), distal forearm (S52.5, S52.6) and humerus (S 42.2) fracture Cases of high energy fractures were excluded from the analysis.

**Results:** In 2011-2012 among people older than 40 y we identified a total of 1515 fractures of which 340 were hip, 197 – humerus, 494 – distal forearm and 484 – ankle fracture. The forearm fractures were the most frequent, their incidence reached 367.3 (515.0 and 171.1 per 100,000 for women and men respectively) that was 1.4 times higher than the hip fracture and 2.4 times higher than the humerus fracture rates. The peculiarity of the forearm fractures epidemiology was the peak character of their age distribution with maximal rate in 60-year-old women and men and its subsequent gradual

diminishing. The ratios in age-standardized incidences of forearm/hip fractures in Moldova in were 1.4 times higher and in women 1.8 times higher than would be predicted from the incidences of hip fracture using "Malmo ratio" indexes. In comparison with the Russian-speaking countries of EVA project the indexes "Distal forearm/Hip ratio" and "Humerus/Hip ratio in Moldova were 1.5-2 times higher than in Armenia for both sexes, but 1.5-2 times lower than in Russia. At all the annual incidence of hip fractures in individuals older than 50 y was 293.9 and 239.0 for women and men per 100,000 respectively that was 1.7 and 1.8 times higher than in neighbor country Romania. The main epidemiologic features of the hip fracture age and sex distribution were the similar to countries of the EVA project: Russia, Armenia, Belarus. The annual estimated number of OP hip fracture in Moldova in 2015 was 3749 and it is predicted to increase to 6327 in 2050. The non-standardized incidence of low energy humeral fractures was 204.2 and 92.4 for women and men per 100,000 acc.; it was the rarest type of fragility fractures we recorded in Moldova.

**Conclusion:** Epidemiologic characteristic of OP fractures in Moldova significantly distinguishes from the neighbor Romania by a higher incidence of all type fragile fractures. Among EVA-project Eurasia countries with the valid epidemiological data the Republic of Moldova has the highest incidence of hip fracture (293.9 and 239.0 for women and men per 100,000). It allows Moldova to be classified as a country with the high level of OP fracture rate. The other characteristic of Moldavian epidemiology is the predominance of forearm fractures in the structure of low energy fractures. It is much closer to Russian population-based epidemiologic trends, than to the parameters of geographically similar rural country of Armenia and West European region and requires future exploration

## P514

## BOOTS STUD SHAPE ON FOOT LOADING USING BIOMECHANICAL ANALYSIS

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**Objective:** Several studies had revealed the effects of different soccer stud configurations on biomechanical characteristics. Therefore, the purpose of this study was to investigate the effect of different stud shaped football shoes on lower limb kinetics during straight-ahead running and 45° left sidestep cutting movements.

**Methods:** 12 male football players were recruited from university football teams. They were asked to perform six trials under a straight-ahead running and a 45° left sidestep cutting conditions while wearing football shoes with knife studs (KS), triangle studs (TS) and round studs (RS) with firm ground design (FG) on artificial turf.

**Results:** TS showed significant larger peak vertical ground reaction force compared with KS ($p=0.002<0.01$) and RS ($p=0.005<0.01$) in the straight-ahead running. Moreover, KS ($p<0.001$) and TS ($p=0.003<0.01$) showed a larger peak vertical ground reaction force than RS in 45° cutting. Peak pressure (PP) and force time integral (FTI) were collected at different anatomical regions for the analysis of impact on different stud shapes. As showed in figure 5, KS had a larger PP and FTI in the big toe area than the other two groups but had a smaller pressure in the other toe area.

**Conclusions:** The different stud shapes of FG soccer shoes have little effect on the traction. The knife stud has a stronger ability to provide a stable support but it also could potentially be deemed relatively more harmful due to the larger pressure under the lateral forefoot, predisposing the foot to injuries. The triangle stud showed good explosive force and had good ability on direction changing. It was also more friendly to the medial metatarsal than round stud design. Round stud generally has the minimum peak vertical ground reaction force and good capability of changing directions among the three shoes.

## P515

## THE FRENCH PATIENT'S ASSOCIATION AFLAR HAS GENERATED THE FRENCH NATIONAL ALLIANCE AGAINST OSTEOPOROSIS AND THE FIRST GENERAL CONVENTION FOR OSTEOPOROSIS, THAT IS A CAMPAIGN TO CREATE A NATIONAL PROMOTING TOOL TO IMPROVE THE MANAGEMENT OF OSTEOPOROSIS

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**Objective:** Osteoporosis is a major public health issue with 5 million of French affected. Overall, she seriously underestimated, and costs are barely covered in France. Considering this situation, AFLAR were urged to create the so called National Osteoporosis Alliance made up of 15 various stakeholders and patients.
**Methods:** National consultations on osteoporosis rely methodologically on 2 pillars. First the bottom-up reporting on patient needs and expectations. Second the conduct of coordination meetings with various osteoporosis key stakeholders and patients as part of regional panel discussions. The aim is to provide an overview of real obstacles contributing to the lack of government subsidies for osteoporosis and write consensual proposals compiled into a white paper.
**Results:** An online survey along with a citizen's panel were key to provide feedbacks on difficulties, knowledges and believes but also patient needs. From November 2016 to June 2017, 10 days of dialogue and debate covering 5 various topics were convened in 10 different cities: Consultation and consolidation work regarding proposals made during various panel-discussions allowed synthesis around one call: the creation of a real public health plan against osteoporosis-related fractures relying on 7 key axis.
**Conclusions:** The human and medico-economic rational considering dramatic fallouts caused by osteoporosis has been illustrated many times over. The policy makers mobilization made by stakeholders through white paper release, a real manifesto for public health plan against osteoporosis-related fracture, remain a significant challenge to face.

| THE FIRST GENERAL CONVENTION FOR OSTEOPOROSIS IN FRANCE | |
|---|---|
| 1 | Transmitting real messages regarding osteoporosis through information campaigns dedicated to the public and concerned/relevant health professionals training. |
| 2 | Elaborating an osteoporosis prevention strategy at an early-age for relevant persons |
| 3 | Generalizing real care pathways soon after the first osteoporosis-related fracture. |
| 4 | Involving General Practitioners in osteoporosis care. |
| 5 | Promoting and sustaining medico-economic research plan considering cost challenges caused by multiplying fractures. |
| 6 | Facilitating empowerment and acting efficiently against risks of falling among people suffering from osteoporosis. |
| 7 | Creating a national register of osteoporosis-related fractures. |

## P516

## RENOPROTECTIVE EFFECT OF URATE LOWERING THERAPY IN GOUTY PATIENTS WITH STAGE 3 CHRONIC KIDNEY DISEASE

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**Objective:** Approximately 25% of gouty patients suffer from chronic kidney disease (CKD). High serum uric acid (sUA) levels have been related to estimated glomerular filtration-rate (eGFR) imbalance. Beneficial effect of treatment with xanthine oxidase inhibitors (XOI), mostly allopurinol, has already been proved in patients with CKD and asymptomatic hyperuricemia. Although several studies have described the efficacy and renal safety of treatment with XOI in gout, few authors have analyzed its effect on GFR in gouty patients with moderate CKD. Our aim was to assess the effect of XOI therapy in gouty patients with moderate CKD, in terms of eGFR changes.
**Methods:** In this multicenter, retrospective study, we included patients from 4 centers diagnosed with gout (EULAR/ACR criteria) and stage-3 CKD according to Cockroft-Gault formula (eGFR 30-59 ml/min/$m^{2)}$ who received XOI (febuxostat and allopurinol) with a follow-up for 6 and 12 months. We used clinical records to collect patient features (age, sex, BMI, sUA, hypertension (HTA), diabetes mellitus (DM), dyslipidemia (DL), cardiovascular events), treatments (lipid-lowering drugs, antihypertensives, antidiabetics, antiplatelet therapy, NSAIDs, urate lowering treatments and colchicine) and gout history (duration of disease, tophi presence, clinical and ultrasonographic (US) pattern (monoarticular, oligoarticular, polyarticular). Statistical analysis: descriptive analysis of variables. Mixed effects model lineal regression Differences were considered significant $p<0.05$.
**Results:** 52 patients with gout and stage-3 CKD were identified. We obtained complete 6 and 12-months follow-up from 37 patients (33 males and 4 females). Mean age was 74.11±6.96 y, 32.4% DM, 83.78% HTA, 56% DL, 40% tophaceous gout, Clinical and US pattern (37.8% polyarticular, 37.8 oligoarticular and 24.3% monoarticular). Febuxostat 19 patients, Allopurinol 18. Mean baseline sUA was 8.63±1.33 mg/dl, and baseline eGFR was 47.77±8.45 ml/min/$m^2$. To assess the effects of considered variables over eGFR a linear mixed model was adjusted using *nlme R-package*. Within the adjusted model we obtained significant differences in eGFR between baseline and 6 months ($p=0.0081$), and between baseline and 12-months ($p=0.0028$). sUA decreased significantly between baseline and 6 ($p=0.0181$) and 12 months ($p=0.0188$).
**Conclusions:** Reduction of sUA levels in gouty patients with XOI entitles an improvement of eGFR in stage-3 CKD. These findings suggest that the response to urate lowering therapy take place in the first 6 months, leading to an improvement in eGFR in this period. From 6 months to 1 year, sUA levels are stabilized and so is eGFR.

## P517

## EFFECT OF ORAL CHONDROITIN SULFATE ON FUNCTIONAL STATUS IN PATIENTS WITH KNEE OSTEOARTHRITIS: OUTCOMES OF A COMPREHENSIVE META-ANALYSIS EXPLORING INCONSISTENCIES IN RANDOMISED, PLACEBO-CONTROLLED TRIALS

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**Objective:** To determine whether chondroitin sulfate (CS) is effective at improving functional status in patients with knee osteoarthritis (OA) and to assess whether brand of CS, risk of bias, dose of CS and duration of study explain inconsistencies in trials using CS for the symptomatic management of OA.

**Methods:** A systematic review of randomised, placebo-controlled trials was conducted, searching the Medline, CENTRAL and Scopus databases. Random-effects meta-analysis was performed, using $Tau^2$ and $I^2$ statistics to assess heterogeneity. The Lequesne index (LI), a composite index measuring pain and function, score was expressed as standardised mean difference (SMD), with 95%CI. Heterogeneity was explored by stratifying the analysis, according to pre-specified study-level characteristics, and assessing the sources of funnel plot asymmetry.

**Results:** The inclusion criteria yielded 18 trials. Compared to placebo, CS significantly but inconsistently improved function (SMD: -0.82; 95%CI: -1.31, -0.33; $I^2$=95%, p<0.05). When limiting the analysis to studies with a low risk of bias, the pharmaceutical-grade CS of IBSA origin showed a greater and consistent effect on function (SMD: -0.33; 95%CI: -0.47, -0.20; $I^2$=53%, p=0.07), compared to the other preparations (SMD: -0.18; 95%CI: -0.36, +0.01; $I^2$=0%). Assessing funnel plots asymmetry in the studies with a low risk of bias, we found a strong correlation between the CS effect on the LI and study size ($r_S$=0.86; p<0.05). Finally, there was no residual heterogeneity in the CS effect when the smallest studies were removed from the analyses.

**Conclusion:** This new meta-analysis suggests that CS provides a high effect on function in knee OA, however, with large heterogeneity. Our analyses showed that the risk of bias, brand and study size were the factors explaining inconsistency among the clinical trials results. The pharmaceutical-grade CS preparation of IBSA origin generated greater benefit on functional status than the other CS in the studies with a low risk of bias.

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## P518

## TOTAL HIP BMD COMBINED WITH AGE AND FRACTURE HISTORY ARE HIGHLY PREDICTIVE OF HIP FRACTURE RISK IN ACTUAL PRACTICE SETTINGS: A REAL WORLD COHORT INCLUDING 21,278 POSTMENOPAUSAL WOMEN FROM CATALONIA

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**Objectives:** We used a large population-based healthcare database to examine the performance of total hip BMD (thBMD) combined with age and fracture history to predict hip fracture risk amongst postmenopausal women.

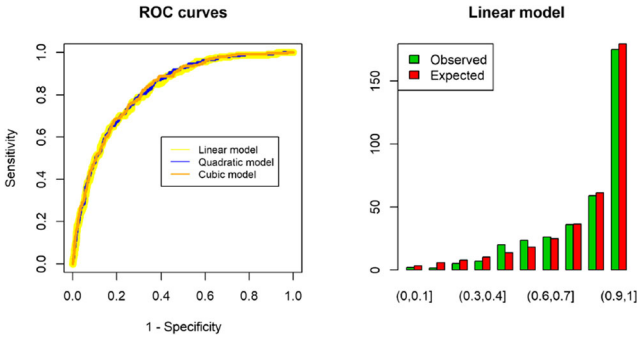
**Methods:** A retrospective cohort including all women age 50 to 94 with 1+ thBMD measures recorded in electronic medical records from Catalonia (www.sidiap.org). Participants were followed-up from first DXA until a hip fracture occurred or 5 years follow-up. We used a Cox regression model to test the discrimination and calibration of a model combining thBMD, age, and fracture history to predict 5-year hip fracture risk.

**Results:** A total of 21,278 women with mean age 65.9 years (SD 9.2) were included; 3,022 had a previous fracture (20%). Median (interquartile range) thBMD T-score was -1.60 (-2.30 to -0.90). 231 (1.09%) sustained a new hip fracture during a median 3.13 (2.06 to 4.25) years of follow-up. Incidence rate was 3.18/1,000 person-years, 95%CI (2.78, 3.62). As expected, thBMD had an inverse and linear association with hip fracture risk (adjusted HR 0.68 [95%CI 0.59-0.77]). The derived equation had AUC 0.82 [95%CI 0.80-0.85], and excellent calibration (Figure 1).

**Conclusions:** A simple tool combining thBMD, age, and fracture history, is highly predictive of 5-year fracture risk in primary care actual practice settings. More data are needed on the performance of a similar tool for men.

**Disclosures:** ADP reports grants from Amgen, personal fees from UCB, Mereo, Sandoz, Gilead, and other from Active Life Sci, outside the submitted work. DPA reports unrestricted research funding from UCB, Amgen, and Servier Laboratoires outside of the submitted work; DPA's department has received fees for speaker services from Amgen outside of the submitted work. DML reports personal fees from Amgen, Lilly, Novartis, Ferrer And Rubió outside the submitted work. CT, NP and XNS have nothing to disclose.

Figure 1. AUC ROC and calibration (observed vs. predicted) plots.




## P519

## CORRELATION BETWEEN DURATION OF MENOPAUSE AND REDUCED BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN AND VITAMIN D AS A RISK FACTORS FOR BONE LOSS

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**Objective:** To show the correlation between duration of menopause and reduced BMD in postmenopausal women with risk factors for osteoporosis.
**Methods:** The prospective analysis is performed from October to December 2018 at the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. The study involved 85 postmenopausal women who had risk factors for reduced BMD. In the first visit to the rheumatologist all respondents were examined, BMD was measured by DXA and serum vitamin D tests were performed. The central tendency measures and Pearson correlation test were used for statistical analysis.
**Results:** The average age of participants was 63.29±9.33 y. Duration of menopause was 13.2±10.1 y. All women had vitamin D deficiency with average vitamin D level 53.55 ±24.3 nmol/l. Average T-score of the femur neck was -1.70 ±1.78, average hip T-score was -1,60±0.82, average vertebral T-score was -2.0±2.84, average BMD of the femur neck was 0.79±0.2, BMD of the hip 0.80±0.22, vertebral BMD was 0.94±0.32. We found statistically significant negative correlation between duration of menopause and reduced BMD (BMD of the femur neck R=-0.27, $p<0.012$; hip BMD R=-0.314, $p<0.003$; vertebral BMD R=-0.211, $p<0.05$). There was also statistically significant negative correlation between duration of menopause and average T-score of the hip (R=-0.32, $p<0.02$), femur neck(R=-0.29, $p<0.06$) and vertebral T-score (R=-0.23, $p<0.030$).
**Conslusion:** Postmenopause is a period of a decrease in BMD. Many factors have impact on this process. Vitamin D deficiency is one of them, which points out that adequate supplementation with vitamin D in population of postmenopausal women can slow down this process.

## P520

## HIGH-RISK PATIENT CAPABILITY FOR OSTEOPOROTIC FRACTURES / FUSEX * PROPOSAL FOR THE INCLUSION OF PATIENTS IN A NATIONAL DATABASE. (RELEVANCE OF FLS - FRACTURE LIAISON SERVICES)

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**Objectives:** We are currently experiencing a pandemic of osteoporotic fractures. The prevalence is over 200 million people in the world with osteoporosis. The incidence of hip fractures will increase substantially in the year 2050: 240% in women, 320% in men. The hip fracture will increase from 1.7 million in 1990 to 6.3 million in 2050 (IOF, 2015). In this way, we can extract our users according to the parameters listed above and perform osteoporosis fracture prevention. We should avoid the first fracture, if it is not possible, to make the first fracture the last. In the military sphere, the movements of the military and their families to the various workplaces distributed throughout the national territory may compromise the patient's follow-up and treatment and, consequently, facilitate the occurrence of complications (new fractures requiring new surgical treatment) burdening the user and FUSEX. The uptake of these patients is fundamental for the elaboration of a database and follow-up of the treatment instituted. The database together with a protocol of diagnosis and treatment favor the patient in the extratification and direction of the appropriate treatment with subsequent follow-up. These measures reduce the risk of prescribing high-cost medications, favor secondary prevention of refractures, disabling the patient and FUSEX.
**Methods:** In the Military Hospital of Brasília Area (HMAB), we have been doing this process for 6 y in the orthopedic outpatient clinic. We have the possibility to perform a multidisciplinary treatment (related specialties) and medication (severe osteoporosis) benefiting the user of the FUSEX. The most important is to achieve the patient's adherence to the treatment instituted and the follow-up of the resolution of the clinical picture of the patient. Certainly, the uptake of high-risk patients plays an important role in the efficiency of FLS. By including these patients in a national database we can track them during their movement around the country and monitor their clinical evolution, even at a distance. The Army's telemedicine service can access remote areas and guide professionals who are in contact with at-risk patients. Telemedicine also serves to publicize educational guidelines on osteoporosis for the population and health professionals.
We implemented several opportunities for capturing patients served by FUSEX:
Regular educational campaigns in media: Radio interviews, printed media distributed in institutions that use FUSEX, FLS

disclosure in the hospital and army e-mail address. We have a telemedicine service that we use to guide our professional colleagues in remote regions, avoiding the need for patient displacement. This channel is for professional improvement events integrating several FUSEX health units.
Prevention campaigns through regular events such as HMAB Osteoporosis Prevention Week, when we carry out screening tests. We use forearm ultrasound, calcaneal ultrasound, and forearm densitometry. At this time, basic laboratory tests are requested to evaluate untreated patients. This measure brought us an average of 90 new patients / year to FLS. The event takes place in October and serves to spread our FLS to the medical class in the region.
Outpatient clinics of the related specialties (orthopedics, rheumatology, geriatrics, nutrition, endocrinology and gynecology) integrated through a specific protocol for diagnosis and drug treatment. Multidisciplinary control of adherence to treatment and notification of complications (atypical fractures, mandible osteonecrosis, therapeutic failure). With several professionals involved in the treatment of the patient, there is a decrease in GAP between the diagnosis and adherence of the treatment by the patient.

- Compulsory notification of fragility hip fractures arriving at the orthopedic emergency room, as well as subclinical fractures of the spine without the diagnosis of osteoporosis.
- Patients treated at health institutions accredited to FUSEX and requiring surgical treatment (total hip prosthesis, osteosynthesis, spine surgeries) are referred to the refractive prevention clinic. All fractured patients who require surgical treatment, women above 49 years and men over 69 years, are evaluated for fragility fractures.
- Patients referred from outpatient clinics of other specialties for evaluation of bone health that presented altered bone density tests (bone densitometry, Rx, tomography). We evaluated the densitometry of diabetic patients with TBS (trabecular bone score) to capture patients with osteopenia who are at high risk for fractures (Leslie WD et al, JCEM 2013;98:602).

**Conclusions:** These measures have made it possible to increase the dissemination of our FLS to users and also to increase the uptake of high-risk patients. When we entered patients into our database, we were able to decrease GAP between diagnosis and the start of osteoporosis treatment. Today we have 539 patients monitored by our FLS / FUSEX database, obtained during the 6 years of implementation of the service of prevention of refractories / HMAB (*Data obtained in the OPME / FUSEX / HMAB sector, in Brasília / DF*). As FUSEX operates throughout the national territory, the proposal of an integrated diagnosis and treatment protocol with an effective collection of high-risk patients seems to us a reasonable measure to maintain the control of the treatment of our patients. Such measures are reasonable due to the low cost of its implantation, easy reproducibility to the health professionals and viable administrative structure in all the health institutions of the Brazilian Army.

## P521
## TRABECULAR AND CORTICAL BONE HEALTH IN POSTMENOPAUSAL WOMEN RECEIVING AROMATASE INHIBITORS FOR EARLY BREAST CANCER TREATMENT: THE B-ABLE PROSPECTIVE COHORT STUDY

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**Objectives:** Aromatase inhibitor (AI) therapy is critical for breast cancer (BC) management. However, it induces muscle weakness, joint pain and a marked bone impairment. The aim of this study was to evaluate the effects of AI, after 24 months of treatment, on bone health in a prospective cohort (B-ABLE) composed of women suffering from early BC (EBC).
**Methods:** Details on the B-ABLE study design have been published previously (Servitja et al., The Breast, 2011). From January 2006 to November 2017, 837 consecutive women with EBC, about to start adjuvant AI therapy with and without bisphosphonates (BP and BP- respectively) protective treatment have been recruited. All participants had a DXA exploration (QDR4500, Hologic, USA) at spine and non-dominant femur before AI initiation and after 12 and 24 months of AI therapy. A software algorithm (3D-SHAPER® v2.8, Galgo Medical, Spain) was used to derive QCT-like subject-specific 3D models from the hip DXA scans of the participants and compute the trabecular volumetric BMD (trabecular vBMD) and the cortical surface BMD (cortical sBMD). The follow-up changes from baseline were normalized at 12 and 24 months and evaluated in terms of percentage. Paired tests were used to compare parameters at 12 and 24 months follow-up and at baseline.
**Results:** Ultimately, 464 postmenopausal women were deemed eligible for the study. Among them, 21% received BP protective treatment. After 24 months of AI, BP- subjects exhibited

significant decrease at both spine (-2.4%) and at total femur (-1.3%) considering areal BMD (aBMD) parameter but more marked at spine (Figure 1a&b) while BP subjects exhibited an increase (+3 and +2.6% respectively, Figure 1c&d). 3D measurements showed similar bone impairment at both cortical and trabecular compartments in BP- (-1.7 and -2.1% for cortical sBMD and trabecular vBMD respectively, Figure 2a&b) with a more marked decreasing rate on the trabecular bone after 12 months (3 times more). In BP group, both cortical sBMD and trabecular vBMD increased (+4.5% and +3.7% respectively, Figure 2c&d) at 24 months. Furthermore, in the same group, trabecular vBMD increase reached a plateau at 12 months while Cortical sBMD continued to increase.

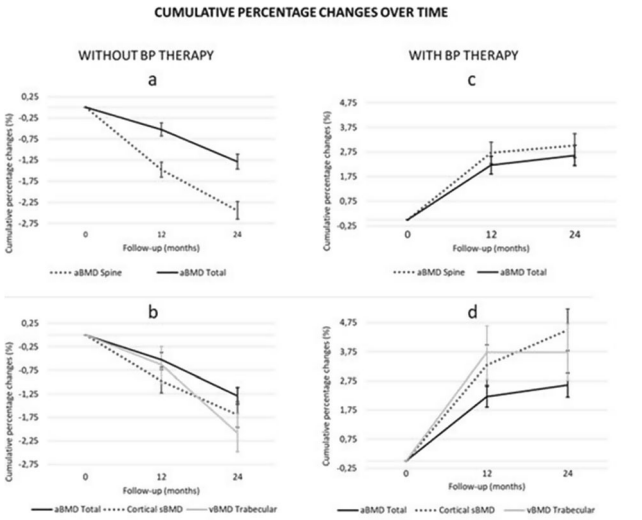


**Figure 1** : Cumulative changes in % after 12 and 24 months of follow-up in subjects treated with AI with and without BP protective treatment.

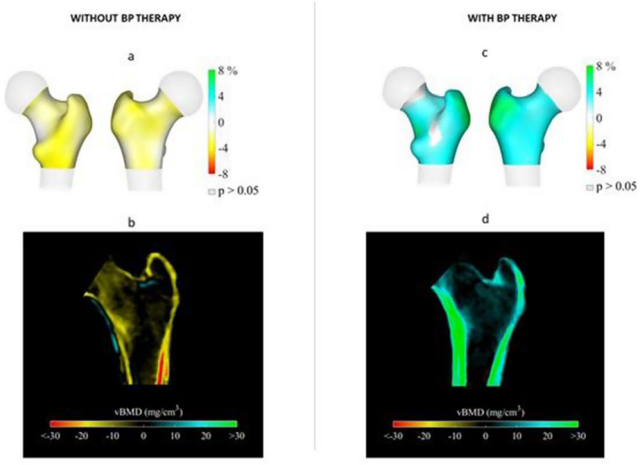


**Figure 2 :** Top, 3D distribution of the differences (in %) observed in Cortical sBMD after 24 months of AI. Increases are presented in blue-green colour while decreases are presented in yellow-red colours. Bottom, distribution of the average changes in vBMD observed after 24 months of AI in both trabecular and cortical bone in the mid coronal between controls and GCs subjects.

**Conclusion:** As expected, AI impaired both trabecular and cortical compartments in BP- group while BP protective treatment compensated the negative AI effects. Consistently with aBMD at spine, BP- had a more marked decrease of the trabecular compartment at femur. Interestingly, 3D analysis showed that BP protective treatment stops to overcome the negative effect of AI on trabecular bone after 12 months, suggesting a possible decrease of the trabecular bone after 24 months of AI.

## P522
## MULTIPLE OSTEOPOROTIC FRACTURES IN PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS: CASE REPORT

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**Objectives:** We summarized the diagnosis, clinical picture, disease course and management of osteoporotic complications in patient with systemic lupus erythematosus focusing on secondary osteoporosis and fracture risk.
**Methods:** Female patient. 60 years old diagnosed with SLE with pulmonary involvement 10 y ago, treated with corticosteroids (mean dose 7.5 mg prednisolone per day), concomitantly with different immunosuppressants - initially cyclophosphamide, then azathioprine and finally mycophenolate mofetil. In order to prevent bone loss she was also treated with vitamin D and calcium, and was regularly referred to DXA examinations. Her initial BMD was in range of osteopenia. Besides corticoid therapy she had early menopause as factor risk for osteoporosis, due to hysterectomy and adnexectomy when she was 40 year old (cervical carcinoma, without any additional treatment).
**Results:** Five years from diagnosis SLE she accidentally fell in her home. RTG was performed and fracture of left tibia was diagnosed. DXA results at that time was- vL1-4 T-score -2.1 BMD 0.875 g/cm$^2$. total hip T-score -2.5 BMD 0.812 g/cm$^2$. Bisphosphonate therapy was initiated (alendronate 70 mg once weekly). Alfacalcidol and calcium supplements. After 6 months she fell again - fracture of wrist was diagnosed, and soon after that fracture, she came in our clinic because of back pain with sudden onset, multiple vertebral fractures v Th 12, v L1,2,3 / wedge type/ was diagnosed on plain radiography. Bone turnover markers were increased, 25OHD was sufficient, so we decided to change bisphosphonate, and treat her with parenteral zoledronic acid 5 mg once a year, because teriparatide was contraindicated. In spite of that treatment she got one more fracture next year (humerus) and she was operated. Other reasons included spreading malignant disease were previously eliminated.
**Conclusions:** We wanted to highlight increased bone fragility in patients with diagnosis of SLE due to longstanding use of corticosteroids, inactivity, due to joint pains, premature menopause due to hormonal changes or other diseases, like our patient had, and insufficient awareness of sufficient prevention bone complications which decreased quality of life, in spite of good control of lupus activity.

## P523

## MEDITERRANEAN DIET AND KNEE OSTEOARTHRITIS OUTCOMES: A LONGITUDINAL COHORT STUDY

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**Objectives:** Mediterranean diet has several beneficial effects on health, but data regarding the association between Mediterranean diet and knee osteoarthritis (OA) are limited mainly to cross-sectional studies. We investigated whether higher Mediterranean diet adherence is prospectively associated with lower risk of radiographic OA (ROA), radiographic symptomatic knee OA (SxOA) and pain worsening in North American people at high risk or having knee OA.
**Methods:** Adherence to the Mediterranean diet was evaluated using a validated Mediterranean diet score (aMED), categorized in five categories. Knee OA outcomes included incident (1) ROA, (2) SxOA, as the new onset of a combination of a painful knee and ROA, (3) knee pain worsening, i.e. a Western Ontario and McMaster Universities Osteoarthritis Index difference between baseline and each annual exam of ≥14%.
**Results:** 4330 subjects (mean age: 61.1 y; 58.0% females) were included. Based on a multivariable Poisson regression analysis, during a mean follow-up period of 4 y, participants who were more highly adherent to a Mediterranean diet (Q5) reported lower risk of pain worsening (relative risk, RR=0.96; 95%CI: 0.91-0.999) compared to those in Q1. In 2994 people free from SxOA at baseline, higher adherence to a Mediterranean diet was associated with a lower risk for SxOA during follow-up by 9% (Q5 vs. Q1; RR=0.91; 95%CI: 0.82-0.998). No significant associations emerged between aMED and incident ROA.
**Conclusion:** Higher adherence to Mediterranean diet is associated with a lower risk of pain worsening and symptomatic forms of knee OA.

## P524

## ASSOCIATION BETWEEN DIETARY MAGNESIUM INTAKE AND MAGNETIC RESONANCE PARAMETERS FOR KNEE OSTEOARTHRITIS

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**Objectives:** To evaluate the relationship between dietary magnesium (Mg) intake and prevalence of osteoarthritis (OA) of the knee in a large cohort from North America.
**Methods:** 783 participants in the Osteoarthritis Initiative (59.8% females; mean age: 62.3 y) in possession of a MRI assessment (a coronal 3D FLASH with Water Excitation MR sequence of the right knee) were enrolled in our cross-sectional study. Adherence to the Mediterranean diet was evaluated using a validated Mediterranean diet score (aMED). The strength of the association between aMED and knee MRI parameters was gauged using an adjusted linear regression analysis, expressed as standardized betas with 95%CIs.
**Results:** Using an adjusted linear regression analysis, each increase of one standard deviation (SD) in the aMED corresponded to a significant increase in the central medial femoral cartilage volume (β=0.12; 95%CI: 0.09 to 0.15), in the mean central medial femoral cartilage thickness (β=0.13; 95%CI: 0.01 to 0.17), in the cartilage thickness of the mean central medial tibiofemoral compartment (β=0.12; 95%CI: 0.09 to 0.15), and in the cartilage volume of the medial tibiofemoral compartment (β=0.09; 95%CI: 0.06 to 0.12).
**Conclusions:** Higher Mg dietary intake is associated with lower prevalence of knee OA, also when adjusting for potential confounders.

## P525

## EFFECT OF NUTRITIONAL SUPPLEMENTATIONS ON PHYSICAL PERFORMANCE AND MUSCLE STRENGTH PARAMETERS IN OLDER PEOPLE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** Malnutrition plays a role in the development of poor physical performance, frailty and sarcopenia. The use of nutritional supplementations for improving physical performance and muscle strength parameters in older people is still debated. We therefore aimed to summarize the effect of nutritional supplementations compared to placebo on physical performance and muscle strength outcomes in older people in randomized controlled trials (RCTs).
**Methods:** A literature search in major databases was undertaken until 1 September 2018. Eligible studies were RCTs investigating the effect of nutritional supplementations vs. placebo in older people (people having an age ≥60 y). Standardized mean differences (SMD) and 95%CIs were used through a random effect model.
**Results:** Over 4007 potentially eligible articles, 32 RCTs for a total of 4137 older participants (2097 treated and 2040 placebo)

(mean age: 76.3 y; 65% females) were included. Compared to placebo, multinutrient supplementations significantly improved chair rise time (n=3; SMD=-0.90; 95%CI: -1.46 to -0.33; $I^2$=87%). Multinutrients significantly improved handgrip strength when compared to placebo (n=6; 780 participants; SMD=0.41; 95%CI: 0.06 to 0.76; $I^2$=79%), similarly to nutritional supplementations including proteins (n=7; 535 participants; SMD=0.24; 95%CI: 0.07 to 0.41; $I^2$=16%). Nutritional supplementations also led to a significant improvement in chair rise time and in handgrip strength in participants affected by frailty/sarcopenia and in those affected by medical conditions.

**Conclusion:** Nutritional supplementation can improve a small number of physical performance outcomes in older people, particularly when they are multinutrients and in people already affected by specific medical conditions, or by frailty/sarcopenia.

## P526
## STUDY OF CORTICAL AND TRABECULAR COMPARTMENTS THROUGH 3D-SHAPER IN LUNG TRANSPLANTED PATIENTS

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**Objectives:** Osteoporosis in lung transplant (LT) patients is a frequent complication. Glucocorticoid treatment (GC) is a prominent risk factor (RF) that alters both bone mass and architecture. Studying the volumetric BMD using 3D-SHAPER software would help the study of architecture. Our aim was to study the change in cortical surface density, volumetric trabecular density and integral volumetric density measured by 3D-SHAPER before and after LT as well as changes in BMD measured by DXA.

**Methods:** LT patients assessed in Rheumatology are included. The demographic characteristics, diagnosis of lung disease and RF of low bone mass prior to LT are collected. Patients were grouped into 3 groups according to the type of disease, these being: chronic obstructive pulmonary disease (COPD), interstitial lung diseases (ILD) and other pathologies. Bone mass was evaluated by DXA (GE-Lunar) before and 6 months after LT and 3D-SHAPER software (v2.7, Galgo Medical) was applied in all DXAs.

**Results:** 49 LT patients were included (46.9% women), with an average age of 56.9±8.7 y. In the ILD group, a higher proportion of patients with a low calcium intake (p=0.027) and with high doses of GC (p=0.001) was observed. COPD group presented the highest proportion of smokers (p=0.027). Prevalence of osteoporosis prior to LT was 24.5%, higher in COPD (p=0.007). Values of BMD and 3D-SHAPER as well as the percentage of post-transplant variation are shown in Table 1. Of the 47 patients, 19 (38.8%) started osteoactive treatment before LT, with a higher percentage of patients treated in the COPD group (p=0.007). Of 42 patients, we have DXA at 6 months post-transplant, with a prevalence of osteoporosis of 23.8%. 27/42 patients underwent post-transplant osteoactive treatment, with an average treatment time until DXA was 19.2 ±26.1 months, with no differences between groups.

| PRE-TRASPLANT | TOTAL (n=47) | COPD (n=11) | ILD (n=30) | OTHERS (n=8) |
|---|---|---|---|---|
| BMD pre-trasplant (mean) | g/cm² (T-score) | g/cm² (T-score) | g/cm² (T-score) | (g/cm² (T-score) |
| . Lumbar Spine | 1,074 (-1,02) | 0,927^^ (2,18^^) | 1,131 (-0,55) | 1,051 (-1,18) |
| . Femoral Neck | 0,868 (-1,28) | 0,798 (-1,89^) | 0,899 (-1,04) | 0,846 (-1,35) |
| . Total Hip | 0,907 (-1,15) | 0,812^ (-2,07^^) | 0,950 (-0,79) | 0,878 (-1,27) |
| 3D-SHAPER (mean) | | | | |
| . BMDs Cortical; g/cm² (T-score#) | 155,6 (-1,19) | 143,9 (-1,90^) | 163,3 (-0,97) | 142,7 (-1,26) |
| . BMDv Trabecular; g/cm³ (T-score#) | 146,1 (-1,69) | 115,4 ^^ (-2,65) | 155,3 (-1,64) | 153,6† (-1,06†) |
| . BMDv Integral; g/cm³ | 296,0 | 258,4* | 309,4 | 297,5 |
| 6 m POST-TRASPLANT | TOTAL (n=42) | COPD (n=10) | ILD (n=25) | OTHERS (n=7) |
| % change BMD (mean±DE) | | | | |
| . Lumbar Spine | - 1,26 ± 10,3 | 9,38 ± 11,6** | - 3,92 ± 7,3 | - 7,03 ± 7,7† |
| . Femoral Neck | - 4,34 ± 7,3^ | - 0,74 ± 6,5 | - 5,43 ± 6,9 | - 5,57 ± 9,3 |
| . Total Hip | - 3,22 ± 6,0^^ | 1,18 ± 3,5* | - 4,07 ± 6,2 | - 6,58 ± 5,6†† |
| % change 3D-SHAPER (mean±DE) | | | | |
| . BMDs Cortical | - 1,59 ± 5,9 | 0,14 ± 4,9 | - 2,53 ± 6,5 | - 0,59 ± 4,9 |
| . BMDv Trabecular | - 4,42 ± 11,6^^ | 8,63 ± 8,6** | - 8,12 ± 9,5 | - 11,66 ± 5,1†† |
| . BMDv Integral | - 3,11 ± 6,3^^ | 1,87 ± 4,3* | - 4,67 ± 6,5 | - 5,20 ± 3,9† |

^ p<0.05, ^^ p<0.01 respect previous, *p<0.05, **p<0.01 COPD vs. ILS; †p<0.05, ††p<0.01 COPD vs. Others; # only in women

**Conclusions:** • Prevalence of low bone mass is high both before and after the transplant. • Prevalence of some osteoporosis RFs was different between the lung disease groups. • COPD group presented a worse bone mass before LT. Subsequently, they experienced a significant improvement in BMD and volumetric measurements with respect to the other two groups, which showed losses of these parameters. COPD was the group most treated for osteoporosis and with a lower proportion of patients with GC at high doses. • Trabecular BMD was the most altered measure of 3D-SHAPER, with greater decrease in patients with GC at high doses and lower in those with osteoactive treatment.

## P527
## BONE HEALTH TELE-ECHO: A GLOBAL STRATEGY TO REDUCE THE OSTEOPOROSIS TREATMENT GAP

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**Objective:** Bone Health TeleECHO (Extension for Community Healthcare Outcomes) uses videoconferencing for ongoing interactive case-based learning to improve the level of knowledge of healthcare professionals for the care of patients with skeletal diseases. Participants can be located anywhere there is an electronic connection. The ECHO model

of learning recapitulates familiar learning methods of postgraduate medical training programs. Bone Health TeleECHO aims to reduce professional isolation of clinicians worldwide and offer more patients with skeletal diseases better care, closer to home, at lower cost than referral a specialty center. We aimed to report 39-month progress of the proof-of-concept Bone Health TeleECHO program and global development of the ECHO model of learning for skeletal diseases.
**Methods:** Bone Health TeleECHO participants register online with the Osteoporosis Foundation of New Mexico (www.ofnm.org). Demographic information and attendance for weekly teleECHO sessions are collected and processed by Project ECHO at University of New Mexico Health Sciences Center (https://echo.unm.edu). Other Bone Health TeleECHO programs collect data independently through a variety of methods. ECHO experiences are shared on the ECHO website, personal communications, quarterly collaborative videoconferences, and periodic live ECHO congresses.
**Results:** The prototype Bone Health TeleECHO program was launched on October 5, 2015. Since then, weekly (excluding holidays) sessions have been held. Over 39 months, 437 individuals from the USA and 25 from other countries have registered to participate. Average attendance each week has grown from 13 in 2015 to 42 in 2018. Regular participation has improved self-confidence in 20 different domains of osteoporosis care (previously reported). Other Bone Health TeleECHO programs have been established in Grand Blanc, Michigan; Washington, DC; Galway, Ireland; and Moscow, Russia. At least 3 additional programs are expected to be launched in 2019. Challenges for global development of Bone Health TeleECHO include funding, staffing, recruitment of participants, and bureaucratic barriers.
**Conclusions:** Bone Health TeleECHO offers educational opportunities with minimal disruption of office routines. It provides relief of professional isolation that occurs in many practice settings. Bone Health TeleECHO offers opportunities to leverage scarce healthcare resources and expand capacity to deliver best practice skeletal care for patients with osteoporosis and rare bone diseases, as well as enhance effectiveness of fracture liaison services.

## P528
## PSEUDOHYPOPARATHYROIDISM: A TALE OF HYPOCALCEMIA AND HYPERCALCEMIA WITH A GENETIC SOLUTION

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**Objective:** Pseudohypoparathyroidism (PHP) is a rare, genetic disease characterized by renal resistance to PTH, presenting with hypocalcemia, hyperphosphatemia and elevated PTH. We describe a PHP patient who presented with significant hypercalcemia.
**Case description:** A 46-year-old woman with history of hypocalcemia presented to the emergency department with new-onset hypercalcemia, renal failure and anemia. She had hypocalcemic episodes throughout life with elevated PTH and hypocalciuria, suggestive of PHP. Medications included calcium 1800mg/d, alfacalcidol (1$\alpha$-OHD3) 3 $\mu$g/d and cholecalciferol (25-OHD3) intermittently. Lab tests revealed hypercalcemia at 13.9mg/dL (nl 8.5-10.5), albumin 3.8 g/dL (nl 3.5-5.5 g/dL), phosphate 4.3 mg/dL (nl 2.5-5.0 mg/dL), creatinine 4.7 mg/dL (nl 0.5-1.2 mg/dL), and hemoglobin 9.8 g/dL (nl 12-16 g/dL). Urinary calcium excretion was high, 485 mg/24h (nl 0-250 mg/24h). PTH levels were <5.5 pg/mL (nl 6.7-38.8); thus, defining the hypercalcemia as PTH-independent. Lab tests 4 months earlier were normal. Calcium and vitamin D supplements were immediately stopped with rapid normalization of calcium levels. A previous PTH infusion test supported the diagnosis of PHP. There were no Albright Hereditary Osteodystrophy features, resistance to other hormones or family history of calcium homeostasis dysregulation. Due to these factors, PHP type 1B seemed most likely. Genetic analysis revealed broad methylation defects in the *GNAS* (Guanine Nucleotide Binding Protein, Alpha Stimulating) locus, diagnostic for sporadic PHP1B. Vitamin D intoxication was suspected as the cause of hypercalcemia; yet, low 25-OHD3 and 1,25-OHD3 levels excluded this. The patient then became hypocalcemic and lower dose supplements resumed. She remains normocalcemic.
**Conclusion:** PHP is characterized by hypocalcemia in the face of elevated PTH. Treatment includes calcium and hydroxylated vitamin D supplements to maintain normocalcemia and lower PTH levels as much as possible. Hypercalcemia is rarely reported in PHP, but frequently in hypoparathyroidism due to vitamin D intoxication. We speculate that our patient's hypercalcemia was caused by calcium overdose, although she did not report a change in the regular dose. Close surveillance is essential in PHP to prevent potentially life-threatening electrolyte disturbances.

## P529
## IN-HOSPITAL MORTALITY RATE AFTER OSTEOPOROTIC HIP FRACTURE IN A SPECIALIZED CENTER IN BUCHAREST

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**Objective:** Hip fracture remains the most important clinical manifestation of osteoporosis, with a high and relatively unchanged in the last decades mortality rate. We aimed to

evaluate the in hospital mortality rate after osteoporotic hip fracture in patients treated surgically or functionally in a specialized center in Bucharest.
**Methods:** We calculated the in-hospital mortality in 589 patients (women 430 [73%], men 159 [27%], with a mean age of 79.42±11 y), operated or functionally treated for fragility hip fracture in a 12-month period.
**Results:** In-hospital mortality rate was 5.77% (n=34, women 64.7%). The male sex is a risk factor with a mortality rate of 7.54% (n=12), compared to 5.11%. in women. Average BMI was 23.6 kg/m$^2$, with 9%, 54.5%, 27.2% and 9% for under, normal, overweight and obese. Average length of hospitalization was 20.34 d, with a total of 691 d. Out of the 29 patients, 44.8% had a femoral neck fracture, 3.44% an intracapsular one, 38% intertrochanteric and 13.8% atypical fracture in absence of bisphosphonates. 11.74% had previous fragility fractures, with none being diagnosed with osteoporosis. 85.3% of the patients had a history of one or more cardiac pathology (41.17% with atrial fibrillation), 26.4% with strokes, 1/3 of them with hemiparesis, 32.35% with one form of dementia, 20.58% with anemia, 17,64% with chronic kidney disease stages III-IV, 10.25% with diabetes and 8.82% with chronic pulmonary disease. Regarding the treatment, 58.82% sustained surgical interventions (n=20) with average day of intervention of 8.37 after admission. None of the patients had osteoporosis treatment before the event, 1 had a history of glucocorticoids and in average 4.1 medications with increased risk of falling and fracture. Only 2.94% and 5.88% were consumers of tobacco and alcohol.
**Conclusion:** In-hospital mortality rate is very high, in concordance or even higher compared to other studies, probably this being related to the age of the patients and high comorbidity associated. Male sex is a risk factor.

## P530
## COMPARISON OF THE EFFECT OF TRANSITIONING FROM TERIPARATIDE TO DENOSUMAB OR BISPHOSPHONATES ON BONE MINERAL DENSITY OF LUMBAR SPINE AND FEMORAL NECK IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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**Objectives:** To clarify the effect of transition from teriparatide to denosumab (DNS) or per os bisphosphonates (BIS), in terms of BMD of lumbar spine (LS) and femoral neck (FN), in postmenopausal women with osteoporosis.
**Methods:** Retrospective study of 36 postmenopausal women who previously received 24 months of teriparatide (20 μg/d), followed by 36 months of DNS 60 mg/6mo (group A, n: 22) or 36 months of per os BIS (group B, n: 14). Bone densitometry of LS and FN was performed at 0, 1, 2 and 3 y.
**Results:** The mean age (70.18±11.07 vs. 71±11.43 y, p: 0.8318) and the postmenopausal years (23.9±15.6 vs. 26.29±14.34, p: 0.6470) were comparable between two groups. Baseline BMD at both measured skeletal sites was also comparable between groups (LS: 0.775±0.06 vs. 0.809±0.19, p: 0.4376, FN: 0.666±0.09 vs. 0.692 ±0.08, p: 0.3973). Patients in group A had significant greater increases in BMD of all measured skeletal sites at the end of the third year (LS: 0.775±0.06 to 0.815 ±0.02, p: 0.005, FN: 0.666±0.09 to 0.786±0.09, p: 0.001). At the end of third year BMD of LS in group B significantly decreased (0.809±0.19 to 0.700±0.05, p: 0.047), whereas a nonsignificant improvement in BMD of FN was observed (0.692±0.08 to 0.715±0.06, p: 0.3973). Switching from teriparatide to DNS resulted higher increase from baseline compared to BIS (group A vs. B LS: +7.36% vs. -15.57%, p: 0.0019, group A vs. B FN: +15.27% vs. +3.22%, p: 0.0137).
**Conclusion:** Transitioning from teriparatide to DNS results in improvements in BMD of both measured skeletal sites, whereas switching to BIS results in progressive bone loss in LS and insignificant gain in FN.

## P531
## PREDICTORS OF REDUCED BONE MINERAL DENSITY IN CHILDREN AND ADOLESCENTS WITH CEREBRAL PALSY

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**Objective:** Determine the predictors of reduced BMD in children and adolescents with cerebral palsy (CP) compared to the tested parameters.
**Methods:** The study included 82 children and adolescents with CP, average age 10.8±3.6 y (range 5-19.4 y), with different degrees of functional disability estimated on the basis of Gross Motor Function Classification System (GMFCS). The BMD was measured in the lumbar spine region with DXA and results are determined as Z-score. BMD is estimated in relation to age, sex, clinical form, mobility, nutrition status, daily physical activity and the use of antiepileptic therapy. Relation between variables has been used by Pearson correlation, with statistical significance p<0,05.
**Results:** Lower bone density, defined as BMD Z≤-2, was present in 37 or 45.2% of subjects with statistically significant differences in particular clinical forms (p<0.001), among which the highest representation was recorded in quadriplegic (86%) and dyskinetic form (60%). All tested parameters, except age and sex, had a statistically significant effect on bone density reduction. The highest incidence of reduced bone density (p<0.001) was found in

undernourished (94%) and immobile patients (80%). The average value of BMD Z-score in the mentioned groups were around -2.6, unlike the average of subjects with less severe functional disability and better nutritional status in which the BMD Z-score was >-2 ($p<0.001$).

**Conclusion:** Reduced bone density is significantly present in children and adolescents with CP. The best predictors of decreased bone density are nutritional status and degree of functional disability.

## P532

## INFORMING A PATIENT ABOUT THE ONSET OF CHRONIC RHEUMATIC DISEASE (CRD) RHEUMATOLOGIST'S (RH) EXPERIENCE: PATIENT'S (PA) FEELING

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**Objective:** Informing a patient about the diagnosis of CRD can cause an emotional shock. As a result, the relationship between the Rh and the Pa can be at stake. Our aim was to compare the point of views of Rh/Pa for items related to the information. Bring a better approach by the Rh.

**Methods:** 39 Rh/222 Pa. CDR including 56% rheumatoid arthritis (Ra), 27% spondyloarthritis (SPA), 17% others. Only Ra and SPA are included. Female 78% Ra/52% SPA, average age/average duration of disease: Ra 58/8 y, SPA 42/13 y.

**Results:** The Rh's approach for informing a patient differs with the type of CDR 59%, of its form 29%, of the patient's profile 82%. The consultation takes longer 62% Rh/57% Pa. Empathy is noted for 98% Rh/82% of Pa. Frankness 72% Rh/82% Pa. Time is given to digest the information 93% Rh/73% Pa, to exchange 90% Rh/73% Pa. All explanations are provided (sometimes rephrased 32%) but not sufficiently according to 24% of patients. An anxious, depressed or patient in denial is seen a second time in 29%. He is listened to and the rheumatologist adjusts accordingly. The Rh is empathic/recomforting 98% Rh/64% Pa. He is supportive and tends to be optimistic. Confidence comes for 87% Pa with him being available, listening and explaining. The Rh brings up the quality of life 51%/63% Pa, the evolution 92%/72% Pa. He encourages the patients to be involved in the management of the disease and insists on treatment compliance.

**Conclusion:** The findings show there is no substantial difference between the judgment of the Rh and the perception of the Pa for the items evaluating the first information about the diagnosis of CDR, even though the items are less noted by the Pa. The Rh uses tact and reassurance, he takes time but not enough according to Pa. He brings up the quality of life and remains available, which is appreciated by the Pa. For the 31 items, SPA patients are less optimistic than the Ra patients.

## P533

## THE EFFECT OF SOCIODEMOGRAPHIC CHARACTERISTICS ON THE QUALITY OF LIFE IN POSTMENOPAUSAL WOMEN WITH REDUCED BONE MINERAL DENSITY

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**Aim:** To establish if postmenopausal women with reduced BMD that differ in sociodemographic characteristics report statistically significantly different quality of life across various dimensions.

**Methods:** The retrospective study included 112 postmenopausal women aged 60-70 y with reduced BMD, who were referred for osteodensitometry (DXA) scan at the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia, from February 2017 to January 2018. BMD in hip and spine (L1 −L4) was measured in all patients, and the values were expressed as T-scores. All participants completed the QUALEFFO-41 Serbian Version questionnaire for quality of life assessment, and the demographic characteristics were obtained from medical records. Statistical analyses were conducted using SPSS ver. 24 to ascertain if scores on quality of life (QoL) dimensions are affected by differences in demographic characteristics.

**Results:** The pain score was statistically significantly the lowest for those with primary education only (59.55 ±22.69). Participants that engage in physical labor also report lower QoL (58.33±22.99 vs. 41.3±21.65). Everyday activity score was the lowest in patients with primary education only (28.6±17.54). Ability to perform everyday activities was compromised in those that had experienced fracture (26.08±16.62 vs. 19.18±15.47). Household chores are more challenging for unemployed (27.73±19.38). Better quality of leisure time is reported by participants from rural areas (62.58±23.19). Leisure time quality is the lowest for those with primary education only (68.64±18.31), but is also reduced in women that walk and perform physical activities at work (74.69±14.84). Patients with post-secondary education report the lowest quality of mental functioning (64.14±7.27). Overall quality of functioning is lower in those that have primary-level education only (49.05±11.94) relative to other educational levels, as well as among employed (55.92±13.88) relative to unemployed women (43.02±11.27).

**Conclusion:** When analyzing quality of life in individuals with reduced BMD, it is essential to consider their demographic characteristics.

## P534
## EFFECT OF CLINICAL CARE PATHWAYS ON HEALTH-RELATED QUALITY OF LIFE AND PHYSICAL FUNCTION FOLLOWING FRAGILITY FRACTURE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objectives:** This meta-analysis aimed to evaluate the effect of clinical care pathways (CCPs) on health-related quality of life (HRQoL) and physical function following fragility fracture of the most common sites – hip, wrist, vertebrae and humerus.
**Methods:** We searched 4 online databases for all published studies that involved participants aged ≥50 years who sustained a fragility fracture; evaluated the effects of a CCP compared to usual post-fracture care; and reported outcomes of HRQoL or physical function.
**Results:** 22 studies (17 randomized controlled trials, 5 nonrandomized studies) were included comprising 5842 participants. 21 studies included hip fracture patients, and one included wrist fracture patients. 82% of studies were assessed as high quality. Meta-analyses showed moderate improvements in the CCP group for HRQoL [standardized mean difference (SMD)=0.24; 95%CI, 0.12-0.35; n=10 studies] and physical function (SMD=0.21; 95%CI, 0.10-0.33; n=15 studies) compared with usual care. Sensitivity analyses by study design showed no difference in effects. CCPs with ≥5 components showed greater improvements in HRQoL (SMD=0.32; 95%CI, 0.22-0.43; n=5 studies) and physical function (SMD=0.21; 95%CI, 0.06-0.36; n=10 studies) compared to CCPs with <5 components. Larger improvements in HRQoL and physical function were found for CCPs that included a care coordinator; geriatric assessment; rehabilitation; nutritional advice; discharge planning; or home modifications.
**Conclusions:** Meta-analysis by fracture type was not possible due to lack of non-hip fracture studies. Treatment with CCPs following hip fracture showed improvements in HRQoL and physical function compared with usual care. Further research is warranted to assess the combination of CCP components that provide the most beneficial results; evaluate the effect of CCPs in patients with non-hip fractures; and determine which patient groups are more likely to benefit from CCPs.
**Acknowledgments:** JT is supported by an Australian National Health and Medical Research Council (NHMRC) Postgraduate Scholarship (1151089) and SLB-O is supported by a NHMRC Career Development Fellowship (1107510).

## P535
## OBESITY ASSOCIATED WITH LOW LEAN MASS AND/OR LOW BONE DENSITY FURTHER WORSEN CARDIORESPIRATORY FITNESS IN MIDDLE AGED AND OLDER ADULTS

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**Objective:** Cardiorespiratory fitness (CRF), expressed by maximal oxygen uptake ($VO_{2peak}$), is a strong predictor of mortality. Aging is associated with changes in body composition that could compromise the $VO_{2peak}$. We aimed to investigate the impact of disturbances in body composition on the CRF in middle aged and older persons.
**Methods:** This is a small-scale, hypothesis-driven, cross-sectional study with 43 individuals (55% male; aged 57-85 y) recruited from the Health Survey-Sao Paulo 2015. Appendicular lean mass (ALM), fat mass and BMD were measured by DXA. Obesity was defined as fat mass (kg) divided by height squared >9 kg/m$^2$ and >13 kg/m$^2$ for men and women, respectively. Low lean mass was set as ALM divided by BMI <0.789 for men and <0.512 for women. Osteopenia was defined as T-scores at lumbar spine and femoral neck <-1.0. Subjects were then clustered into groups according to the presence or not of body composition disturbances. $VO_{2peak}$, ventilatory anaerobic threshold (VAT) and respiratory compensation point (RCP) were assessed by incremental exercise test on a treadmill. Serum vitamin D, leisure physical activity and grip strength were assessed as potential confounders.
**Results:** The groups were as follows: 8 (50% male) individuals "without disturbances", 16 (56% male) with "osteopenia and/or low lean mass", 9 (44% male) with "obesity alone", and 10 (70% male) with "obesity plus osteopenia and/or low lean mass". The group with "obesity plus osteopenia and/or low ALM" showed lower $VO_2$ at the RCP than the groups "without disturbances" (-5.1 ml/kg/min, p=0.008) and "osteopenia and/or low lean mass" (-5.2 ml/kg/min, p=0.008). The group with "obesity plus osteopenia and/or low lean mass" also showed lower $VO_{2peak}$ than the group with "osteopenia and/or low ALM" (-4.5 ml/kg/min, p=0.026). Serum vitamin D, leisure physical activity and grip strength did not change the results.
**Conclusion:** In this sample of middle aged and older adults, obesity combined with low lean mass and/or osteopenia resulted in poorer aerobic conditioning, which suggests that showing a cluster of body composition disturbances may predispose to higher morbimortality risks.
**Acknowledgements:** São Paulo Research Foundation (FAPESP) [2014/26787-0].

## P536

## LIPOPOLYSACCHARIDES AND LIPOTEICHOIC ACID SHOW THE OPPOSITE EFFECT ON BONE FORMATION THROUGH THE REGULATION OF OSTEOCLAST ACTIVATION

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**Objective:** Osteoblasts and osteoclasts play crucial roles in bone formation processes. Osteogenesis and osteoblast differentiation produce new bone cells. Osteoclast activation can be metabolized to aging bone cells and is important for bone remodeling. Appropriate balance between the activities of these two cell types is essential for maintaining bone function and prevent osteoporosis. Additionally, after treating bone infection with antibiotics, dead bacteria tend to remain as cell wall components, which stimulate the activity of osteoblasts and osteoclasts. However, the mechanisms of lipopolysaccharides (LPS) and lipoteichoic acid (LTA) on the activity of osteoblasts and osteoclasts remains unclear.
**Methods:** In this study, we conducted animal experiments to confirm the opposite effects of LPS and LTA on osteogenesis in mice. We also conducted cell culture experiments to investigate the effects of LPS and LTA on the osteogenic differentiation and osteoclastogenesis in osteoblasts and osteoclasts.
**Results:** First, we found that LPS or LTA injection into the femur bone marrow cavity in a mouse model confirmed that LPS can cause bone loss, whereas LTA does not alter microCT-related parameters. By contrast, LTA appears to increase the number of trabecular bones. Staining of the femoral bone slices with H&E and Masson's trichrome stains revealed that the bone image in the LPS group showed tissue necrosis and enhances cathepsin K expression in osteoclasts. By contrast, LTA does not appear to cause bone tissue necrosis, and the LTA-treated group appears to reduce the cathepsin K expression in osteoclasts. Second, we established a mouse femur bone implant surgery and induced a bone defect of size 1 mm. LTA promotes bone healing, whereas LPS worsens bone healing. LPS treatment also causes fractures in mice. LTA not only enhances callus formation but also promotes the hardening of the callus bones into dense bones. H&E and Masson's trichrome stains were used to stain the femoral bone slices, and the results showed that LTA can promote new bone formation. Third, we found that the effects of LPS and LTA on osteoblast differentiation are activation in vitro. The osteoblastic cell line (MC3T3-E1) was treated with osteogenic factor in the presence or absence of LPS or LTA. The results demonstrated that LPS inhibited osteoblast differentiation, but LTA slightly promoted osteoblast differentiation.
**Conclusions:** Our research findings revealed the effects of LPS and LTA on osteoblasts and osteoclasts are reversed in vivo and in vitro. We believe that it can help in the development of a novel strategy for the treatment of bone infection and contribute to the field of bone physiology.

## P537

## ASSOCIATION BETWEEN BONE MINERAL DENSITY AND TUMOR MARKERS IN HEALTHY WOMEN

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**Objective:** We investigated the relationship between BMD and tumor markers.
**Methods:** A total of 314 female, who had undergone comprehensive routine health examinations at the Daegu Fatima Hospital, were included in this study. The BMD of lumbar spines (L1 to L4) was measured by DXA. Serum α-fetoprotein (AFP), carcinoembryonic antigen (CEA), carbohydrate antigen (CA) 125 and carbohydrate antigen (CA) 19-9 levels were checked. Patients with malignancy were excluded.
**Results:** The mean age of total patients was 48.58±12.65. In univariate analysis, the BMD of lumbar spines (L1 to L4) was associated with CEA, CA 125 and CA 19-9. AFP was not related with BMD of lumbar spines. After adjusted for age and BMI, AFP and CA 19-9 were associated with the BMD of lumbar spines, but CEA and CA 125 were not related with BMD of lumbar spines. The regression coefficients between AFP and BMD of lumbar spines were 0.137 for L1, 0.104 for L2, 0.129 for L3 and 0.117 for L4, whereas those between CA 19-9 and BMD of lumbar spines were -0.082 for L1, -0.097 for L2, -0.119 for L3 and -0.134 for L4.
**Conclusion:** In the present study, we found that the level of AFP and CA 19-9 is significantly associated with BMD in women. Further studies are needed to provide a definite relationship and elucidate the mechanism.

## P538

## ONE YEAR TREATMENT OF ANTI-TNF THERAPY AFFECTED SYSTEMIC BONE LOSS IN PATIENTS WITH RHEUMATOID ARTHRITIS (RA) DIFFERENTLY ACCORDING TO THE DISEASE DURATION

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**Objective:** In this study, we tried to find out how disease duration affects systemic bone metabolism in patients with RA after one year anti-TNF treatment. The disease duration of rheumatoid arthritis is classified as recent onset RA (≤3 y) and established RA (>3 y).

**Methods:** 32 seropositive RA patients were enrolled. They had been refractory to antirheumatic drugs and anti-TNF therapies including etanercept, adalimumab and infliximab were administrated for 1 y. Etanercept, adalimumab and infliximab at approved dose were given to 11, 13 and 8 patients, respectively. BMDs were measured at baseline and one year after treatment. Blood sampling was done at baseline, 6 months and 1 y after the treatment. Peripheral blood mononuclear cells were cultured and number of osteoclasts was counted. Bone turnover markers including c-terminal telopeptide (CTX), bone specific alkaline phosphatase (BSALP) were measured using ELISA. In addition, RA disease activity including DAS28 was assessed.
**Results:** BMD at femur and total hip decreased after 1 y in recent onset RA although BMD did not differ in established RA. In recent onset RA, bone resorption pit by cultured osteoclasts as well as calcified nodule produced by cultured osteoblasts did not change in 6 months of anti-TNF treatment. In contrast, bone resorption pit decreased and calcified nodule by osteoblasts increased in 6 months in established RA patients. The number of osteoclasts decreased in 1 y in both groups. BSALP increased in recent RA and CTX increased in established RA but both markers seemed not to reflect systemic bone metabolism. DAS28 in both groups responded well to anti-TNF treatment.
**Conclusion:** Recent onset RA showed significant systemic bone loss although BMD in established RA stayed still after one year of anti-TNF treatment. Decreased activity of osteoclasts and improved activity of osteoblasts at 6 months seemed to prevent bone loss in established RA. It is suggested that RA patients with anti-TNF therapy may benefit from earlier bone protective treatment to prevent systemic bone loss.

## P539
## PELVIS FRACTURES IN OLDER PEOPLE POSE A HIGH RISK OF INSTITUTIONALIZATION

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**Objective:** Fall-related fractures are a serious threat to the health and wellbeing of older persons. Long-term consequences of hip fractures such as institutionalization and mortality are well known. The impact of pelvis fractures is less well understood. The aim of this study was to estimate risks of institutionalization and death following pelvis fracture and compare them with the corresponding risks after hip fracture.
**Methods:** Data was retrieved from a German health insurance company. Crude and age-standardized 6 months incidence rates for institutionalization and death were calculated. To compare the risks of institutionalization or mortality multivariate regression models were applied.
**Results:** Between 2005-2008 19,670 people suffering an incident hip fracture were identified with 2776 being newly institutionalized and 3199 deceased during the following six months. During the same period 4574 people suffered an incident pelvis fracture with 590 being institutionalized and 499 deceased. Crude and age-adjusted rates of institutionalization and mortality were higher in patients with hip fracture compared to pelvis fracture. However, after adjustment for age, prefracture functional status and comorbidity, relative risks of institutionalization after pelvis fracture in women (0.94; 95%CI 0.86; 1.02) and in men (0.89; 95%CI 0.70;1.12) were not statistically different compared to hip fractures while relative risks of death after pelvis fracture were still lower than after hip fracture in women (0.71; 95%CI 0.64;0.78) and in men (0.75; 95%CI 0.63;0.88) .
**Conclusions:** Both fracture sites are presumably associated with a significant decline in physical function. People suffering from fractures of hip and pelvis experience immediate loss of mobility. Hence, the link between hip and pelvis fractures and subsequent institutionalization may be the result of mobility limitations. While rehabilitative programs are standard of care after hip fracture comparable programs for people recovering from pelvis fracture have to be developed first.

## P540
## IMPACT OF REHABILITATION THERAPY FOCUSED ON THE MUSCULOSKELETAL CAPACITY IN OSTEOPOROTIC-DIABETIC PATIENTS

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**Objective:** Comorbidities such as diabetes and osteoporosis affect the quality of life in elder patients, outlining negative aspects of daily life, including the risk of falls. Bone tissue microarchitecture determines the bone quality and is associated with high risk of bone fragility, especially in elder patients. Proper management of these patients includes rehabilitation therapies that increase musculoskeletal strength.
**Methods:** We present a group of 5 in patients with diabetes, osteoporosis and musculoskeletal pathology that followed a rehabilitation program including physical therapy, antalgic electrotherapy and manual therapy in INRMFB 3rd Clinic. Management started after a detailed clinical assessment including cardiologic, diabetologic, neurological and functional evaluation.
**Results:** Among our group of patients 80% of them accused intense musculoskeletal pain (VAS=8/10) and 60% had lower functional level in admission. After 2 weeks of medical treatment and physical therapy the level of pain was reduced to 20% and the intensity of pain was mild (VAS=3/10). The

functional level was increased due to improving the strength in muscles. The main key is of treatment is the long time association with medication that can improve the bone microarchitecture and mineralization.

**Conclusions:** Understanding the pathophysiology of the illness provides the key to establish the proper therapeutic management and can provide the quality of life for these patients. Multidisciplinary approach is required for an optimal result. We intend to realize a prospective study with a larger group of individuals in order to analyze the long term benefits of associating rehabilitation therapy to patients with comorbidities.

## P541

## EFFECTS OF ARONIA MELANOCARPA FRUIT JUICE ON METABOLIC INDICES IN A RAT OVARIECTOMY-INDUCED MODEL OF BONE LOSS

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**Objective:** Polyphenols are intensively studied because of their beneficial effects on human health. The aim of the study was to investigate the effects of polyphenol-rich *Aronia melanocarpa* fruit juice (AMFJ) on metabolic indices in a rat ovariectomy-induced model of bone loss.

**Methods:** Female Wistar rats were divided into 4 groups, each of 14 animals: SO (sham-operated), OV (ovariectomized), OV+$AMFJ_5$ and OV+$AMFJ_{10}$. Beginning 2 weeks after the operation, in the course of 10 weeks, the animals were treated daily orally. SO and OV groups received distilled water. OV+$AMFJ_5$ and OV+$AMFJ_{10}$ groups were respectively treated with AMFJ at doses of 5 and 10 ml/kg. Weight was measured throughout the experiment and weight gain was calculated. At the end of the experiment, femur BMD was evaluated by DXA, fat deposits (total, retroperitoneal and mesenteric) and blood lipids were measured.

**Results:** AMFJ dose-dependently antagonized OV-induced BMD reduction. Thus, in OV+$AMFJ_{10}$ group the BMD was significantly higher ($p<0.05$) than that of OV group. OV rats had a significantly higher ($p<0.05$) weight gain than SO rats. The total and retroperitoneal fat deposits of OV group were significantly higher ($p<0.01$) than those of SO group and the mesenteric fat was insignificantly increased. This accounted for significantly higher ratios of total fat/body weight ($p<0.05$) and retroperitoneal fat/body weight ($p<0.01$) of OV rats compared to SO rats. Blood cholesterol level of OV group was significantly higher ($p<0.05$) than that of SO group. AMFJ in the two doses could not counteract these effects of ovariectomy on metabolism. Thus, the weight gain, total fat, retroperitoneal fat and the calculated ratios of total fat/body weight and retroperitoneal fat/body weight, as well as the blood cholesterol of OV+$AMFJ_5$ and OV+$AMFJ_{10}$ groups were significantly higher than those of SO group and were not significantly different from those of OV rats.

**Conclusion:** In a rat ovariectomy-induced model of bone loss, *Aronia melanocarpa* fruit juice antagonized the reduction of BMD but could not antagonize the effects of ovariectomy on lipid metabolism.

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## P542

## DEVELOPMENT OF A FRAILTY SPECIFIC PATIENT REPORTED OUTCOME (PRO): THE FRAILQOL

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**Objective:** In recent years, there has been an increased focus on placing patients at the center of healthcare research. Currently, the impact of frailty on quality of life of the older is assessed by generic tools only. However, these tools may not detect subtle effects of this geriatric condition on quality of life. Therefore, the aim of this study was to develop a frailty specific Patient Reported Outcome (PRO).

**Methods:** A two-stage process was followed: (I) Item generation based on a literature review, a Delphi survey conducted among professionals in the field of frailty (i.e., members of the working groups on frailty from the EUGMS or ESCEO), and two focus groups (i.e., one in frail community-dwelling older subjects and one in frail nursing home residents). (II) PRO generation reviewed by 2 linguists.

**Results:** The first version of the questionnaire consists of 40 items translated into 17 questions rated on a 4-point Likert scale. These items are organised into 6 domains, based on the concept of intrinsic capacity proposed by the WHO: locomotion, sensory, vitality, psychosocial, cognition and others.

**Conclusion:** The first version of the FRAILQOL, a frailty specific PRO, has been developed. Investigations are now required to test the psychometric properties (internal consistency, test-retest reliability, divergent and convergent validity, discriminant validity, floor and ceiling effects) of this PRO. The number of items will probably be reduced during the validation analyses to lead to a final version.

## P543

## LONG-TERM TREATMENT WITH TNFα INHIBITORS IMPROVES BONE MINERAL DENSITY BUT NOT VERTEBRAL FRACTURE PROGRESSION IN ANKYLOSING SPONDYLITIS

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**Objectives:** To evaluate the long term effects of TNF inhibitors (TNFi) on BMD and the incidence of vertebral fractures (VFx) in patients with ankylosing spondylitis (AS).

**Method:** Consecutive patients with active AS with a TNFi treatment duration up to 4 y, with available DXA scans and spine X-rays, were included. BMD (classified according to the WHO criteria for osteoporosis) of hip and lumbar spine, the VFx (classified as a Genant score $\geq$1 / $\geq$20% height loss) and radiological progression (modified stoke ankylosing spondylitis spinal score; mSASSS) scores were performed at baseline and 4 y of TNFi treatment.

**Results:** Overall, 135 AS patients were included. At baseline, 40.1% of the patients had a low BMD of the hip and 40.2% of the lumbar spine. This decreased respectively to 38.1% (p=0.03) with a low hip BMD and 25.3% (p<0.001) for the lumbar spine after 4 y of TNFi treatment. VFx were present at baseline in 11.1% of the 131 patients, which increased to 19.6% after 4 y of TNFi treatment. A Genant score ≥2, was found at baseline in, 3 out of 14 VFx (21.4%) which increased to 7 out of 27 VFx (25.9%) after 4 y. All disease activity parameters, The Ankylosing Spondylitis Disease Activity Scale (ASDAS, both CRP and ESR), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), C-reactive protein and erythrocyte sedimentation rate decreased all significantly (p<0.001). The mean radiological progression (n=80) increased significantly from a median mSASSS-score of 4.0 (1.5-16.0) at baseline to 6.5 (2.1-22.9) after 4 y of TNFi treatment (p<0.001).

**Conclusion:** Despite the improvement of BMD and well-known decrease in disease activity, we still found new VFx, increase in severity in the number and grade of VFx and radiographic progression during 4 years of treatment with TNFi in AS patients with a long disease duration.

Table 1: BMD measurement in spine and hip of 107 AS patients treated with TNFi.

| | Baseline* | After 4 y of TNFi** | p-value |
|---|---|---|---|
| Osteopenia LS | 34 (31.8) | 25 (23.4) | |
| Osteoporosis LS | 9 (8.4) | 2 (1.9) | |
| Low BMD LS | 43 (40.2) | 27 (25.3) | <0.001 |
| Osteopenia total hip | 39 (36.4) | 31 (29.0) | |
| Osteoporosis total hip | 4 (3.7) | 3(2.8) | |
| Low BMD total hip | 43 (40.1) | 34 (31.8) | 0.03 |
| Patients with VFx | 13 (12.1) | 21 (19.6) | 0.004 |
| Total number of VFx | 14 | 26 | |

*1 patient with spondylodesis; 4 patients with a total hip replacement

** 2 patients with spondylodesis; 5 patients with a total hip replacement

LS: lumbar spine, Abnormal BMD= osteopenia and/or osteoporosis according to WHO guideline

Vertebral fractures (VFx) are presented in number of patients with a VFx and the actual prevalence of VFx. Outcomes are presented in n (%)

## P544

## CLINICAL AND RADIOLOGICAL EFFICACY OF COMBINATION THERAPY OF RHEUMATOID ARTHRITIS WITH SYSTEMIC MANIFESTATIONS

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**Objective:** To evaluate clinical and radiological efficacy of infliximab (IF) in combination with methotrexate for treatment of rheumatoid arthritis (RA) with systemic manifestations.

**Methods:** RA patients with any systemic involvement were intended to include in the study. All the patients were initially treated with methotrexate 12.5-20 mg/week during at least 6 months in combination with different NSAIDS. Intravenous IF 3 mg/kg was then added using the common protocol. We assessed RA activity before initiation of IF therapy (week 0) and after its completion (week 54) using DAS28-CRP(4) score. The number of tender and swollen joints, the VAS data according to patient's assessment, and changes in X-ray

manifestations of hands and feet were evaluated both at week 0 and week 54. Results were presented as mean±SD, differences were considered significant when p<0.05.

**Results:** 12 patients with RA and systemic manifestations (only with mild anemia) were included in study. The average age of these patients was 46±8.4 y. 10 (83.3%) of them were positive for rheumatoid factor, 100% – for anticitrulline antibodies. Radiographic stages III and IV of RA were detected in 8 (66.7%) cases. All the patients had high disease activity with DAS28-CRP (4) >5.2. Positive effects of infliximab was observed in terms of intensity of articular inflammation including time of the morning stiffness and number of painful and swollen joints. By the end of 54th week DAS28-CRP(4) was 2.77 ±0.9, and this decrease was significant (p<0.05). The mean VAS score was also lower at 54th week comparing to week 0: 65.0±12.9 mm and 16.5±10.07 mm, respectively; p<0.05. On hand and feet radiographs at 54th week, there was no increase in cyst-like bright colored structures and erosions.

**Conclusion:** Combination therapy with infliximab and methotrexate leads to increase of the efficacy of RA treatment with anemia in terms of clinical activity and radiological progression.

## P545

## MICRORNA-125B EMBEDDED IN BONE MATRIX EXERTS PROTECTIVE EFFECTS ON OVARIECTOMY- AND NEURECTOMY-INDUCED BONE LOSS BY SUPPRESSING OSTEOCLAST FORMATION

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**Objective:** Growing evidence indicates the roles of microRNAs (miRNAs) in bone. We found that miR-125b expressed in osteoblasts accumulates in bone matrix as a "cargo" of matrix vesicles, key players in the initiation of bone mineralization. During bone resorption, miR-125b is released from bone matrix and acts on osteoclast precursors, resulting in impaired osteoclast formation by downregulating the transcription repressor PRDM1 and subsequent increase in negative regulators of osteoclastogenesis, such as IRF8 and MAFB. Transgenic (Tg) mice overexpressing miR-125b under the control of the human osteocalcin promoter displayed increased bone volume with decreased number of osteoclasts and without affecting bone formation. We therefore aimed to determine whether MV-based transfer of miR-125b to bone matrix represents a potential therapeutic target for bone loss using mouse models.

**Methods:** 8-week-old female and 10-week-old male wildtype (WT) and Tg mice were ovariectomized (OVX) and sciatic-neurectomized (NX), respectively. Four weeks postoperation, bone parameters in tibiae/femurs were analyzed by microCT and histology and compared with those of sham-operated control mice. To determine the direct effect of miR-125b on bone, LPS was injected subcutaneously into newborn WT mice over the calvaria with transfection of miR-125b mimic or control microRNA. LPS-induced osteolysis was measured by TRAP staining. Results: OVX increased body weight gain with hypoplastic uterus in both phenotypes. OVX-induced trabecular bone loss, as declines in BMD, bone volume, trabecular thickness and so on, was much lower in Tg compared to WT mice. An increase in the number of osteoclasts per bone perimeter was obvious in OVX-WT but not OVX-Tg mice. Similarly, trabecular bone loss was significantly blunted in Tg mice compared to WT mice subjected to NX. LPS-induced osteolysis visualized by tartrate-resistant acid phosphatase staining was significantly attenuated, when miR-125b mimic was transfected.

**Conclusion:** Our findings reveal that osteoblast-derived miR-125b which accumulates in bone matrix can protect bone from OVX- and NX-induced bone loss. These data may provide a novel therapeutic target for bone diseases.

## P546

## PLACENTAL VOLUME IN EARLY PREGNANCY IS ASSOCIATED WITH OFFSPRING BONE AND LEAN MASS: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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**Objectives:** Growth in utero is associated with later musculoskeletal health. We therefore investigated associations between placental volume measured in early pregnancy (EP: 11 weeks' gestation), and bone and lean mass at birth and at age 6 years.

**Methods:** The Southampton Women's Survey is a longitudinal study of women (recruited preconception) and their children. To assess placental volume, 3D ultrasound scanning in early pregnancy was performed in a subset (n=242) using a Kretz Voluson 730 scanner with a 3D curvilinear multi-frequency transducer (Zipf, Austria). Maternal height was measured and information on smoking in early pregnancy and parity was collected via questionnaire. DXA was performed on the neonates within the first 2 weeks of life and again at 6 years. Linear regression was used to assess associations between placental volume, bone mass and body composition.

**Results:** We observed positive relationships between placental volume at 11 weeks and neonatal bone area (β=0.385 (95%CI 0.063 to 0.707) $cm^2/cm^3$, n=83), bone mineral content (BMC) (β=0.24 (95%CI 0.044 to 0.44) $g/cm^3$, n=83), and lean mass (β=4.47 (95%CI 0.39 to 8.55) $g/cm^3$, n=83) after adjustment for gestational age at ultrasound, child's sex, gestation duration at birth, age at DXA, maternal height, smoking

in early pregnancy and parity. Significant positive associations were also found at 6 years with bone area (β=1.057 (95%CI 0.101 to 2.012) $cm^2/cm^3$, n=103), BMC (β=1.80 (95%CI 0.47 to 3.13) $g/cm^3$, n=103) and BMD (β=0.001 (95%CI 0.0002 to 0.002) $g/cm^2/cm^3$, n=103) adjusted for the same maternal and childhood factors. At 6 y lean mass was of borderline significance after adjustment (p=0.07).

**Conclusions:** We found that placental volume in early pregnancy was positively associated with childhood bone area, BMC and BMD at age 6 y, independent of maternal factors known to be associated with childhood bone mass. Our findings emphasise the importance of maternal placental development in early pregnancy in determining a child's future musculoskeletal health.

## P547

## COST EFFECTIVENESS OF AN FLS IN A BRAZILIAN HEALTHCARE PROVIDER

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**Objective:** Fiosaúde is a healthcare provider that has approximately 15.000 beneficiaries. 27% of them are over 60 years of age. In January of 2015 we started an FLS in the Fiosaúde Clinic. Men and women over 50 years of age with a history of fragility fractures were referred. From 2016, patients with a high risk of fractures (BMD <2.5 SD in the lumbar spine or neck of the femur or total femur) were referred without previous fractures. The objective of this presentation is to demonstrate the cost effectiveness of FLS in this environment and the avoided cost in fractures.

**Methods:** From January 2015 to December 2018, 144 patients (127 women and 17 men) were assigned to receive targeted intervention to reduce fracture or refracture rates. The patients data related to fractures and incidence of new fractures are reported.

**Results:** 108 had previous fractures and 36 had no fractures. 47 patients had 1 previous fracture, 38 had 2 fractures and 23 had 3 or more previous fractures. 67 patients were assigned to receive yearly zoledronic acid 5 mg infusion. 65 patients were assigned to receive twice daily subcutaneous injection of denosumab 60 mg. 12 patients were assigned to receive monthly ibandronate 150 mg. 4 new fractures occurred (2 transtrochanteric and 2 pelvis). In this environment the cost of a fragility fracture is U$10,500. The annual cost of a patient in the FLS is $786, including medical fees, medication and laboratory and imaging tests. There was no additional investment by the health infrastructure operator in the implementation of FLS. It is estimated that 66 fragility fractures were avoided.[1] Calculating the annual cost of patients in the FLS, the cost of the 4 fractures occurred and the avoided cost of the fractures, the balance is positive at U$546,133.33.

**Conclusion:** The FLS in the healthcare provider environment is high cost effective.

**Reference:** 1. King AB et al. Osteoporos Int 2005;16:1545.

## P548

## FRAILTY INTERVENTIONS TO IMPROVE PHYSICAL PERFORMANCE: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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**Objectives:** Frailty, falls and age-related declines in physical performance are reversible. To guide clinical management, a systematic review and network meta-analysis (NMA) were performed. The latter methodology enables the simultaneous assessment of the effects of multiple interventions for the same condition. Our objective is to determine the comparative effectiveness of frailty interventions on physical performance measured by short physical performance battery (SPPB). Secondary outcomes included knee strength, balance, walking speed, grip strength, and adverse events.

**Methods:** Randomized controlled trials (RCTs) were identified by systematic search of several databases (MEDLINE, EMBASE, CINAHL, AMED). Duplicate title/abstract and full-text screening, data extraction and risk of bias assessment were performed. Inclusion criteria were singular or multifaceted interventions targeting frailty and/or improvement in physical performance. Comparators were standard care, placebo or another intervention. We performed both standard pairwise meta-analysis and Bayesian NMA under a random-effects model. Pooled estimates of treatment effects were odds ratios for dichotomous outcomes and standardized mean difference (SMD) for continuous outcomes. Interventions of each outcome were ranked using the surface under the cumulative ranking curve (SUCRA) and presented in a rank-heat plot. The GRADE approach specific to NMA was used to assess the quality of the evidence.

**Results:** A total of 180 RCTs were included after screening of 7090 citations and 749 full-text articles. The mean age of included studies ranged between 75 and 85 years, BMI

between 25 and 30; 62.5% of participants were female. Of the included RCTs, 77.7% had overall high risk of bias. The NMA for SPPB (including 36 RCTs, n=4568, 9 interventions) suggested that medication management intervention, when compared to placebo/standard care, were associated with the greatest improvement in SPPB score (SMD, 3.94 (95%CI, 0.93 to 6.98) followed by physical activity with nutritional supplementation (SMD, 2.41 (95%CI, 1.21 to 3.63). According to SUCRA, medication management intervention and physical activity plus nutritional supplementation were the most effective interventions (100% and 88% likelihood, respectively).

**Conclusion:** Medication management and physical activity with nutritional supplementation were most effective in improving physical performance of older adults. Given the low quality of evidence available, more intervention studies that rigorously examine treatments to improve physical performance are required.

## P549

## ESTIMATION OF CALCIUM, VITAMIN D, AND ALKALINE PHOSPHATASE IN POSTMENOPAUSAL WOMEN

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**Objective:** To evaluate the correlation between serum calcium (Ca), alkaline phosphatase (ALP), vitamin D and BMI in group of postmenopausal women.

**Methods:** 20 women with low BMD participated in the study. Reference values for Ca level in serum are 2.15-2.55 mmol/l, and for ALP <104 IU/L. The level of vitamin D <30 nmol/l is defined as a deficiency, 30-50 nmol/l is insufficient, and the level higher than 50 nmol/l as sufficient.

**Results:** 10 patients had BMD at osteoporosis level (G1 group) and 10 at osteopenia (G2 group) level. The groups were homogeneous in ages (G1- mean ages 62.3±5.31, G2- mean ages-62.2±8.65, t=-0.031, p=0.975). Median values of Ca in G1(2.41; 2.13-2.56) and in G2 (2.39; 2.30-2.74) and the difference is not statistically significant (Mann–Whitney test W=50.5, p=1). There is no statistically significant difference in median ALP values in G1 and G2; G1 med (50.5; 21-220), G2 med (66; 42-85) (Mann–Whitney test W=61.5, p=0.405). Mean value of vitamin D G1 72.11±29.42, G2 mean 69.83 ±24.67, t=-0.188, p=0.853. Mean value of BMI in G1 23.49 ±3.51, in G2 28.01±4.07, there is a statistically significant difference in BMI between G1 and G2 (t=2.655, p=0.016). There is no statistically significant correlation in Ca and ALP levels in G1 (Spearman's rank correlation coefficient 0.235 p=0.514), while in G2 there is a positive moderate correlation (Spearman's rank correlation coefficient 0.683, p=0.03, S=52.317). There is no statistically significant correlation between the levels of vitamin D and ALP in both groups (G1 Spearman's rank correlation coefficient -0.237 p=0.51, S=204.12; G2 Spearman's rank correlation coefficient 0.584 p=0.076, S=68.708).

**Conclusion:** There was no statistically significant difference in Ca, vitamin D and ALP levels between these two groups, while BMI values were statistically significantly higher in the osteopenia group. In osteopenia group there is a positive moderate correlation between the level of Ca and ALP.

## P550

## A BIOMECHANICAL ANALYSIS ABOUT FIXING THE LOCKING COMPRESSION PLATE OF DISTAL FEMUR FRACTURES

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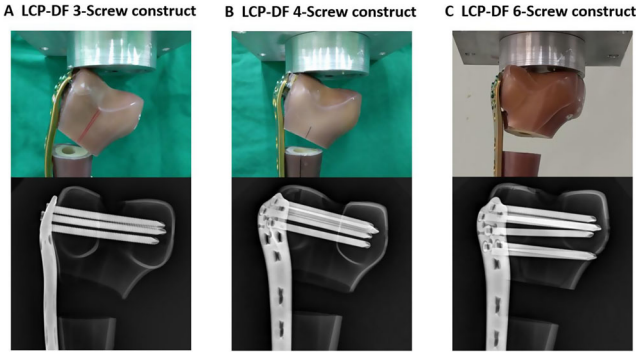
**Objective:** A locking compression plate with the technique of minimal invasive plate osteosynthesis has been the most commonly used procedure in distal femur fractures. However, when the patient is old and the bone is osteoporotic, it is difficult to fix a sufficient number of screws at the distal part of the plate. From this viewpoint, this study aimed to identify how biomechanical stability varies according to the numbers of distal part screws of the LCP – DF, which is a standard implant for the distal femur fractures.

**Methods:** Biomechanical stability was compared between three LCP-DF fixation groups (3-screw group, 4-screw group, and 6-screw group). For each group, 6 synthetic adult-sized femur models (Model 3403, Pacific Research Laboratories) were used for the biomechanical research. The composite replicate femurs was used to simulate the distal femur fracture with comminution. After fixing the LCP-DF, the bone of 6 cm and 8.5 cm above the distal edge of knee part, was removed with a gap of 2.5 cm. For the biomechanical analysis, the servohydraulic testing machine (MTS 810 Material Test System, MTS Systems, Eden Prairie, MN) was used. For the cyclic loading, an axial loading of 100-1000 N, 3 Hz, and 100,000 cycle was given, after a 100 N preload was given. For the failure test, an axial load at a velocity of 10 mm/min was given so that the load to failure, mode of failure and displacement at load to failure were all recorded and analyzed.

**Results:** During the cyclic loading test, there was no failure in all of the 3-screw, 4-screw and 6-screw groups. In load-to-failure test, average load to failure was 4214.8N (ranging from 4138-4390 N) for the 3-screw group, 4273.2 N (from 4143-4329 N) for 4-screw group, and 4713.3 N (from 4587-4955 N) for the 6-screw group (p=0.007). Every sample taken from the three groups showed cracks. The average displacement in the failure showed an average of 10.3 mm (ranging from 9.6-11.8 mm) for the 3-screw group, 9.1 mm (ranges from 6.5-11.7

mm) for the 4-screw group and an average of 8.8 mm (ranges from 6.4-10.4 mm) for the 6-screw group. As expected, 6 screws group was the strongest biomechanical construct of LCP-DF in the fixation of extra-articular distal femur fractures.

**Conclusion:** However, when there is no osteoporosis in fractures with the difficulty to fix 6 screws at the distal fracture segment, the fixation of 3-4 screws were also achieved an acceptable stability, biomechanically. However, the further study is needed in the model of the elderly people or osteoporotic fractures.




## P551
## CHANGES IN FEMORAL CORTICAL AND TRABECULAR BONE AFTER BARIATRIC SURGERY

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**Objective:** To evaluate changes in femoral cortical and trabecular bone after bariatric surgery.

**Methods:** Male and Female adults who underwent bariatric surgery were included in this study. Hip DXA scans were performed before the surgery, and between 6-18 months after the surgery. Scans were acquired at the Hospital Universitari de Bellvitge (Barcelona, Spain) using a Hologic QDR 4500 scanner. Areal BMD (aBMD) was calculated at total femur. 3D analysis of the cortical and trabecular bone was performed from the hip DXA scans using the 3D-SHAPER software (v2.9, Galgo Medical, Barcelona, Spain). Trabecular volumetric BMD (vBMD) and cortical surface BMD (sBMD) were calculated at total femur. Changes in DXA-derived aBMD and 3D measurements between baseline and follow-up visit were expressed as a percentage and compared using paired Student's t-test.

**Results:** 13 subjects (9 female and 4 male) were included in this study. Mean (SD) age at baseline (i.e., before surgery) was 53.4 (6.6) y. Follow-up scans were performed on average at 13.4 (3.6) months from baseline. Mean weight was 89 (16) kg at baseline and 73 (12) kg after surgery ($p<0.001$). An 8.3% decrease in total hip aBMD was observed after surgery ($p=0.001$). Decrease was 12.8% ($p=0.001$) in trabecular vBMD and 6.0% ($p=0.005$) in cortical sBMD. Figure 1 shows that the mean changes in cortical sBMD were more pronounced at the lateral aspect of the greater trochanter (magenta area). Although decreased, bone density measurements after surgery were normal for their age with Z-scores of 0.5 for total hip aBMD, 0.8 for cortical sBMD and 1.3 for trabecular vBMD.

**Conclusion:** Patients who underwent bariatric surgery, although suffering from marked decrease in trabecular and cortical density, showed normal bone density for their age. DXA-based 3D analysis of the cortical and trabecular bone could potentially provide insightful information to monitor patients undergoing bariatric surgery.

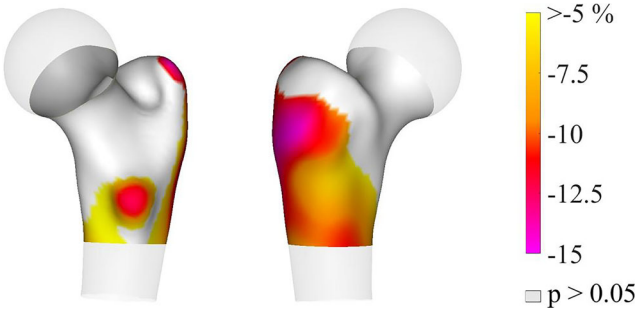


Figure 1: Anatomical distribution of mean changes in cortical sBMD after bariatric surgery

## P552
## PREDICTORS OF BONE MINERAL DENSITY AND BONE MINERAL CONTENT IN TYPE DIABETES MELLITUS

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**Objective:** Obesity and hyperinsulinemia can lead to lower bone turnover in type 2 diabetes mellitus (T2DM) patients. Studies assessing BMD in T2DM have given mixed results with few suggesting normal to increased BMD whereas others documenting decreased BMD. Factors modulating BMD in T2DM have not been well determined. This study analysed the effect of body fat distribution on BMD and bone mineral content (BMC) in patients of T2DM. We compared BMD and BMC in normal (BMI <25 kg/m$^2$) and obese (BMI >25 kg/m$^2$) T2DM patients with age and BMI matched controls, and evaluated the impact of lean mass and body fat distribution on them.

**Method:** Anthropometric assessment and blood sampling was done in 70 T2DM patients and 70 normal controls. BMD, BMC, lean mass and body fat distribution were measured by DXA.

**Results:** Obese individuals had significantly higher BMD, BMC, fat mass and significantly lower 25(OH) vitamin D levels. Lean mass showed strong positive correlation with BMC and BMD as compared with fat mass. Percent body fat showed negative correlation with BMC and BMD. BMI and android/ gynoid (A/G) ratio showed positive correlation with BMD and BMC. T2DM patients had higher central obesity (A/G ratio) and waist circumference was best predictor of A/G ratio. Regression analysis revealed lean as the strongest predictor of BMC after adjusting for age, sex, BMI and 25(OH)vitamin D, both in normal individuals and in patients with T2DM. Fat mass and percent body fat were significantly higher in females whereas BMD, BMC, lean mass and A/G ratio were significantly higher in males.
**Conclusion:** T2DM and obese individuals have increased BMD and BMC with lean mass being the strongest predictor of BMC in normal individuals and T2DM.

## P553
## VITAMIN D IMPROVES GLYCEMIC OUTCOMES IN PREDIABETES THROUGH REDUCED FETUIN-A AND SYSTEMIC INFLAMMATION

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**Objective:** To evaluate the impact of VitD supplementation on FetA and systemic inflammation [IL6, IL1β, TNFα, soluble TNF receptor (sTNFR)1, sTNFR2] in IPD, and their relationship with long-term glycemic outcomes.
**Methods:** From an initially screened 2245 individuals, 207 IPD with persistent IFG and/or IGT over 2 successive OGTTs with vitD <30 ng/ml were randomized into intervention group (Group-I) (cholecalciferol 60,000 U once weekly for 8 weeks and then monthly with 1250 mg of calcium carbonate/d for study duration), and control groups [Group-C1 (calcium control group: 1250 mg of calcium carbonate/d); and Group-C2 (placebo control group: placebo tablet similar to calcium tablet). All received therapeutic lifestyle modification. Glucose tolerance, insulin, 25OHD, lipids, IL6, TNFα and hsCRP were done baseline and annually. Data from IPD with at least 1-y follow-up were analyzed.
**Results:** Data from 192 IPD (males: females=122:70) with at least 1-y follow-up were analyzed (mean follow-up: 27.68±9.72 months. At end of study, IPD in intervention group had greatest reduction in FBG, 2hPGBG, HbA1c, fetuin-A, total cholesterol, IL6, sTNFR1, sTNFR2, which was statistically significant. Group-I IPD also had greatest increase in 25OHD (Δ25OHD: 22.96 [11.54 – 40.30] ng/ml; P<0.001). Quantum of decrease in serum triglycerides, LDL-C and HDL-C was greatest in Group-I. Placebo control group (Group-C2) had greatest increase in hip circumference and IL1β. Analysis based on glycemic outcomes revealed IPD who reverted to normoglycemia had highest baseline 25OHD, sTNFR2, along with greatest reduction (Δ change) in FetA, sTNFR1 and sTNFR2. 42.7% (41/96) IPD in intervention group reversed back to normoglycemia, in contrast to 22.92% (22/96) in control groups (P=0.003). With regards to progression to T2DM, it was 10.41% (10/96) in intervention group and 17.70% (17/96) in control groups (P=0.144). Cox regression revealed that FBG, 25OHD, fetuin-A, HOMA-IR, sTNFR1 and Group-I independently predicted prediabetes reversal to normoglycemia. Only FetA was an independent predictor of prediabetes progression to T2DM. Every 1 mg/dl increase in blood glucose was associated with 3.7% decreased reversal to normoglycemia. Every 1ng/ml increase in serum 25OHD was associated with 3% increased reversal to normoglycemia. Every 1μg/ml increase in FetA was associated with 0.4% decreased reversal to normoglycemia and 0.6% increased progression to T2DM. Kaplan Meier analysis also showed significantly higher rates of prediabetes reversal to normoglycemia in intervention group (P=0.033; log rank test [Mantel-Cox]). 42.7% IPD in intervention group reversed back to normoglycemia in contrast to 22.92% in the control groups. This evaluation achieved power of 83.7%, keeping α (type I error) at 0.05.
**Conclusion:** VitD supplementation in prediabetes was associated with improved glycemic outcomes, significant reduction in serum FetA, decreased IR and systemic inflammation.

## P554
## WILL THERE BE A FRACTURE IN THEIR FUTURE? BONE MINERAL DENSITY FINDINGS IN YOUNG SOUTHEAST ASIAN WOMEN WITH ANOREXIA NERVOSA

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**Objective:** Anorexia nervosa carries with it an increased risk of bone loss and fractures. No prior study has explored the bone density findings of Southeast Asian women with this condition and therefore that was the aim of our study.
**Method:** Case notes of 100 young women aged 20-30 with a history of anorexia nervosa and who were seen in the Endocrinology clinic of a large public hospital for evaluation of their bone health were retrospectively reviewed. 75 of them had DXA scans performed at the time of initial diagnosis and these scans were examined and these patients were analysed further.
**Results:** 49 (65%) had a diagnosis of restrictive type anorexia nervosa. The remaining carried a diagnosis of binge purge type. 97% of the women were Chinese, the remaining were Malay or Indian. The mean (SD) age and BMI at presentation was 18.5 (5.7) and 14.2 (2.0) respectively. The mean (SD) duration of amenorrhea in months at the time that the DXA scans were done was 16.5 (14). 19 of the 85 women had a Z-

score ≤-2 at the LS or neck of femur. Age at presentation (17.1 (5.3) vs. 22.1 (5.9); p=0.005), duration of untreated illness in years (1.51 (1.45) vs. 3.9 (3.1); p=0.001 and duration of amenorrhea in months (12.48(12.6) vs. 31.2 (30.9) were significantly associated with Z-score of ≤-2 at either lumbar spine or neck of femur. None of the women had been started on any potential bone metabolism modifying agents including oral contraceptives at the time the DXA scans were done.

**Conclusion:** Early identification and treatment that will help to shorten the duration of illness and amenorrhea may help to ameliorate bone density losses in anorexia nervosa. This may potentially prevent complications such as fragility fractures in later life.

## P555
## RELATIONSHIP AMONG SPINAL ALIGNMENT, BONE MINERAL DENSITY, AND MUSCLE MASS IN ELDERLY OSTEOPOROSIS PATIENTS

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**Objective:** Elderly patients with osteoporosis often complain of back pain associated with pathological vertebral fractures which cause abnormal spinal alignment. Recently, the relationship between abnormal spinal alignment and low back pain has become increasingly more apparent, and corrective surgery for such conditions is being performed. There were few reports to evaluate the relationships among muscle mass, BMD, spinal sagittal alignment and low back pain. We hypothesized that decreasing muscle mass in elderly patients with osteoporosis could also cause abnormalities in spinal alignment. This study evaluated the relationship among spinal alignment, BMD, and muscle mass in elderly patients with osteoporosis.

**Methods:** A total of 50 patients aged over 75 y with severe osteoporosis and pathological vertebral fractures were included in this study. We evaluated the sagittal vertical axis (SVA), pelvic tilt (PT), pelvic incidence minus lumbar lordosis (PI–LL), bone density by DXA analysis, and trunk and limb muscle mass by bioelectrical impedance analysis. Low back pain was evaluated by the Oswestry disability index (ODI). Corrected trunk muscle mass and corrected limb muscle mass (skeletal mass index: SMI) were also measured.

**Results:** The mean age of patients was 80.3 y and the average number of vertebral bodies fractured was 3.4. There was significant low positive correlations between TMI and SVA or PI–LL (r=0.31, and r=0.30, respectively). Further, there were significant low positive correlations between SMI and SVA (r=0.30, respectively) . When we compared between normal group and imbalance group, regarding the PI-LL, TMI, SMI, ODI score in Imbalance group were significantly higher than those in normal group ($p<0.05$). Further, here were more vertebral fractures in Imbalance group compared with the normal group ($p<0.05$).

**Conclusion:** Elderly osteoporosis patients with spinal sagittal imbalance had more vertebral fractures and a higher risk of low back pain as we expected. Interestingly, patients with spinal sagittal imbalance tended to have a higher muscle contrary to hypothesis. However, since muscle mass is not necessarily proportional to muscle strength, a concurrent evaluation of muscle strength is necessary in the future.

## P556
## MUSCULOSKELETAL DISORDERS AMONG GREEK COMPETITIVE WATER POLO ATHLETES

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**Objectives:** The highly repetitive nature of competitive water polo associated with injuries[1,2]. The purpose of this study was to record the musculoskeletal symptoms per anatomical body region in adult Greek competitive water polo players.

**Methods:** The Greek version of Nordic Musculoskeletal Questionnaire (NMQ)[3], was given to adult participants during the 2017 water polo season. Participants in NMQ were asked whether they had pain /discomfort in 9 different anatomical regions (neck, shoulders, elbow, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/feet) during the preceding 12 months and if those symptoms prevented their normal activity during the last year as well as the 7 previous days. Analysis consisted of descriptive statistics.

**Results:** 75 (23 in A1-first category, 52 in B-third category) water polo players (age: 23.5±6.4 y, height: 1.84±0.06 m, weight: 85.1±12.0 kg, BMI: 25.2±2.8 kg/m$^2$, training age: 11.7±5.5 y, training h/week: 10.7±5.6 h) completed the NMQ. The 12-month prevalence rate of pain/discomfort was 58,7% in shoulders, followed by the neck (34.7%), lower back (24%), elbows-knees-wrists/hands (20%), hips/thighs (10.7%), upper back (8%) and ankles/feet (5.3%). Those symptoms prevented athlete's normal activity (functionally) during the last 12 months with different prevalence rate per anatomical body region (shoulders: 30.7%, neck: 16%, wrists/hands: 10.7%, elbows and lower back: 8%, knees and upper back: 5.3%, hips/thighs: 4% and ankles/feet: 2.7%).

**Conclusion:** The high prevalence of musculoskeletal pain/discomfort in adult water polo players, highlights the need for specific injury prevention programs.

**References:**

1. Wolf BR et al. Am J Sports Med 2009;37:2037.
2. Mountjoy M et al. Br J Sports Med 2010;44:522.
3. Antonopoulou M et al. Eur J Gen Practice 2004;10:35.

## P557
## ATYPICAL FEMORAL FRACTURE INCIDENCE IN AN ORTHOPAEDIC SETTING

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**Objective:** Atypical femoral fractures (AFFs) are mostly associated with patients taking antiresorptive osteoporosis therapy. The reported absolute risk of AFFs in this population ranges from 3.2 to 50 cases out of 100,000 people/year and with long term exposure to antiresorptive osteoporosis therapy, it may increase up to 100 out of 100,000 people/year. Also, two-thirds of the AFF are bilateral. The goal of the study was to determine the incidence of AFF in all femoral and subtrochanteric fragility fractures seen our orthopaedic surgery department.
**Method:** 576 femoral fragility fractures were admitted between October 2011 and August 2015 in our institution. All X-rays were reviewed to identify AFFs. Descriptive statistics (mean, standard deviation, proportions) were used to present patients characteristics. Men & women were compared using student t-test and Pearsons $X^2$/Fisher's exact test. Antiresorptive osteoporosis therapy status was compared using Fisher's exact test. All analysis were done with SPSS v 25.0 (IBM corp. 2017, Armonk, NY), $p<0.05$ was considered statistically significant.
**Results:** Mean age of the cohort of patients (n=576) was 82.9 ±10.2 and 76.5% were women. We identified 11 AFFs (2% overall incidence) and all were sustained by women. All were treated by long intramedullary locking nailing. At the time of the fracture, eight out of 135 patients taking anti-resorptive osteoporosis therapy (5.9%) and three out of 441 patients that were not (0.7%) sustained an AFF. Patients under antiresorptive osteoporosis therapy had a significantly higher incidence of AFF compared to patients that were not ($p<0.001$). Only three out of 11 (27%) were initially identified as AFF by the treating orthopaedic surgeon. Two out of 11 underwent contralateral investigations, and one of them presented with a bilateral AFF.
**Conclusion:** The overall incidence of AFF in all femoral and subtrochanteric fragility fractures seen in our orthopaedic surgery department is 2%. They were all sustained by women. Not recognizing an AFF may lead to delay in healing and to miss contralateral AFF identification and prophylactic nailing. It may also result in a failure to adjust antiresorptive osteoporosis therapy accordingly.

## P558
## EFFECTS OF 12 MONTHS OF RESISTANCE TRAINING VS. ENDURANCE TRAINING ON BONE MINERAL DENSITY, HIP GEOMETRY INDICES AND TRABECULAR BONE SCORE IN A GROUP OF YOUNG OVERWEIGHT WOMEN

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**Objective:** To analyze the effects of two different training protocols on body composition, bone mineral content (BMC), BMD, geometric indices of hip bone strength, composite indices of femoral neck strength and trabecular bone score (TBS) in a group of young overweight women.
**Methods:** 43 young overweight women (BMI >25 kg/m$^2$) whose ages range from 18-35 y were randomly assigned to a resistance training group (RTG, n=15), an endurance training group (ETG, n=14), or a control group (CG, n=14). The experimental groups performed incremental training of 3 sessions per week for the period of 12 months. Weight, height, body composition, BMC, BMD, TBS, geometric indices of hip bone strength (cross-sectional area (CSA), cross-sectional moment of inertia (CSMI) and strength index (SI)), maximal half-squat strength and maximal aerobic velocity were measured before and after the training period. Composite indices of femoral neck (FN) strength (Compression strength index (CSI), bending strength index (BSI) and impact strength index (ISI)) were calculated before and after the training period as previously described [1].
**Results:** Both experimental groups (RTG and ETG) showed significant decreases in weight, BMI, fat mass, fat mass percentage, hip and waist circumferences. Both experimental groups (RTG and ETG) showed significant increases in lumbar spine BMD and WB BMC values. RTG showed significant improvements in lean mass, maximal strength, maximal aerobic velocity, TBS, SI, CSI, BSI and ISI. ETG showed significant increases in maximal aerobic velocity and maximal strength but a significant decrease in trunk fat mass percentage. In the CG, weight, BMI and hip circumference were increased but CSI, BSI and ISI were significantly decreased. In the RTG, The variation of TBS was positively correlated with the variation of vertical jump and that of maximal half-squat strength. RTG showed the highest improvements in maximal strength and ETG showed the highest improvement in maximal aerobic velocity.
**Conclusion:** The present study shows that resistance training is an effective method to decrease fat mass and to increase lean mass, BMD, trabecular bone score and composite indices of femoral neck strength in young overweight women.
**References:** 1. Karlamangla AS et al. Osteoporos Int 2004;15:62.

## P559
## RAINE SYNDROME AS A RARE CAUSE OF HYPOPHOSPHATEMIA AND OSTEOSCLEROSIS IN AN ADULT PATIENT

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Raine syndrome is an extremely rare hereditary disease, of which one of the clinical presentations may be hypophosphatemia, caused by increased loss of phosphate in the urine due to increased levels of fibroblast growth factor 23 (FGF23). It has been found that a mutation in the gene FAM20C is the cause of the Raine Syndrome phenotype. With accordance to previously described cases of Raine syndrome, it is considered to be a fatal disease leading to death within few hours of birth or in a childhood.

A 38 year old female patient (height – 166 cm; weight – 58 kg) was referred to our clinic due to pain in long bones and joints of her extremities, exacerbated by physical activity. These symptoms have gradually progressed over the last seven years. The patient also reported dental prosthesis due to amelogenesis imperfecta since childhood. On examination, signs of dysmorphisms were noted such as nose hypoplasia, low-set ears, exophthalmos. On X-Ray, CT and DXA scans we found craniosynostosis, osteosclerosis, cerebral calcification; +2.25 Z-score DXA lumbar Spine, but -1.5 Z-score at the femoral neck. Low phosphate levels were registered in all presented laboratory tests varying from 0.51-0.6 mmol/l (reference range 0.74-1.52 mmol/l); tubular phosphate reabsorption – 47%. In addition to this she had vitamin D deficiency – 10 ng/ml; which was associated with secondary hyperparathyroidism PTH- 76.9 pg/ml (15-65 pg/ml); calcium – 2.28 mmol/l (2.1-2.55 mmol/l); calcium ionized – 1.14 mmol/l (1.03-1.29 mmol/l), alkaline phosphatase, creatinine and bone remodeling markers were within the reference ranges. Interestingly, the patient had increased calcitonin – 30.2 pg/ml (reference range <8.8 pg/mL), without any signs of thyroid gland abnormality. A whole exome sequencing revealed compound heterozygous mutations in the gene *FAM20C*: c.1107_1108insTACTG (p.Y369fs) and c.1375C>G (p.R459G), which has not been reported before.

In summary, this is one of the few adult clinical cases of osteosclerosis and low phosphate levels caused by Raine syndrome which was confirmed by the exome sequencing. The type of mutation probably explains the mild phenotype of this patient.

## P560

## MUSCULOSKELETAL DISORDERS AMONG GREEK COMPETITIVE TABLE TENNIS ATHLETES

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**Objectives:** To record the musculoskeletal symptoms in each anatomical body region in Greek competitive table tennis athletes.

**Methods:** The Greek version of the Standardized Nordic Questionnaire1 (SNQ) was administered to participants during the scheduled table tennis games of the 2017-2018 season. Participants in SNQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/foots) during the preceding 12 months and if those symptoms impeded their normal activity during the last year as well as the 7 previous days. Analysis consists of descriptive statistics.

**Results: 31** (22 male & 9 female) table tennis athletes (age: 21.0±6.0 y, height: 1.76±0.05 m, weight: 70.5±13.3 kg, BMI: 22.6±2.9 kg/m$^2$, training age: 10.4±4.9 y, training h/week: 13.1±6.2 h) competing in 3 different categories (A1, A2 and B division) completed the SNQ. The 12-month prevalence rate of pain/discomfort was 61.3% in shoulders followed by the knees (29.0%), wrists/hands (25.8%), neck (22.6%), ankles/feet (12.9%), lower back (12.9%), elbows (9.7%), hips/thighs (6.5%) and upper back (6.5%). Those symptoms impeded athletes' normal activity (functionality) during the last 12 months with different prevalence rate per anatomical body region (shoulders: 45.2%, knees: 22.6%, neck: 19.4%, wrists/hands: 9.7%, lower back: 6.5%, ankles/feet: 6.5%, hips/thighs: 3.2%, upper back: 3.2% and elbows: 3.2%).

**Conclusions:** The high prevalence of region-specific musculoskeletal pain/discomfort in competitive table tennis athletes, highlights the need for specific injury prevention programs.

**References:** 1. Antonopoulou M et al. Eur J Gen Practice 2004;10:35.

## P561

## BIOMARKERS OF SARCOPENIA IN VERY OLD PATIENTS WITH HIP FRACTURE

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**Objectives:** Hip fracture is both a cause and a consequence of sarcopenia. Older persons with sarcopenia have an increased risk of falling, and the prevalence of sarcopenia may be increased in those who suffer a hip fracture. The aim of this study was to explore potential biomarkers (neuromuscular and peripheral pro-inflammatory and oxidative stress markers) that may be associated with sarcopenia in very old persons with hip fracture.

**Methods:** We recruited 150 consecutive patients ≥80 years old admitted to an orthogeriatric unit for a traumatic hip fracture. Muscle mass was assessed preoperatively using bioimpedance analysis; Janssen's (J) and Masanés (M) reference cutoff-points were used to define low muscle mass. Muscle strength was assessed with handgrip strength (Jamar's dynamometer). Sarcopenia was defined by having both low muscle mass and strength. Peripheral markers – pro-inflammatory and oxidative

stress parameters – were determined either in the plasma or in the erythrocyte fraction obtained from peripheral whole blood of every patient preoperatively.

**Results:** Mean age was 87.6±4.9 y, 79% were women. The prevalence of sarcopenia was 11.5% with Janssen's and 34.9% with Masanés cutoffs. Among the four pro-inflammatory cytokines tested in plasma, only TNFα was different (lower) in sarcopenic than nonsarcopenic participants using both cutoffs (J 7.9±6.2 vs. 8.3±5.8, M 6.8±4.7 vs. 9.1±6.2). Erythrocyte glutathione system showed a non-significant tendency to lower GSH levels and GSH/GSSG ratios in sarcopenic participants compared to nonsarcopenic subjects. Catalase (CAT) activity was also lower in sarcopenic participants (J 2904±1429 vs. 3329±1483, M 3037±1430 vs. 3431±1498. No significant differences were found between groups in chymotrypsin-like activity of the 20S proteasome, SOD, GPx and BuChE activity, CAF, IFNγ or IL-1β.

**Conclusion:** The prevalence of sarcopenia in patients with hip fracture varies according to the muscle mass reference cutoff points used, being higher with national references. We did not find differences in most neuromuscular, pro-inflammatory or oxidative stress markers, except for lower peripheral TNFα levels and catalase activity in sarcopenic participants, which may be markers of an early inflammatory reaction that is hampered in sarcopenic patients.

## P562
## EFFECT OF GLUCOCORTICOSTEROID THERAPY ON THE BODY'S METABOLIC PROCESSES

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**Objective:** Traditional therapy for rheumatic diseases (RD) includes the appointment of nonsteroidal anti-inflammatory drugs (NSAIDs), basic drugs and glucocorticosteroids (GCS). Studies show that GCS in combination with NSAIDs provide an earlier regression of the manifestations of articular syndrome, as well as indicators of the inflammatory process. It is known that small doses of GCS with their long-term administration can slow down the destruction of articular cartilage and bone in patients with RH due to the inhibitory effect on T-lymphocytes, and thus on the systemic autoimmune process as a whole. In addition, GCS is prescribed for other autoimmune diseases, in particular, the thyroid gland. Currently, the relationship of RD, (systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA)), and pathology of thyroid gland is not in doubt. All of them are associated with HLA-DR3 and HLA-DR4, and dysfunction of T-lymphocytes. Our aim was to assess the effect of GCS on the structure of the two main components of these diseases - BMD and the thyroid function.

**Methods:** The study included 96 patients with a reliable diagnosis of SLE, of whom there were 7 men (7.29%) and 89 women (92.71%) aged 20-76 y and 30 patients with RA (the average age of patients was 42.2±13.4 y, the average duration of the disease - 9.47±8.83 y), along with basic therapy, receive systemic GCS at a dose of 15-40 mg/d. The diagnosis of SLE and RA was made in accordance with international criteria The study of the function of the thyroid gland and the evaluation of BMD were performed on inpatient patients in the department of rheumatology of hospital No. 25 of Volgograd. All 96 (100%) patients with SLE received GCS therapy, and 12 (12.5%) of them underwent pulse therapy according to standard regimens. GCS therapy in the group of RA patients was administered to 15 (50%) patients.

**Results:** According to the ELISA data, patients taking GCS showed a marked decrease in the level of all thyroid hormones: the level of FT4 before the start of therapy, GCS was 18.1±1.1 pmol/ml, after 1 month of treatment - 14.0±0.9 pmol/ml ($p=0.02$); level of FT3 - 3.88±1.8 pmol/ml and 3.26±0.33 pmol/ml ($p=0.0099$). As a result of our examination, 51.04% of patients with SLE and RA were diagnosed with osteoporosis (OP) of varying severity. Of these, 11.46% of patients had OP, and 39.58% had osteopenia. The dependence of the decrease in BMD and the increase in the cumulative dose of GCS ($p<0.05$) was also revealed. The obtained dependence of the state of the bone tissue on GCS therapy may be related to the fact that in the physiological state glucocorticoids play an important role in the regulation of bone remodeling. GCS, both endogenous and exogenous, are inhibitors of TSH secretion and suppress T4 - T3 deiodination. In addition, the corticosteroids cause a decrease in the level of T3 and T4 due to a violation of intrasubstance delivery to the periphery and a decrease in the concentration of thyroxin-binding globulin, which is the main blood protein that binds to 85% of T3 and T4 and limits the fraction of free hormones by adjusting the speed of their delivery to free blood flow.

**Conclusions:** Thus, when used in the complex treatment of patients with GCS, an increased destruction of bone tissue and a decrease in the level of thyroid hormones are observed, which limits their use in thyroid pathology and OP manifestations. GCS assignment to patients with RB should be carried out after the diagnostic examination of thyroid status, in order to exclude the appearance or enhancement of the possible negative effect of GCS on the auto thyroid function. As well as with long-term treatment of GCS, a study of BMD should be conducted for all patients.

## P563
## RELATIONSHIP BETWEEN PHYSICAL PERFORMANCE VARIABLES AND DXA PARAMETERS IN A GROUP OF MIDDLE-AGED MEN

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**Objective:** The purpose of this study was to explore the relationships between many physical performance variables and DXA parameters in a group of middle-aged men.

**Methods:** 24 middle-aged men whose ages range from 48-55 y participated in this study. Body composition (bone mineral content, fat mass and lean mass), BMD and geometric indices of hip femoral neck (FN) strength (cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z), buckling ratio (BR) and strength index (SI)) were evaluated by DXA. BMD was evaluated at the whole body (WB), total radius (TR), lumbar spine (L1-L4), total hip (TH) and femoral neck (FN). Handgrip, vertical jump, maximum power of the lower limbs (watts), maximal half-squat strength, maximal bench-press strength, sprint performance (10 m) and maximum oxygen consumption ($VO_2$ max, L/min) were evaluated by validated tests.
**Results:** Handgrip, maximum power of the lower limbs, lean mass and $VO_2$ max (L/min) were positively correlated to WB BMC, WB BMD, FN BMD, CSA, CSMI, and Z. Lean mass was a strongest determinant of WB BMC and CSA than handgrip. VO2 max (L/min) was a strongest determinant of WB BMD, TH BMD, and FN BMD than lean mass.
**Conclusion:** The current study suggests that $VO_2$ max (L/min), lean mass and handgrip are the strongest determinants of bone variables in middle-aged men.

## P564
## PREVALENCE OF SEVERE HYPOVITAMINOSIS D IN YOUNG FEMALE PATIENTS AND RISK FACTORS PRESENTED WITH PERSISTENT AND NONSPECIFIC BACKACHE AND KNEE PAIN IN TWO TERTIARY CARE HOSPITAL KARACHI PAKISTAN

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**Objective:** To assess the prevalence of hypovitaminosis D in young female patient in outpatients department of two tertiary care hospital of Karachi, Pakistan with persistent, nonspecific backache and knee pain syndromes refractory to initial medical management.
**Methods:** This cross-sectional study includes 200 young female patient age range between 14-35 y presented consecutively between June 2018 and Dec 2018 with persistent, nonspecific backache and knee pain to the OPD of two tertiary care hospital of Karachi, Pakistan. A questionnaire was designed and filled after taking consent includes details regarding age, gender, occupation, area of skin and sun exposure duration, dietary habits, type of clothing and residence used. Patient BMI and plain x-ray lumbosacral spine and knee were taken to exclude other pathologies. Serum vitamin D3 levels were determined and compared with serum calcium levels, serum phosphorus and alkaline phosphatase levels. Serum vitamin D level <20 μg/ml defined as deficiency.
**Results:** Among 200 patients, 100 from each hospital ranging from 13-35 y, mean 24±7.21 SD. Patients were predominantly married 136 (68%). Exposure of face and hands while outdoor by most of them was 96 (48%). Sun exposure duration in majority of participant was 1-2 h/d 116 (58%). Mostly are resident of apartments 152 (76%). Variable coloured clothes used by majority participant 128 (64%) and variable fabric 164 (82%). 178 (89%) patients had deficiency of vitamin D and correlated with duration of sunlight exposure significantly, also with exposure of large skin area, dietary consumption of vitamin D rich food and worn variable clothing colours. Serum phosphorus level and serum alkaline phosphatase level were negatively correlated with vitamin D significantly whereas positively correlated with serum calcium.
**Conclusion:** All patients with persistent, nonspecific backache and knee pain are at high risk for the consequences of unrecognized and untreated severe hypovitaminosis D. female of childbearing age with such pain appear to be at greatest risk for misdiagnosis or delayed diagnosis. Because osteomalacia is a known cause of persistent, nonspecific musculoskeletal pain, screening all outpatients with such pain for hypovitaminosis D should be standard practice in clinical care.

## P565
## EVALUATION AND CLASSIFICATION OF FOOT MEDIAL LONGITUDINAL ARCH HEIGHT IN ADULTS

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**Objective:** Foot as a complex system which provides interaction between ground and lower extremity during locomotion are comprised of bones, muscles and ligaments. Medial longitudinal arch is one of the arches that supports the foot and absorb the weight pressure priorly and its shape depends on genetic factors or age.
**Methods:** Aged between 18-40 y, 344 (184F, 160M; age 24.38±6.10; BMI 23.61±11.90) adult volunteers were included in the study. Medial Longitudinal Arch (MLA) analysis was carried out Navicular Drop (ND), Feiss Line (FL) and Longitudinal Arch Angle (LAA) measured by a ruler while foot loaded and unloaded. Foot length and foot width has been measured and calculated mean values.
**Results:** MLA normal values for ND was between 3.08-4.82 cm, FL was between -1.52 to -0.42 and for LAA was between 145.16-158.72. According to prediction limits, lower number of normal limits present low arch, higher numbers present high arch. Many variables show statistically differences between male and female and duration of standing time in a day.
**Conclusion:** These cutoff values may be used by clinicians to classify MLA on patients.

## P566

## RELATIONSHIP OF NESFATIN-1 LEVEL WITH BONE MINERAL DENSITY, TOTAL BODY COMPOSITION, BONE FORMATION AND RESORPTION MARKERS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Nesfatin-1 is a molecule associated with the melanocortin signaling system. The effect of nesfatin in the regulation of appetite, glucose metabolism, lipids, thermogenesis, anxiety, depression, cardiovascular and reproductive system functioning has been studied [1]. There is evidence of the pro-inflammatory activity of nesfatin-1 [2]. Among the pleiotropic effects of nesfatin, its osteogenic activity deserves attention. In an experiment on ovariectomized rats (OVX) with intravenous administration of nesfatin for 2 months, an increase in BMD in vertebrae and femoral bones was proved. Treatment of mouse preosteoblast cells MC3T3-E1 with nesfatin led to an increase in their differentiation and mineralization. Revealed some inhibition of osteoclastogenesis in mice [3]. The degree of activity of bioactive molecules depends on the expression of target cells, their functions may differ in normal and pathology. Our aim was to study the correlation of nesfatin-1 level with BMD,total body composition, markers of bone formation and resorption in patients with rheumatoid arthritis (RA).

**Methods:** We studied 110 patients with RA (mean age 54.07 ±11.32; M±SD). The diagnosis of RA is made according to the ACR/EULAR criteria for RA (2010). All patients with RA were examined using a Lunar DPX-Pro densitometer and underwent clinical and laboratory examination. Serum nesfatin-1 levels were measured using a commercial test system (RaiBiotech, cat. EIA-NESF) according to the instructions attached to the kit.

**Results:** The average level of nesfatin-1 in patients with RA was 50.49±34.05 ng/ml. Patients with RA were divided into group 1 (n=44) with normal serum nesfatin-1 concentration (<37.95 ng/ml) and 2nd (n=66) with elevated nesfatin-1 level (>37.95 ng/ml). Differences in the serum C-terminal telopeptide type I collagen in the 1st and 2nd groups were not detected. A statistically significant correlation was found between nesfatin-1 and the N-terminal telopeptide of type I procollagen (PINP)) (r=0.218, p=0.022). There was no significant relationship between serum nesfatin-1 and BMD with muscle or fat mass.

**Conclusions:** We did not identify the relationship between elevated serum nesfatin-1 (BMD) and total body composition in patients with RA. We noted the relationship between nesfatin-1 and PINP, which confirms the effect of nesfatin-1 on differentiation and osteoblast function.

**References:**

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3. Li R et al. PLoS One 2013;4:e61619.

## P567

## NUTRITIONAL STRATEGIES FOR MAINTAINING MUSCLE MASS AND STRENGTH FROM MIDDLE AGE TO LATER LIFE: A NARRATIVE REVIEW

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**Objective:** To determine evidence on the role of dietary intake and nutritional supplementation in maintaining muscle mass and strength from midlife through old age.

**Methods:** PubMed and Cochrane databases were searched to identify original research including observational studies of dietary intake and nutritional interventions for sustaining muscle mass and strength.

**Results:** Progressive age-related reductions in muscle mass/strength (i.e., sarcopenia) can cause substantial morbidity. The benefits of exercise, particularly progressive resistance training, to muscle mass and strength with/without dietary interventions are well documented. Protein and amino acid (particularly leucine) intake should be considered, and supplementation may be warranted for those not meeting recommended intakes. Other nutrients may contribute to sustaining/improving muscle mass and strength. Vitamin D receptors are expressed in muscle tissue; meta-analyses have shown that vitamin D benefits muscle strength. Data suggest that milk and other dairy products containing different bioactive compounds (i.e., protein, leucine) can enhance muscle protein synthesis, particularly combined with resistance exercise. Omega-3s can improve muscle mass and strength by mediating cell signaling and inflammation-related oxidative damage, but no studies were specifically conducted in sarcopenia. Low-dose antioxidants (e.g., vitamins C and E) can protect muscle tissue from oxidative damage, but relevant studies are limited. Magnesium is involved with muscle contraction processes and data have shown benefits to muscle strength. Acidogenic diets (e.g., limited fruits/vegetables) increase muscle protein breakdown, which is exacerbated by aging. Supplementation with alkalizing compounds (e.g., bicarbonates) can promote muscle strength. Small studies of probiotics and plant extracts have generated interest, but few large studies have been conducted.

**Conclusions:** Based on available data, dietary and supplemental interventions may add to benefits of exercise on muscle mass and strength; effects independent of exercise have not been consistently shown.

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## P568
## THE PREDICTORS OF SARCOPENIA IN COPD PATIENTS

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**Objectives:** COPD often coexist with other disease (comorbidities) that may have a significant impact on prognosis. Sarcopenia is one of the frequent important comorbidities in the COPD patients, is often under-diagnosed. The aim of the study was to analyze predictors of sarcopenia in COPD patients.

**Patients and Methods:** The cross-sectional study included 86 patients with stable COPD (68 males/18 females, mean age 66,6 ± 8,7 years). Patients were assessed according to GOLD consensus report. The following data were obtained and analyzed: clinical parameters (including the COPD symptoms assessment, exacerbation history), pulmonary function test data, serum 25OHD level. Sarcopenia was diagnosed according to EWGSOP2 criteria. The Appendicular Skeletal Muscle Mass was estimated using DXA.

**Results:** According to the EWGSOP2 algorithm, sarcopenia was diagnosed in 44.1% of patients. It was registered at any severity of COPD, but the following predictors were identified. In patients with predominantly emphysematous phenotype of COPD, the risk of sarcopenia was higher than in patients with predominantly bronchitic phenotype (OR 2.8 (95% CI 1.1; 6.8), p<0.03). Sarcopenia was more common in patients with severe symptoms: "more breathless" persons (mMRC ≥2 grades) had sarcopenia more often than "less breathless" persons (OR 4.6 (95% CI 1.8; 11.6), p=0.001). Patients with severe and very severe airflow limitation (FEV1<50%) have significantly higher rate of sarcopenia than patients with FEV1≥50% (OR = 4.4 (95% CI 1.7-11.4, p=0.001). Strangely, we didn`t reveal correlation between sarcopenia and exacerbation rate (including hospitalization). Most of the COPD patients were vitamin D deficient or insufficient (94,1%).

**Conclusion:** Although sarcopenia was seen in all groups of COPD patients, this comorbidity was observed more often in patients with more severe symptoms, with emphysematous phenotype and with severe and very severe airflow limitation.

## P569
## ULTRASOUND CHARACTERISTICS OF GOUTY DACTYLITIS: ICONOGRAPHIC STUDY

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**Objective:** Dactylitis is a well known hallmark of spondyloarthritis but also can be found in other autoimmune of infectious diseases. Also, dactylitis is a manifestation of gout that can occur on debut or throughout the disease. From the clinical perspective, dactylitis is defined as the swollen of a finger with or without associated pain but with a corresponding limitation on its arc of movement. Although it is usually considered a sign of chronicity or a hallmark of long-term disease, gouty dactylitis can be assessed as part of the physical examination of patients with their first flare. Classically, the synovitis or tenosynovitis mediated by the deposit of microcrystals and the presence of tophi has been interpreted as the cause of gouty dactylitis. There are, however, no etiological study based on imaging studies. The present study aims to determine the prevalence of different ultrasonographic features of dactylitis of the hands in patients with gout.

**Method:** A cross-sectional study was conducted based on a registry of ultrasound images of patients with gout and clinical dactylitis either in debut or throughout evolution. Source of registries: In 2013 we started a rheumatology clinic dedicated to assessing patients on self-demand into the urgency and emergency department of our hospital. Our clinic protocolized the use of ultrasonography in almost all patients assessed. Every image was recorded into a database related to the corresponding clinical case using an identification code. To gather registries for the purposes of the present study, we accessed that database and the corresponding demographic, epidemiologic and clinical information from the electronic registries. The selection of patients followed strictly clinical criteria based on the corresponding medical reports. All images were obtained in a medium-high gamma GE equipment and were obtained by the same operator over three years. Given that no comparisons were planned, no masking of the clinical situation of the patients was made in the eyes of the interpreter. The interpretation of findings was dichotomous in the determination of synovitis, tenosynovitis, and enthesopathy according

to EULAR definition criteria. The identification of tophi was made according to the definition of Avila Fernandes et al. (doi: 10.1007 / s00256-010-1008-z) The overlapping of findings was counted independently at the moment of establishing the prevalence.

**Results:** We included images of 66 patients diagnosed with gout and with dactylitis of at least one finger at the time of the ultrasound evaluation. The mean age of the patients was 59.2 SD 4.3 years. 62 patients were male. Of the total number of patients, 60 had tenosynovitis of the flexor tendinous apparatus (90.9%). Four of these patients also presented tenosynovitis of the tendinous extensor apparatus. No patient presented only extensor tenosynovitis. Enthesopathy was identified in 6 patients (9.1%), in no case did enthesopathy occur with power Doppler signal. Synovitis was identified in 43 patients (65.1%). Of these, in 13 patients a grade I was registered and in 26 a power Doppler signal was demonstrated. Tophi were identified in 16 patients (242%).

**Conclusions:** This is, as far as we know, the first iconographic study of gouty dactylitis based on ultrasound. According to our results, tenosynovitis of the flexors is the most frequent finding in gouty dactylitis while enthesopathy is rather rare. The presence of significant synovitis is the second most frequent finding while tophi as conditioning agents of synovitis were the least frequent finding. We understand that the knowledge of the echographic characteristics of gouty dactylitis can serve as a clinical guide when making therapeutic decisions in cases where this clinical sign lasts despite the control of other manifestations.

## P570

## DOES HISTORY OF OSTEOPOROTIC FRACTURES AFFECT QUALITY OF MENTAL FUNCTIONING?

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**Objective:** To establish the effect of prior osteoporotic fractures on the quality of mental functioning in postmenopausal women.

**Methods:** The retrospective study included 112 postmenopausal women aged 60-70 y with reduced BMD, who were referred for osteodensitometry (DXA) scan at the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia, in the period from February 2017 to January 2018. BMD in hip and spine (L1−L4) was measured in all participants, and the values were expressed as T-scores. All participating women completed the QUALEFFO-41 Serbian Version questionnaire for quality of life assessment, and the information pertaining to osteoporotic fractures was obtained from medical records, along with patients' demographic and clinical characteristics. Questionnaire reliability was determined via Cronbach's Alpha coefficient, calculated at 0.899 and 0.911 for the full scale and the mental functioning subscale, respectively, indicating high instrument reliability. Analyses included effects of the number of prior vertebral and non-vertebral osteoporotic fractures on mental functioning in postmenopausal women. Data was statistically analyzed using SPSS ver. 24.

**Results:** Average participant age was 65.98±3.27 y, while the average age of menopause onset was 48.07±4.86 y. Average T-score for all three regions of interest was at the level of osteopenia, 1.74±0.78 SD, -1.48±0.83 SD, and 1.93±1.15 SD for femur, hip and lumbar spine (L1−L4), respectively. History of minor fractures was noted in 43 participants, whereby 0.9% of the sample suffered hip fracture, 8% had vertebral fractures (7.1% had one, while 0.9% respondents had two), while 33.9% of the women suffered non-vertebral fracture (31.2% had one, while 2.7% had two). Quality of mental functioning was statistically significantly lower in women that had one (61.46±7.03: $p = 0.043$) and two (70.37 ±8.49; $p = 0.018$) non-vertebral fractures.

**Conclusion:** Postmenopausal women with reduced BMD that have experienced at least one nonvertebral fracture report lower quality of mental functioning.

## P571

## INCIDENCE OF SARCOPENIA IN STABLE COPD PATIENTS: COMPARISON OF EWGSOP AND EWGSOP2 DIAGNOSTIC ALGORITHMS

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**Objectives:** Sarcopenia is one of the frequent comorbidities in the COPD patients. In 2018, the European Working Group on Sarcopenia in Older People (EWGSOP) published the updated consensus paper (EWGSOP2). The new diagnostic algorithm differs significantly from the previous one (EWGSOP, 2010). The aim of the study was to compare the incidence of the sarcopenia and the severe sarcopenia on the same sample of COPD patients using the old (EWGSOP) and the new (EWGSOP2) algorithms.

**Methods:** EWGSOP and EWGSOP2 criteria were applied to 86 patients (68 males/18 females, mean age 66.6±8.7 y) with stable COPD. The clinical evaluation included: anthropometry, handheld dynamometry, the different tests (the 4m gait speed, the chair stand test, the timed-up and go test, the SPPB tests). The appendicular skeletal muscle mass (ASM) was estimated using DXA, ASM index was calculated (ASM/height$^2$).

**Results:** According to the EWGSOP algorithm, the gate speed was measured in all patients, then the grip strength was defined in 25 patients with the gate speed >0.8 m/s. To confirm the sarcopenia, the muscle mass was measured by DXA in 62 persons (72% of the total patients number, here

and below). Sarcopenia was diagnosed in 38 (44.1%) patients, 20 patients had severe sarcopenia (23.3%). EWGSOP2 recommends use of the SARC-F questionnaire on the first step. After that only 64 persons were needed in measuring of the muscle strength. DXA was indicated in 51 patients (59.3%) with probable sarcopenia. The diagnosis of sarcopenia and severe sarcopenia were confirmed in 38 (44.1%) and 34 (39.5%) patients, respectively.

**Conclusion:** By using EWGSOP and EWGSOP2 algorithms in the same COPD patients group, the incidence of the confirmed sarcopenia did not differ (44.1%). But EWGSOP2 diagnostic criteria allowed to reduce the number of examinations, including expensive ones, and to identify a greater number of COPD patients suffering from severe sarcopenia.

## P572

## ALENDRONATE ATTENUATES THE GENE EXPRESSION OF PROINFLAMMATORY CYTOKINES AND MMP-8 IN APICAL PERIODONTITIS OF OSTEOPOROTIC RATS

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**Objective:** To evaluate the gene expression of proinflammatory cytokines and matrix metalloproteinases in apical periodontitis (AP) of osteoporotic rats treated or not with Alendronate (ALD).

**Methods:** 25 12-week-old female Wistar rats were submitted to ovariectomy (OVX) or sham surgery and followed by 9 weeks. Then, the dental pulp of upper first molars was exposed to the oral environment for induction of AP. The groups were as follows: sham-AP, OVX-AP and OVX-AP-ALD. After 21 days of AP induction, the animals were euthanized and the blocks containing teeth and bone were collected to be analyzed by RT-PCR for quantification of proinflammatory cytokines and matrix metalloproteinases genes (*Il1b, Tnfa, Il6, Mmp8* and *Mmp13*).

**Results:** AP in OVX rats showed increased expression of *Il1b, Il6* and *Mmp8* compared with AP in sham rats ($p<0.05$). Alendronate treatment reduced *IL-6* and *MMP-8* expression to the same level as the AP in sham group ($p<0.05$).

**Conclusion:** AP in OVX rats have increased expression of proinflammatory cytokines (*Il1b* and *Il6*) and matrix metalloproteinase (*Mmp8*) genes and ALD treatment reduced *Il6* and *Mmp-8* to the same level as the AP in sham group. So, we speculate that the osteoporotic condition aggravates inflammation and degradation of extracellular matrix components and ALD treatment attenuates this condition.

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## P573

## ORTHOPEDIC SURGEON: SHOULD AND SHOULDN'T FOR THE MANAGEMENT OF PATIENTS WITH FRAGILITY FRACTURES – A SINGLE CENTER RETROSPECTIVE OBSERVATIONAL STUDY

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**Objectives:** The implementation of the fracture liaison service (FLS) has provided an important improvement in the definition of orthopedic surgeons (OS) role for care in patients with fragility fractures (FFx). Here we present a 3-y experience with a FLS at the Orthopedic Department of St Maria Loreto Nuovo General Hospital in Naples (Italy). The main aim is to show how an immediate and appropriate identification of the fragile patient, a quick surgery, a correct underlying osteoporosis therapy and a multidisciplinary approach for the follow-up may improve adherence and reduce the refracture index.

**Methods:** At the admission, a dedicated "Proforma" was developed to record the mortality rate of lateral vs. medial proximal femur fractures, the osteoporosis therapy history and to enroll the patient in the FLS care. A similar questionnaire was administered at discharge. Between January 2013-December 2015, 1100 consecutive patients, women and men, were enrolled in this retrospective study; 750 patients survived for the 3 year follow-up. The mean age was 77.5 (±12/20). All the patients presented with a proximal femur fracture (482 lateral, 268 medial). Adherence to OP therapies with teriparatide (TPTD), denosumab (DNB) and bisphosphonates (BPs) was evaluated every 6 months and throughout the study period by clinical examination and/or phone interview.

**Results:** In the entire study population (n=750), lateral femoral fractures were more frequent (64%, from which type AO A2.2 n=293 were 60%). Thirty-three percent of patients referred a previous FFx and only 17.5% received an osteoporosis therapy for a maximum of 12 months. During the 3-y study, the FLS care was able to improve the identification of osteoporotic patients from 13% (standard care) up to 83% (FLS). In this population the adherence to osteoporosis therapy was higher in the TPTD & DNB groups (98%), than in the BP group (53%); 47% abandoned the BP therapy and in 32% of them a new fracture was reported, while in patients treated with TPTD and DNB no fracture or side effects were recorded.

**Conclusions:** The results of this study show that OS play a key role; before surgery, they *should* identify patients with fragility fractures and perform a proper diagnosis; after surgery, discharge them with an appropriate osteoporosis therapy

to slow down the fracture cascade, and through the FLS perform an adequate follow-up. What OS *should not do* is to leave these patients without any follow-up, thus speeding up the fracture cascade.

## P574

## COMPLEX EVALUATION OF CLINICAL RESULTS OF THE EFFECTIVENESS OF LOCAL THERAPY OF PLATELET RICH AUTOLOGOUS PLASMA AND CONDITION OF ARTICULAR CARTILAGE, USING TECHNIQUES T2 MAPPING AMONG PATIENTS WITH OSTEOARTHRITIS OF THE KNEE

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**Objective:** The use of autologous platelet-rich plasma (PRP) has recently become widely used in the treatment of osteoarthritis of the knee (OA), not only to reduce the severity of pain, but also as a factor of influence on reparative processes of articular cartilage (AC). Our aim was to evaluate complex clinical results of the effectiveness of local therapy of PRP and condition of AC, using T2 mapping in patients with OA.
**Methods:** In the study, results were obtained in 12 patients with OA stage II-III according to Kellgren-Lawrence grading scale, aged 44-72 y (mean age 56.4±9.2 y), stage II is exhibited in 6 persons, stage III - in 6. The effectiveness of the therapy was assessed by the dynamics of pain intensity and functional activity of the joints on the third, sixth, ninth and twelfth months after the treatment according to the visual analogue pain intensity scale - VAS (score), the functional index WOMAC (%) and the total Leken index (score). To obtain PRP, the technology of a "double syringe" was used. PRP was administered intra-articularly to 5.0 ml 3 times at intervals of 2 weeks. All patients underwent MRI of knee joints on a scanner with induction of a magnetic field of 1.5T before and 3 months after therapy. To assess the degree of hydration of the AC, T2 mapping was used to obtain T2 values (typical T2 values for healthy cartilage range from 35-65 ms) with the construction of color maps of the central sections of the condyles of the femur.
**Results:** The poll showed a positive dynamic according VAS after 6 months in patients with OA stage II from 4.4±1.51 to 1.40±0.89 scores (p=0.005), after 9 months to 1.6±0.54 scores (p=0.005) and after 12 months to 2.0±1.22 (p=0.02), in patients with OA stage III after 3 months from 7.3±1.36 to 2,6 ±2.65 scores (p=0.003), after 6 months to 3.1±2.04 (p=0,002), after 9 months to 3.5±2.07 (p=004) and after 12 months to 3.0 ±1.58 (p=<0.001). After 3 months, there was a significant improvement in the Leken index in patients with OA III stage from 13.8±3.18 to 7.8±5.26 scores (p=0.003). Also, the significant dynamics of the WOMAC index was noted. Significant differences were obtained in patients with OA stage III from 55.6±18.47% to 20.16±14.55% (p=0.004) after 3 months, unlike to patients with OA stage II from 3 to 12 months. Evaluation of AC in patients with OA stage II, T2 values initially got for the medial condyle were 59.1±6.93 ms and in patients with OA stage III - 66.9±10.15 ms, in the lateral condyle in patients with OA II stage were 53.3 ±5.38 ms and in patients with OA stage III - 55.2±7.74 ms. Reliable differences in T2 values were obtained after 6 months for the medial condyle of the femur in patients with OA stage III stage (p=0.003). There were no significant differences anymore in the T2 values for the medial and lateral condyles in patients with OA stage II and stage III.
**Conclusions:** The conducted study showed significant therapeutic efficacy of PRP in patients with OA stage II and III, which is confirmed by a significant decrease in pain syndrome, an increase in the functional activity of the knee joint. T2 mapping techniques revealed more pronounced structural changes in the AC of the medial condyle of the femur only after 6 months of PRP therapy in OA stage III. Thus, T2 mapping of articular cartilage does not provide convincing correlations with clinical and functional data and requires further study.

## P575

## SERUM PERIOSTIN LEVELS ARE ALTERED IN 131 PERSONS WITH SPINAL CORD INJURY

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**Objective:** Spinal cord injury (SCI) induces an acute alteration in bone metabolism that is characterised by increased bone resorption and bone loss under the neurological lesion. Although the aetiology of the bone disturbances is not precisely known, immobilisation reduces mechanical loading and the differentiation of osteocytes, which are considered as the primary mechanosensors. Our aim was to determine for the first time in subjects with SCI, the effects of lesion levels (tetraplegia vs. paraplegia) and time since surgery on the osteocytes synthesized molecules periostin and sclerostin and their relationship with bone turnover and BMD.

**Methods:** 131 persons with SCI (96 males and 35 females; aged 42.8±13.7 y) with a mean duration of SCI of 14.2±12.1 y were prospectively evaluated and compared to 64 able bodied controls. The serum levels of total periostin (Biomedica), sclerostin (Biomedica) and bone turnover markers (S-CTX, PINP; Roche Diagnostics) and areal BMD (aBMD) at the femoral neck, total hip, radius and lumbar spine were measured in all SCI subjects and controls.
**Results:** Compared to controls, persons with SCI presented reduced aBMD at the femoral neck (-32% p<0.001) and total hip (-31%, p<0.001) and these differences were accentuated in acute patients (time since injury <2 y) and more marked in persons with tetraplegia (n=34) than in persons with paraplegia (n=97). Serum periostin (854.7±253.8 vs. 734.6±164.9 pmol/l, p=0.002) was increased and serum sclerostin (53.7 ±38.2 vs. 63.4±30.4 pmol/l, p=0.002) was decreased in all subjects with SCI compared to controls whereas no difference was observed for bone turnover markers. For all the biological parameters, but sclerostin, values were higher in acute patients (p<0.001) while the lesion levels have little influence.
**Conclusion:** This large study confirmed that SCI induces a dramatic loss of BMD in the lower limbs associated with intense bone remodeling during the acute phase. These bone alterations might be linked to a transient increase in periostin levels, suggesting that this factor is involved in the regulation or protection of bone in patients with SCI.

## P576
## CHILDREN IN RISK OF LOW BONE MASS HAVE MORE THAN 2 RISK FACTORS

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**Objective:** Low bone mass (LBM)/infantile osteoporosis (IOP) require an active evaluation for its diagnosis and prevention. Therefore, its incidence is unknown and could be undertreated. The systematic collection of risk factors associated with LBM/IOP could help identify the population at risk of presenting it. Our aim was to assess the prevalence and number of risk factors (RF) in the pediatric population at risk of developing LBM/IOP. Assess its influence on BMD.

**Methods:** Demographic and clinical data were prospectively collected from patients from 2-20 years of age, who had at least one risk factor for LBM/IOP, among them: chronic diseases, treatment with immunosuppressants and/or corticosteroids and insufficient calcium intake. Calcemia, calciuria, and vitamin D were determined in blood samples, and whole body and lumbar DXA were performed. The calcium intake, the number of previous fractures and other RF were collected
**Results:** Data were collected from 103 patients, with an average age of 9.8 y, 52.4% women, and 80% Caucasians. Of these, 9 were preschoolers (2-3 years old), 33 schoolchildren (4-9 y), 55 teenagers (10-17th) and 6 young people (18-20th). The most frequent diagnoses were malabsorption/food allergies: 46.6%, JIA: 17.5%, nephropathies: 17.8%, hematological diseases: 6.8%, and vasculitis and connective tissue diseases: 3.9% each.

Table 1. The frequency of RFs

| | % |
|---|---|
| Insufficient calcium intake in the diet | 84.5 |
| Association of a second chronic diagnosis | 4.9 |
| Hypovitaminosis D in blood (<30 nmol/L) | 8.1 |
| Sedentary lifestyle (PAQ test <2) | 13.6 |
| History of long bone or vertebral fractures | 12.6 |
| 24-h urine hypercalciuria | 3.1 |
| Proteinuria ≥0.20 g/L in 24-h urine | 17 |
| Drugs with osteopening potential (noncorticosteroid immunosuppressants) | 31.1 |
| Corticosteroids at the time of inclusion | 19.4 |
| Corticosteroids prior to inclusion in the study | 18.4 |

The average dose of current corticoids was 0.21 mg/kg/d of prednisone with a total cumulative average dose of 7 g, with an exposure of 1 to 144 months.
4.3% of the sample had an isolated RF, 38% had 2 RF, 31% 3, 15% 4, and 12% 5 or more. 8.7% of the sample presented a LBM and 4.8% met criteria for Opi for vertebral fractures, 3 of them asymptomatic and discovered by morphometry. In the multiple linear regression analysis: age, Latin ethnicity, gender, and hypovitaminosis D were the main RFs related to lumbar BMD. Likewise, age, Latin ethnicity and sedentary lifestyle were the RF related to the BMD of the whole body without head (BMDwbwh). In lumbar BMD, these 4 FR explained up to 85% of the BMD variation, where the age adds 0.032 per year gained, the male sex subtracts 0.061, the hypovitaminosis D sum 0.077 and the Latin ethnicity subtracts 0.070. Up to a 90.8% variation of BMDwbwh is explained by these 3 RF: age adds 0.036 per year gained, sedentary life subtracts 0.084 and Latin ethnicity subtracts 0.055.
**Conclusion:** The child population at risk of LBM/IOp associates 2 or more risk factors. 8.7% of children with risk factors have LBM and 4.8% IOP. The RFs related to changes in BMD are age, sex, sedentary lifestyle and ethnicity. Hypovitaminosis D correlated positively with lumbar BMD.

## P577

## SEVERE HYPOVITAMINOSIS D AT DELIVERY IN JAPANESE WOMEN: DISCREPANCY WITH QUANTITATIVE ULTRASONOMETORY (QUS)

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**Objective:** Serum 25-hydroxyvitamin D (25-OHD) concentrations is thought to reflect vitamin D stores, and vitamin D deficiency can cause secondary hyperparathyroidism, osteomalacia, bone loss and increased risk of fracture. In addition, recent studies suggest that maternal hypovitaminosis D could increase the risk of preeclampsia, cesarean section, and craniotabes. We have previously reported high prevalence of hypovitaminosis D in Japanese pregnant women with threatened premature delivery (Shibata M et al 2011). However, the relationship between mothers' bone metabolism and vitamin D has not yet been fully elucidated. This study is aimed to assess the bone microarchitecture by calcaneal QUS and its relationship with vitamin D levels.
**Methods:** Japanese women just after their delivery in Fujita Health University Hospital were recruited from February to December in 2018 (n=119, cesarean/vaginal delivery=60/59. age 33.5±5.1 years old). On the third day after their delivery, calcaneal QUS was estimated by ALOKA AOS-100 (n=80) and AOS-100SA(n=31). At the same time, blood sampling was performed to assess their bone metabolism.
**Result:** Mean osteosonoindex (OSI) was 2.58±0.33 (Z-score: -0.45±1.23), and speed of sound (SOS) was 1557.6 m/s (Z-score: -0.31±1.49). Mean serum 25OHD level was 9.0±3.6 ng/mL. Therefore, we found that mean serum 25OHD level was very low, but mean OSI and SOS were within normal range. Their intact PTH, BAP, and TRACP-5b levels were 28.2±10.4 pg/mL, 8.4±4.0 μg/L, 262.9±104.9 mU/dL, respectively. Adjusted Ca level and creatinine levels were 9.5±0.4 mg/dL and 0.5±0.1 mg/dL. Serum 25-OHD was significantly associated with creatinine concentration (r=0.254, n=119, p=0.005), while not related to OSI nor SOS. Other laboratory test data were not associated with 25OHD.
**Conclusion:** Japanese women at delivery showed very low vitamin D levels, while QUS indices were normal.

## P578

## BEHAVIORAL EFFECTS OF ARONIA MELANOCARPA FRUIT JUICE IN RATS WITH OVARIECTOMY-INDUCED REDUCTION OF BONE MINERAL DENSITY

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**Objective:** Aronia melanocarpa fruit juice (AMFJ), rich in polyphenols, possesses pronounced effects on central nervous system functions. This study aimed to investigate AMFJ effects on locomotor activity, anxiety and depressive behavior in rats with ovariectomy-induced reduction of BMD.
**Methods:** Female Wistar rats were divided into 4 groups: SO (sham-operated), OV (ovariectomized), OV+$AMFJ_5$ and OV+$AMFJ_{10}$. Beginning 2 weeks after the operation, rats were treated daily orally with distilled water (SO and OV groups) or with AMFJ at doses of 5 and 10 ml/kg (OV+$AMFJ_5$ and OV+$AMFJ_{10}$ groups, respectively). After 10 weeks, femur BMD was measured and animal behaviors were recorded in the open field test (OFT), social interaction (SI) test and forced swim test (FST).
**Results:** AMFJ dose-dependently antagonized OV-induced BMD reduction. In the OFT, ovariectomy caused a slight reduction in locomotor activity. The horizontal movements of OV+$AMFJ_5$ and OV+$AMFJ_{10}$ groups were significantly lower ($p<0.01$) than those of SO and OV rats and the vertical movements of OV+$AMFJ_{10}$ group were significantly lower ($p<0.05$) than those of SO group. This AMFJ-induced dose-dependent decrease in locomotion was probably due to a sedative effect. The SI time of OV rats was significantly decreased ($p<0.01$ vs. SO group) showing the development of an anxiety state. The SI time of OV+$AMFJ_5$ group was not significantly different from that of SO rats demonstrating an anti-anxiety effect of that AMFJ dose. The SI time of OV+$AMFJ_{10}$ group was similar to that of OV group, probably affected by the higher reduction of locomotion by 10 ml/kg AMFJ. In the FST, the immobility time (IT) of OV group was significantly increased ($p<0.01$ vs. SO group) indicating the development of depression. The IT of OV+$AMFJ_5$ group did not differ significantly from that of OV group. For OV+$AMFJ_{10}$ group, the IT was significantly lower ($p<0.05$) than that of OV group, not significantly different from that of SO group, indicating an anti-depressive effect of that AMFJ dose.
**Conclusion:** AMFJ reduced the locomotor activity probably due to sedation, antagonized ovariectomy-induced anxiety and depressive behavior in rats.
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## P579

## UPPER GASTROINTESTINAL SAFETY WITH THE BUFFERED SOLUTION OF ALENDRONATE 70 MG: 6 YEARS OF POST-MARKETING EXPERIENCE

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**Objective:** Alendronate (ALN) and other bisphosphonates have been the mainstay in osteoporosis management and fracture prevention for over 20 y. While ALN reduces risk of vertebral, nonvertebral and hip fractures by 48%, 27% and 53% respectively in osteoporotic patients with T-score <-2.5 [1], adherence to treatment is problematic and >50% discontinue within 12 months[2]. Upper gastrointestinal (GI) side effects are one of the most common reasons for treatment discontinuation[3]. ALN 70 mg effervescent (ALN EX) was developed to improve the GI tolerability; ingested as a buffered solution of fully dissolved ALN to increase pH in the stomach and to eliminate contact of solid ALN with oesophageal mucosa[4]. Our aim was to assess the impact of ALN EX on occurrence of upper GI adverse reactions (AR).
**Methods:** The post-marketing experience with ALN EX, launched in 2012, comprises approximately 4,394,833 prescriptions, which translate into 366,236 patient years and 17,579,332 ingestions. Number of upper GI AR, descriptive of GI tolerability and associated with use of ALN EX were extracted from the pharmacovigilance database.
**Results:** 5 serious GI AR: erosive esophagitis: 1; abdominal pain upper: 3; rectal bleeding: 1 and 123 non serious GI AR were reported. Among the nonserious AR were abdominal pain: 30; dyspepsia: 25; dysphagia: 4; nausea: 31; gastritis: 5; GI pain: 1; vomiting: 5 and GI disorders: 22.
**Conclusion:** The reported frequency of esophagitis with ALN Tablets is 0.1-1%[5]. Assuming the same frequency for ALN EX in the 366,236 patient years, at least 366 cases of esophagitis would be expected. Even considering that only 6-10% of all ARs are reported[6] post-marketing, the number of ALN EX cases is appreciably below the level expected for ALN Tablets. The available safety data suggest that ALN EX is associated with a lower frequency of upper GI AR than reported for ALN Tablets and that it is a well-tolerated oral bisphosphonate for the management of osteoporosis.
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## P580

## DXA-BASED DIAGNOSIS OF SARCOPENIA IS NOT CORRELATED WITH MUSCULAR FAT INFILTRATION AND RISK OF FALL IN OSTEOPOROTIC ELDERLY WOMEN

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**Objective:** Sarcopenia is a progressive degenerative condition characterized by loss of muscle mass, strength or function and, additionally, muscular fat infiltration. Declined muscle quality and performance may increase the risk of fall in sarcopenic people.[1,2] To date DXA is the preferred method for diagnosis of sarcopenia. The aim of the study is to assess the correlations between skeletal muscle mass index (SMI) from DXA-scan and muscular fat infiltration and risk of fall in osteoporotic, post menopause, women aged over 60 y.
**Methods:** 21 subjects were recruited (age: 60–85 y; median femoral T-score: -2.8). Patients with recent fractures, treated with anti-osteoporotic drugs and glucocorticoids, affected with diabetes, neoplasia, kidney or liver failure, were excluded. All participants underwent a wholebody DXA-scan, a MRI-scan using Dixon sequence automated water–fat segmentation method and were assessed for the risk of fall using a stabilometric computerized platform (OAK, Khymeia Group), whose scores are based on Brief-Balance Evaluation System Test[3]. These assessments respectively lead to the evaluation of the SMI, the muscular fat infiltration and the risk of fall.
**Results:** Pearson correlation coefficients between SMI and muscular fat infiltration and risk of fall were respectively $\rho$=0.169 (p=0.517) and $\rho$=-0.091 (p=0.704).
**Conclusion:** Collected data failed to detect any significant correlation between the investigated parameters suggesting that DXA derived SMI does not reflect a clinical outcome like risk of fall neither muscular fat infiltration distinctive for sarcopenic condition. The lack of associations between SMI definition of Sarcopenia and clinical outcomes appears to be a critical issue of this assessment technique.
**References:**
1. Cruz-Jentoft AJ et al. Age Ageing 2010
2. Scott D et al. Curr Osteoporos Rep 2015
3. Padgett PK et al. Phys Ther 2012

## P581

## FACTORS AFFECTING THE TENDENCY TO FALL IN PATIENTS WITH LOW-ENERGY PROXIMAL FEMUR FRACTURES IN BELARUS

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**Objective:** To evaluate the factors affecting the increased likelihood of falls in patients with proximal femur (PF) fracture over the age of 50.
**Methods:** A special questionnaire was developed for patients who have had a PF fracture after 50. The questionnaire included

family history information, question about where the fracture occurred (at home or outdoor), about visual impairment, the presence of osteoarthritis (degree more than 2 stage), history of smoking, the low-energy previous fractures and fractures among first-line relatives. Frequent fall was considered to fall at least once a month and often. We have analyzed data of self patient records, which visit to "Minsk Clinical Consulting and Diagnostic Centre" and "Minsk City Clinical Hospital No. 1".
**Results:** A total of 300 questionnaires were issued to fill out 150 in each of the medical institutions. 218 questionnaires were returned, of which 200 questionnaires were accepted as completed correctly and included in the further analysis. The study involved 166 women and 34 men aged from 51-98 y. All respondents were divided into 2 groups: group of patients #1 with frequent falls (n=39) and group of patients #2 with rare falls (n=161). Statistical frequency analysis was carried out as a result of which it was found that patients from group #1 were more likely to live alone than patients from group #2 (34.4% vs. 16.8%; $\chi^2$=4.9; p=0.027), have poor vision and constantly use glasses (34.4% vs. 11.5%; $\chi^2$=10.1; p=0.002), have a history of osteoarthritis of the lower limb joints (53.1% vs. 19.1%; $\chi^2$=15.6; p<0.001), smoke at present (18.8% vs. 4.6%; $\chi^2$=7.6; p=0.006). When analyzing other questions of the questionnaire, it was found that, regardless of the tendency to fall, a PF fracture in patients of both groups occurred equally often indoors (34.4% vs. 33.6%; $\chi^2$=0.2; p=0.656), have previous low-energy fractures (59.4% vs. 63.4%; $\chi^2$=0.2; p=0.676) and low-energy fractures in first-line relatives (18.8% vs. 11.4%; $\chi^2$=1.2; p=0.269).
**Conclusion:** Patients with a PF fracture who have a tendency to fall, more often live alone, have poor eyesight, smoke and suffer from osteoarthritis.

## P582
## RISK ASSESSMENT OF OSTEOPOROTIC FRACTURES: BMD vs. FRAX® (10-YEAR PROSPECTIVE COHORT STUDY)

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**Objective:** Evaluate the performance of DXA and FRAX, with and without BMD measurement, in predicting the occurrence of fragility fractures over 10 y.
**Methods:** 256 postmenopausal women aged 50-81 years with a complete set of data on FRAX clinical risk factors and DXA scans of lumbar spine and proximal femur of the nondominant side at baseline were observed during ten years. The 10-y fracture risk probability for major osteoporotic fractures (MOF) (with and without the femoral neck BMD value) for each individual case was calculated using the Russian version of the FRAX tool at the time of inclusion in the study and assessed by comparison with fractures during follow-up prospective observation. Receiver operating characteristic (ROC) area under the curve (AUC) analyses was conducted to explore the fracture risk stratification using FRAX with/without neck BMD and the prediction of BMD alone.
**Results:** Within 10 y, 120 participants suffered fractures, among them 44 women had more than one fracture and six people - hip fracture. The predictive performance of FRAX for MOF was slightly better to that of BMD alone. AUC of hip BMD was 0.64 (95%CI 0.57 to 0.72) and AUC of lumbar spine BMD - 0.62 (95%CI 0.54 to 0.68). AUC for FRAX without BMD was 0.67 (95%CI 0.60 to 0.74). We did not find any significant improvement in predicting of MOF when neck BMD was added to FRAX clinical risk factors (AUC=0.69 (95%CI 0.62 to 0.76, p<0.05). The Russian age-dependent threshold of therapeutic intervention demonstrated 42% sensitivity and 78% specificity of FRAX without the femoral neck BMD, 39% sensitivity and 81% specificity of FRAX with BMD.
**Conclusion:** The using of FRAX tool identifies individuals at high fracture risk more effectively than the use of BMD data only. Russian version of the FRAX tool provided sufficiently fracture prediction and can be used in routine clinical practice.

## P583
## ASSESSMENT OF THE KNEE'S FUNCTIONAL STATUS IN RELATION TO THERAPY

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**Objective:** Arthrosis of the knee is a chronic degenerative disease accompanied by chronic pain, a feeling of stiffness of the joints, limited mobility of joints, disturbed gait and difficulty in performing daily activities. It most often occurs after the age of 40 and more often in women. Our aim was to determine the efficiency of the applied therapy and the functional status of the patients depending on the applied therapy.
**Methods:** The study included 60 patients with osteoarthritis of the knee, treated at Clinic for Medical Rehabilitation CCV during 2018. The diagnosis was achieved according to the ACR criteria. The patients were divided into two groups: Group A (30) patients were treated with outpatient physical therapy. The treatment was conducted over a period of 8 weeks. Group B (30) patients received three applications of 1% hyaluronate ia for 7 d and then had physical procedures. This treatment also lasted 8 weeks. All patients were processed according to a unique questionnaire and clinically appraised by orthopedists and rheumatologists. The average age was 68.4. The representation of women was 80%. Radiological changes were assessed according to the Kellgren-Lawrence classification, 70% had stage III and 30% stage II. The assessment of the functional status, before and after treatment, was made according to the Oxford Knee Score. The assessment of the degree of pain with VAS, before and after treatment. The assessment of the

activities of daily life was estimated with the WOMAC Index before and after treatment.

**Results:** In patient group A, before treatment, the average degree of pain according to VAS was 8, after treatment it was 6. The average value of the functional score was 22 before treatment and 31 after treatment ($p<0.005$). The average value of WOMAC Index was 44.7 before treatment and 62.5 after treatment. In patient group B, before treatment, the average degree of pain according to VAS was 9 and after treatment 4, the average score of the functional status was 22 and 38 after treatment ($p<0.005$). The average WOMAC Index was 50 before treatment and 69.7 after treatment.

**Conclusion:** The patients who received ia 1% hyaluronate and then had physical therapy had a more significant reduction of pain after treatment, as well as a more improved functional status compared to patients who only had combined physical therapy conducted on them.

## P584
## FACTORS ASSOCIATED WITH LOW BACK PAIN IN OSTEOPOROSIS

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**Objectives:** Patients with osteoporosis often experience low back pain (LBP) despite no evidence of new compression fractures. We performed multivariate analyses to identify factors that may affect LBP.

**Methods:** Retrospective data from 262 osteoporosis patients (48 men, 214 women, mean age: 71.3 y) were analyzed for age, gender, BMI, lumbar spine BMD, TRACP5b, trunk muscle mass, sagittal vertical axis (SVA: spinal sagittal balance), existing vertebral fractures, secondary osteoporosis, Charlson comorbidity index (CCI), CONUT score (nutritional status) and Japanese Orthopaedic Association back pain evaluation questionnaire (JOABPEQ; included five domains: pain-related disorders, lumbar spine dysfunction, gait disturbance, social life dysfunction, and psychological disorders as LBP score). Multivariate analyses ($p<0.05$) were reviewed for associations to low back pain.

**Results:** Pain-related disorders was associated with primary osteoporosis, low trunk muscle mass, and high SVA, while high CONUT score, high BMI, low trunk muscle mass, and frequent vertebral fractures were associated with lumbar spine dysfunction. Aging, high TRACP5b, high BMI, low trunk muscle mass, and high SVA were associated with gait disturbance. High CCI, TRACP5b, high SVA, and frequent vertebral fractures were associated with social life dysfunction. High TRACP5b and high SVA affected psychological disorders.

**Conclusions:** Results suggest aging, obesity, high bone turnover, spinal sagittal imbalance, existing vertebral fractures, low trunk muscle mass, poor systemic condition, and poor nutritional status adversely affect low back pain scores. Especially, LBP-related disorders, lumbar dysfunction, and gait disturbance were associated with spinal sagittal imbalance and low trunk muscle mass. However, spinal BMD was unrelated to low back pain scores. Other than pharmacotherapy to increase BMD, exercise therapy to treat low muscle mass and obesity, and nutritional counseling may prove effective in improving ADL due to low back pain in osteoporosis.

## P585
## A SYNTHETIC PEPTIDE DERIVED FROM THE SIBLING PROTEIN MEPE INHIBITS ECTOPIC MINERALIZATION BUT NOT BONE FORMATION

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**Objective:** A peptide fragment of the acidic serine- and aspartate motif (ASARM) derived from the family of noncollagenous proteins in bone matrix, known as SIBLING (small integrin binding ligand N-glycosylated) proteins, may act as an endogenous anti-mineralization factor. We have focused on ASARM in matrix extracellular phosphoglycoprotein (MEPE), a member of the SIBLING proteins, and tested the potential use of its synthetic peptides for the management of ectopic mineralization disorders.

**Methods:** The designed peptide fragments with or without phosphorylated serine residues were synthesized based on human MEPE-ASARM. Rat/mouse osteogenic cell cultures and mouse aorta organ cultures were used to determine mineralized matrix formation in vitro. Normal mice were subjected to analyze bone morphometric parameters and biochemical tests. Warfarin-treated rats were used as vascular mineralization models. Mice transplanted intramuscularly with atelocollagen sponges including bone morphogenetic protein (BMP)2 were developed. Synthetic peptides were given every second or third day in vitro and intravenously using osmotic pumps in vivo.

**Results:** None of peptides synthesized altered the proliferation and differentiation of osteogenic cells, while ASARM including phosphorylated serine residues (pASARM, 2 μM or less) inhibited matrix mineralization. pASARM suppressed phosphate-induced mineralization in mouse aorta organ cultures, which was characterized by differential gene expression profiles. Of the amino acid sequence of pASARM, not only two phosphorylated serine residues, but also cleavage sites by the phosphate regulating neutral peptidase PHEX were necessary for its anti-mineralization effect. Vascular calcification in warfarin-treated rats and BMP2-induced bone-like nodules in muscle pouches were abolished by treatment with pASARM (0.5 mg/mice/d or less). However, injections of pASARM (3 mg/mice/d) for a week did not affect bone parameters and biochemical tests.

**Conclusion:** pASARM has a potential to inhibit ectopic mineralization in a wide range of diseases without affecting bone formation.

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## P586

## IMMINENT FRACTURE RISK AMONGST NEW USERS OF ORAL BISPHOSPHONATES IN ACTUAL PRACTICE SETTINGS: A MULTINATIONAL EUROPEAN COHORT STUDY FROM DENMARK, SPAIN, AND THE UK

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**Objective:** Nonvertebral fracture efficacy for bisphosphonates is not rapidly accomplished. Patients who fracture despite treatment face a high risk for refracture. We calculated imminent (1- and 2-year) fracture risk (IFR) amongst incident users of oral bisphosphonates from three European countries; and after a fracture while on treatment.

**Methods:** Patients aged 50+ starting oral bisphosphonates (12-month wash-out) were identified from Danish, Spanish and UK electronic medical records. Participants were followed from therapy initiation to the earlier of a fracture, death, migration, or end of study. A cohort of patients who fractured while on treatment were identified and analysed separately from then onwards. Incidence rates (per 1000 person-years) and 95% confidence intervals of fracture in the 1 and 2 years following index were calculated after stratification by fracture history.

**Results:** A total of 209,670 patients who started bisphosphonates and 32,235 who fractured while on treatment were included from Denmark, compared to 53,549 and 1,880 from Spain, and 148,507 and 28,930 from the UK. Average age at treatment initiation ranged from 68.9 (ES) to 74.2 (UK), and previous fracture prevalence from 12.0% (ES) to 33.3% (DK). IFR is high (2.5% to 5.6%) in the first year amongst treatment initiators, and higher in patients with a previous fracture history (4.0% to 8.7%). Risk is even higher (5% to 9.2%) in those followed from a fracture while on treatment [Table 1]. Rates in the second year were similar but slightly reduced.

**Conclusion:** IFR risk is high in the first 2 years of bisphosphonate therapy, particularly for those on secondary fracture prevention. Fracture while on treatment is a marker of subsequent higher short-term re-fracture risk.

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Table. One-year IFR in the first year of bisphosphonate therapy, and in the year after a fracture while on treatment with oral bisphosphonates.

| | 1-y IFR following bisphosphonate initiation | | | | | | 1-y IFR following fracture while on treatment | | |
|---|---|---|---|---|---|---|---|---|---|
| | With prior Fx | | | Without prior Fx | | | | | |
| DENMARK | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | |
| Hip | 28.172 | 27.115 | 29.230 | 12.605 | 11.901 | 13.308 | 34.06 | 31.93 | 36.20 |
| Clinical spine | 6.988 | 6.464 | 7.512 | 4.689 | 4.261 | 5.118 | 7.21 | 6.23 | 8.18 |
| Non-hip non-spine | 46.037 | 44.679 | 47.394 | 27.529 | 26.485 | 28.573 | 69.12 | 66.05 | 72.19 |
| Hip/shoulder/wrist | 52.689 | 51.234 | 54.145 | 28.066 | 27.012 | 29.120 | 39.95 | 37.64 | 42.26 |
| SPAIN | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | |
| Hip | 7.289 | 5.951 | 8.628 | 3.890 | 3.257 | 4.524 | 7.61 | 4.56 | 12.08 |
| Clinical spine | 5.364 | 4.217 | 6.511 | 3.676 | 3.061 | 4.292 | 12.01 | 6.99 | 17.03 |
| Non-hip non-spine | 28.818 | 26.140 | 31.495 | 18.795 | 17.397 | 20.194 | 77.31 | 64.27 | 90.35 |
| Hip/shoulder/wrist | 22.327 | 19.975 | 24.680 | 13.989 | 12.784 | 15.193 | 28.66 | 20.87 | 36.44 |
| UK | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | | IR (/1000 py) | 95CI | |
| Hip | 27.514 | 25.664 | 29.363 | 13.263 | 12.582 | 13.945 | 28.88 | 26.78 | 30.98 |
| Clinical spine | 6.436 | 5.547 | 7.326 | 3.750 | 3.388 | 4.112 | 8.01 | 6.92 | 9.11 |
| Non-hip non-spine | 59.485 | 56.740 | 62.231 | 26.556 | 25.588 | 27.524 | 55.30 | 52.37 | 58.22 |
| Hip/shoulder/wrist | 45.826 | 43.427 | 48.226 | 21.790 | 20.914 | 22.665 | 43.89 | 41.29 | 46.49 |

## P587

## DETECTING BONE MARROW LESIONS ON PLAIN RADIOGRAPHS USING ARTIFICIAL INTELLIGENCE (AI): DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI) STUDY

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**Objectives:** Bone marrow lesions (BMLs) are a MRI finding associated with various pathologies such as osteoarthritis of the knee. They have been linked to reduced BMD, raising the hypothesis that these alterations might also be detectable on plain radiographs (1). The aim of the study presented here was to test whether utilization of a convolutional neural network (CNN) is able to detect BMLs from plain radiographs of the knee.
**Methods:** We used radiographic and MRI images from the Osteoarthritis Initiative (OAI) study, a large longitudinal study focusing on knee osteoarthritis (https://data-archive.nimh.nih.gov/oai/). MRI readings according to the MRI Osteoarthritis Knee Scoring method (MOAKS) were provided. We matched radiographic images to BML readings (MOAKS BML subscore) from MRI, resulting in a dataset of 5214 radiographic images of single knees, labeled with respect to the presence, number, and location of BMLs in the corresponding MRI. We split this dataset into train (2085), validation (1564), and testing (1565) subdatasets which were used to train, and independently cross-validated an 8 layer CNN to detect BMLs from plain radiographs. Class imbalance was dealt with by oversampling the minority class.
**Results:** We found that our CNN achieves an average weighted class accuracy >70% in the test dataset, with a sensitivity of 0.72 and a specificity of 0.69, when classifying presence/absence of BML from plain radiographs. Furthermore, saliency analysis indicates that the CNN is able to discriminate the joint compartments in which BMLs are located.
**Conclusions:** Our results show that BMLs can be detected on plain radiographs by using AI-based software. Given that - due to the very limited access to MRI and its high cost - the number of BML cases in a given population is likely to be greatly underestimated, diagnosis of BML by using conventional radiographs could potentially improve healthcare quality even in countries with lower healthcare expenditure per capita.
**Reference:** 1) Berman N et al. Bone Rep 2016;5:308

## P588

## ASSOCIATION BETWEEN SUN EXPOSURE AND LIFESTYLE VARIABLES IN PORTUGUESE CHILDREN

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**Objective:** To investigate whether sun exposure is related to lifestyle variables, nutritional and socioeconomic status.
**Methods:** This is a cross-sectional study carried out with children of both sexes participating in the Study of Social Inequalities in the Health of Portuguese Children: The Impact of the Economic Crisis on Childhood Obesity. Information about lifestyle habits and socioeconomic status were obtained through standardized questionnaires. Sun exposure questionnaire was adapted from Hanwell et al, 2010. Trained professionals performed weight and height measurements, children's BMI was categorized in normal weight and overweight/obese according to IOTF cutoff points. Chi-square Fisher test were used to assess the presence of associations between sun exposure and body surface sun exposed with socioeconomic status, BMI and with following lifestyle variables: active play (hours a day), sporting activity besides school, sporting activities (times a week), TV viewing (in hours a day), use of vitamin D supplements and time in summer outdoor activity. Significance was considered when $p<0.05$.
**Results:** The total sample was 4849 children with a median age of 7.10 y (2.91 - 11.81) being 49.6% male (n=2406). The highest time of sun exposure (up to or equal to 2 h/d) was associated with higher socioeconomic status (p=0.000), greater active play (p=0.000), sporting activity besides school practice (p=0.000), higher times a week in sporting activities (p=0.003) and higher time spent in sports (p=0.019). There was no association between sun exposure with nutritional status (p=0.115) and TV viewing (p=0.433). Higher socioeconomic status was associated with use of vitamin D supplements and greater time in summer outdoor activity.
**Conclusion:** The present study demonstrated that sun exposure was related to a better lifestyle habits, manly in physical activities.

## P589

## ANALYSIS OF BMD DEVELOPMENT IN ORGAN TRANSPLANT RECIPIENTS ORIGINALLY TREATED WITH DENOSUMAB

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**Objective:** The recommended treatment of osteoporosis in solid organ transplant recipients includes vitamin D, calcium

supplementation and bisphosphonates. Denosumab inj. is the possible therapeutic option for patients with impaired renal function.

**Methods:** We already published our positive experience with osteoporosis therapy with Denosumab in 63 patients after solid organ transplantation (Tx) and moderate renal function impairment (liver 14, kidney 34, kidney and pancreas in 15 patients) between years 2012-2017.

**Results:** 52/63 patients is still followed (9 patients died and 2 patients moved away). Denosumab therapy was continued in 29/52 Tx recipients and not continued in 23 patients in 2018. The reason for the therapy discontinuation was mainly BMD improvement (14 patients), re-introduction of dialysis (5), patients' renal function allowed bisphosphonates administration (3), major surgery (1). The denosumab therapy improved L spine T-score from -2.6±1.1 to -2.0±1.0 ($p<0.01$) and proximal femur T-score increased from -2.5±0.8 to -2.1±0.9 in the whole group. BMD of L spine increased by 13.3±8.3% and proximal femur by 10.4±13.7% in patients continuing Denosumab therapy without any interruption (21/29 persons). The mean duration of treatment was 2.83 y (1-5 y). 8/29 patients currently on denosumab had their therapy interrupted for 1-4 y (mean 2.1 y) and then again restarted. Their total mean duration of treatment was 2.75 y (2-3 y) and BMD increase in L spine was 7.2±7.1% and 4.9±6.0% in proximal femur. Last 20 patients originally treated with Denosumab had their therapy completely terminated after 1-2 y (mean 1.7 y) and after BMD increase by 11.4±7.5% in L spine and 6.0 ±5.6% in proximal femur. The discontinuation of Denosumab resulted in BMD decrease by 4.7±7.7% in L spine BMD and by 4.6±5.6% in proximal femur site over 1-5 y (mean 2.7 y). BMD of L spine further increased or remained stable in 6/20 patients after the Denosumab termination and in 5/20 for hips.

**Conclusion:** Denosumab therapy is associated with the BMD improvement in organ transplant recipients. The cessation of therapy resulted in BMD decrease in most patients but relatively small one, probably due to effect of successful transplantation.

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## P590

## TEN-YEAR FRACTURE PROBABILITY IN SYRIA USING A SURROGATE MODEL

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**Objective:** To estimate the 10-y probability of major osteoporotic fracture (MOF) in Syria according to age and BMD T-score at the femoral neck, based on the FRAX® methodology, but using a surrogate country model.

**Methods:** Hip fracture data from Syria were not available for construction of a country-specific FRAX model. A surrogate model was developed according to International Society for Clinical Densitometry and International Osteoporosis Foundation recommendations, using data on fracture risk from Lebanon from 2007 and death rates for Syrian Arab Republic from UN for year of 2009. Fracture probability from the new model for Syria was studied and compared to fracture probability from Lebanon.

**Results:** In this study, the 10-y probability of major osteoporotic fracture in Syria increased markedly with increasing age and decreasing femoral neck BMD T-scores in both women and men. For a woman without clinical risk factors and a BMI of 25 kg/m$^2$, the 10-y probability of a major osteoporotic fracture (MOF) was 1.0% at the age of 50 years and 25% at the age of 90 years. When comparing the 10-y probability for men and women using Syrian FRAX model it was very similar to the probability observed using Lebanon FRAX model. For men the probability was at most 0.1% higher for Lebanon for ages below 85 y. At the age of 85 y the 10-y probability of MOF was 9.1% for both Syria and Lebanon, for a man without clinical risk factors and a BMI of 25 kg/m$^2$. The same was true for women where the biggest difference was 0.2% at the age of 75 y (9.8% in Syria and 10% in Lebanon) for the same scenario.

**Conclusions:** The Syrian FRAX model for 10-y probability using hip fracture incidence from Lebanon was similar to the FRAX model for Lebanon. The surrogate model for Syria can be recommended for use, with appropriate updates when fracture data become available from within Syria.

## P591

## TEN-YEAR FRACTURE PROBABILITY IN SERBIA ACCORDING TO AGE AND OTHER FRAX MODELS IN THE REGION

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**Objective:** To estimate the 10-y probability of major osteoporotic fracture (MOF) in Serbia according to age and BMD T-score at the femoral neck using the FRAX® risk assessment tool calibrated to the epidemiology of Serbia.

**Methods:** Hip fracture data were obtained from hospitalization data in Vojvodina for 2016. The catchment population data (size by age) were obtained from Institute of Public Health of Vojvodina and death rates came from the UN data from 2015. Since there were no country specific data regarding spine, forearm or humeral fractures, the incidences of fracture at these three sites were imputed from the hip fracture incidence from Serbia, using the relationship between hip fracture incidence and other sites in Sweden (Malmö). Fracture probability from the new model for Serbia was studied and compared to comparable fracture probabilities elsewhere in the region (Italy, Hungary, Croatia, and Romania).
**Results:** 10-y probability of MOF in Serbia increased markedly with increasing age and decreasing femoral neck BMD T-scores in both women and men. For a 75-year-old man without clinical risk factors and BMI of 25 kg/m$^2$, the 10-y probability of a major osteoporotic fracture (MOF) was 3.8%, which was higher than for an equivalent man in Romania (3.3%) and lower than in Croatia, Hungary and Italy (4.4%, 4.8% and 6.0% respectively). The situation was similar for a woman in the same scenario from Serbia when comparing to other countries in the region. Her Serbian 10-y probability of MOF was 8.2%, which was higher than a woman from Romania (7.1%) and lower than in Croatia, Hungary and Italy (9.7%, 12% and 12% respectively).
**Conclusions:** The 10-y probability calculated using hip fracture incidence from Serbia was similar to the established FRAX model from Romania. We then recommend the application of the Serbian risk profile to calculate the absolute fracture risk for Serbian subjects.

## P592
## FRACTAL DIMENSION CAN DESCRIBE CHANGES IN VESSEL STRUCTURE OF BONE TISSUE

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**Objective:** Studies performed in conditions of a microgravity models the hypothesis that influence of gravitational load on a various parts of the musculoskeletal system can be a consequence of evolution of biomechanical structures. It was shown previously that in the conditions of a microgravity anisotropic properties of the bone tissue changes (1). To understand the mechanism the origin of the structure changes vessels were studied.
**Method:** The femoral bones and shoulder bones were dissected from all tested rats with following weight measurement, and measurement of geometrical parameters. Bones was scanned on μCT in diaphysis regions. After scanning the threshold was calculated. Then vessel network was determined. To solve this problems the special software was created. The samples were analyzed by multifractal analysis. This method allows to obtain additional quantitative information about vessel structure. For this purpose, the box-counting method was applied to 3D and 2D scans. It turned out that the f(α) spectrum is essentially different in each sample.
**Results:** Average dimensions for vessel networks were: 0.51 ±0.05 for control group, 2.14±0.32 for microgravity group (21 d), 1.12±0.13 for microgravity group (38 days) and 0.81±0.13 for microgravity group (60 d). The behavior of changes of dimensions values correlates with fractional anisotropy of bone tissue (2).
**Conclusion:** Fractal dimension can describe changes of vessel network and correlates with anisotropy properties of bone tissue. Understanding the biomechanical mechanism of vessel network growing can help to understand the processes witch appear in bone structure during microgravity. And multifractal characteristics can be used to distinguish between samples, and to understand the distribution of scales inside the structure.
**References:**
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## P593
## SECULAR CHANGES IN HIP FRACTURE INCIDENCE IN ECUADOR AND IMPLICATIONS FOR FRAX

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**Objectives:** The construct for FRAX model outputs depends on country specific fracture incidence and mortality. The current FRAX model for Ecuador is based on hip fracture data from 2008. A recent publication showed a higher hip fracture incidence in the Ecuadorian population for 2016. The aim of the present study was to examine the impact of these more recent data on the FRAX probability outputs for Ecuador.
**Methods:** Hip fracture incidences for Ecuador from 2016 and mortality data from the UN for Ecuador in 2015 were used to build a new FRAX model for Ecuador. The new FRAX model for Ecuador was compared to the old model which was derived using hip fracture data from 2008 combined with UN mortality data from 2009. For both the old and new models, a ratio from

Malmö was used to calculate the incidence of clinical spine, forearm, humerus fractures. The 10-y probability of major osteoporotic fracture (MOF) was used when comparing old and new FRAX model. An example is given for a woman with no clinical risk factors and BMI 25 kg/m$^2$, where the BMD was not known.
**Results:** For younger women the difference between the old and new FRAX model was minor up to the age of 60 y (Figure). From the age of 65 the difference between the old and new model was greater, with the new model having higher probabilities. The largest difference between old and new model was seen for ages 80 and 85 where the difference was 1.6% points (5.7% vs. 4.1% for the age of 80 y and 7.6% vs. 6.0% for the age of 85). For the age of 90 y the new 10-y probability was lower than the old model.
**Conclusion:** Use of the more recent hip fracture incidence data impacts on the outputs from FRAX, leading to higher probabilities than the old model for ages between 60-87 y. These findings support the need for an updated FRAX model for calculating fracture probabilities in Ecuador.

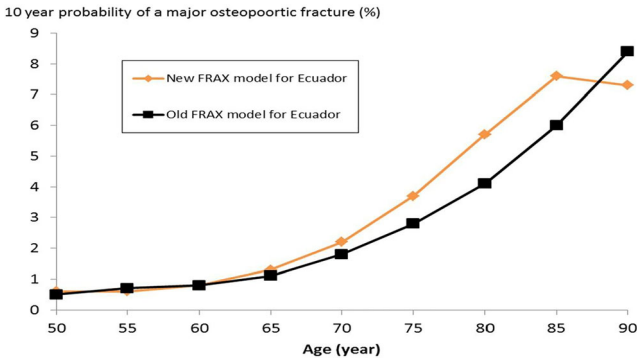


Figure. The 10-y probability of a major osteoporotic fracture (%) for a woman with no clinical risk factors, BMI 25 kg/m$^2$ where the BMD was not known.

## P594
## PROTON PUMP INHIBITORS USE IN HEMODIALYSIS PATIENTS AND INCREASED RISK OF FRACTURES: RESULTS FROM THE DIALYSIS OUTCOMES AND PRACTICE PATTERNS STUDY (DOPPS)

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**Objective:** Proton pump inhibitors (PPIs) are extensively used for the chronic treatment of common gastrointestinal disorders dialysis patients. PPIs interfere with the active transport of magnesium causing hypomagnesemia. Magnesium is deposited in large quantities in bone, is essential for bone health and severe osteoporosis has been reported in patients on chronic PPI treatment. This study aims to assess the relationship of PPIs use with bone and hip fractures in 27097 hemodialysis patients enrolled in the observational Dialysis Outcomes and Practice Patterns Study (DOPPS).
**Methods:** Observational prospective cohort of 27097 hemodialysis patients from the DOPPS study. After data collection, the hypothesis of a relationship between PPI treatment and the incidence rate of bone and hip fractures was tested by the Fine and Gray method, considering the competitive risk of mortality, as well as by a cause-specific hazards Cox model dealing death as a censoring event. In Cox models fitted according to the Fine and Gray method, data were expressed as sub-distribution hazard ratios (SHR), 95%CIs and P values. In cause-specific hazards Cox models, data were expressed as hazard ratio (HR), 95%CIs and P values.
**Results:** Out of 27,097 hemodialysis patients, 13,283 patients (49%) were on PPI treatment. The prevalence of PPI treated patients ranged from 28.6% in Japan to 73.5% in Spain. Across the follow-up period (median 19 months), 3.8 bone fractures x 100 person-years and 1.2 hip fractures x 100 person-years were observed. In multiple Cox models, taking into account the competitive risk of mortality, the incidence rate of bone (SHR: 1.22, 95%CI: 1.10-1.36, P<0.001) and hip fractures (SHR: 1.35, 95%CI: 1.13-1.62, P=0.001) was significantly higher in PPI treated than in PPI untreated patients and these relationships held true also in multiple, cause-specific, hazards Cox models matching patients according to the prescription time (bone fractures, HR: 1.47, 95%CI: 1.23-1.76, P<0.001, hip fractures (HR: 1.85, 95%CI: 1.37-2.50, P<0.001).
**Conclusion:** The use of PPIs requires caution in hemodialysis patients.

## P595
## FAT DISTRIBUTION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS MEASURED USING DXA

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**Objective:** Many health problems such as diabetes mellitus, metabolic syndrome, dyslipidemia, atherosclerosis are closely connected with wrong diet and obesity. Studies have shown that the consequences of the obesity-associated diseases do not correlate with body fat accumulation but closely related to fat distribution. The separation of android and gynoid localization of adipose tissue is caused not only by the regional location, but first of all by the different functional activity of adipocytes in these areas. Measurement of fat distribution is important for understanding mechanisms involved in metabolic regulation.

**Methods:** A sample of 83 patients with type 2 diabetes mellitus and 39 healthy participants were recruited to participate in the clinical research. The mean age of the participants was 46.5±5.2 y, BMI ranged from 18.4-42.1 kg/m$^2$. Total body fat, fat trunk, android and gynoid fat were measured using DXA.

**Results:** We revealed the higher absolute amount of total body fat in patients with type 2 diabetes mellitus vs. controls: 37513 (31154-42697) vs. 33119 (25285-48222)g, $p<0.05$ and higher absolute amount of fat trunk: 21647 (17877-25363) vs. 18146 (13914-22575)g ($p<0.05$), but percentage amount of total body fat and fat trunk did not reveal statistically relevant differences ($p>0.05$). At the same time fat android was remarkable higher in participants with type 2 diabetes mellitus than in healthy controls calculated in grams 4009 (3096-5056) vs. 3115 (2196-3984)g, $p<0.05$ and in percent 49.2 (46.1-53.5) vs. 44.9 (39.8-52.7)%, $p<0.05$.

**Conclusion:** Visceral fat accumulation but not total body fat and fat trunk was positively associated with type 2 diabetes mellitus in our research.

## P596

## THE EFFECT OF MARITAL STATUS ON THE RISK OF HIP FRACTURE IN SWEDEN

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**Objective:** We have previously shown an increased risk of hip fracture among spouses in the Swedish population. The aim of this study was to investigate the effect of marital status as a risk factor for hip fracture in the Swedish population.

**Methods:** We addressed this hypothesis by examining the incidence of hip fracture in men and women aged 50 y and more from Sweden between 1995-2016. In order to reduce double counting, only one hip fracture per period of 5 months was counted per individual. Men contributed with 105,205 hip fractures in 34,423,992 person years and women 247,898 hip fractures in 38,582,172 person years. The effect of marital status was examined by an extension of the Poisson regression model for men and women and was adjusted for age, calendar year, season, latitude and population density.

**Results:** As expected, hip fractures rates were higher in women than in men and the risk of hip fracture increased with age, latitude and population density for both men and women. The risk of hip fracture declined with calendar year for women with 1-2%/y. For men the same was true for 2009-2016 but for 1995-2009 the risk was stable. Both men and women who were unmarried, widowed or divorced had a higher risk of hip fracture compared to a married individual, HR 1.59 (95%CI: 1.57-1.61) for men and HR 1.28 (95%CI: 1.26-1.29) for woman. There was a significant interaction between age and marital status for both men and women ($p<0.001$). For men the HR at age of 60 y was 3.11 (95%CI: 3.02, 3.19) and at the age of 80 y the HR was 1.55 (95%CI: 1.53, 1.57). The corresponding HR for women was 1.97 (95%CI: 1.92, 2.01) and 1.21 (95%CI: 1.20, 1.23). There was no significant interaction between marital status and calendar year ($p>0.30$ for both men and women).

**Conclusions:** Marital status is important for the risk of hip fracture in Sweden adjusted for age, calendar year, season, latitude and population density. The effect is larger at lower ages.

## P597

## ASSOCIATION BETWEEN INSULIN RESISTANCE (HOMA), TRABECULAR BONE SCORE (TBS) AND DXA-DERIVED 3D MEASUREMENTS OF THE CORTICAL AND TRABECULAR BONE IN NONDIABETIC POSTMENOPAUSAL WOMEN

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**Objective:** Study the association between insulin resistance measured by HOMA and bone quality and quantity as measured by TBS and DXA-derived 3D measurements of the cortical and trabecular bone.

**Methods:** A cohort of postmenopausal, nondiabetic women with possible osteoporosis was analysed. Basal glucose, insulin and HOMA (insulin resistance) were measured. The bone densitometry study was performed using a GE-Lunar iDXA scanner. TBS was calculated using the software TBS Nsight v2.1 (Med-Imaps, Pessec, France) from the lumbar DXA scans (L1-L4). The trabecular volumetric BMD (trabecular vBMD) cortical surface BMD (cortical sBMD) were analysed

from the hip DXA images using the 3D-SHAPER software v2.7 (Galgo Medical, Barcelona, Spain). The subjects included in this study were stratified by quartiles of HOMA and differences between groups were analysed using anova test. The statistical analysis was performed with SPSS v22 software. The study was approved by the Clinical Research Ethics Committee of the University Hospital Río Hortega.

**Results:** 381 postmenopausal women with an age of 62±9 years old were included in this study. The analytical values were 90±24 mg/dl of glucose, 13±14 IU/l of insulin and HOMA of 3.3±4.6. No statistical relationship was found between HOMA, TBS and densitometry parameters. However, when stratifying by quartiles of HOMA, our results showed that women with higher HOMA had higher levels of cortical sBMD and trabecular vBMD. compared to women with low HOMA ($p<0.05$). Similar data was observed with total hip BMD

**Conclusion:** In nondiabetic postmenopausal women, the insulin resistance (measured by HOMA) was associated with higher values of cortical sBMD and trabecular vBMD, showing a potential association between insulin resistance and bone quality.

## P598

## DENOSUMAB TREATMENT EFFICACY EVALUATED BY THE INDEX OF THE OSTEOPOROTIC RISK

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**Objective:** The relationship of N-MID osteocalcin (O) and β-CrossLaps (CTX) determined as an index of the osteoporotic risk (IOR) showed predomination of bone resorption compared to bone formation in postmenopausal osteoporotic women. The aim of this study was to discover the change of O and CTX relation, IOR inversion during Denosumab treatment (DT).

**Methods:** Bone turnover markers N-MID osteocalcin and β-CrossLaps were determined, as well as their ratio IOR=O/CTX, and their post-treatment values. O and CTX levels were expressed in ng/ml. The mean percentage (%) of O and CTX reduction and IOR increase from the basal levels were also determined during DT.

**Results:** Pretreatment mean O levels were 21±3.28 ng/ml, and lowered to 13.9±3.99 ng/ml ($p<0.007$) and 11.98±3.4 ng/ml ($p<0.0001$), after 3 and 6 months of DT as well as the correspondent CTX levels 0.39±0.059 ng/ml, lowered to 0.1±0.05 ng/ml and 0.04±0.029 ng/ml ($p<0.0001$). Pretreatment IOR mean levels were 64.35±18.89 and increased to 159.4±75.33 and 238.3±83.6 ($p<0.0001$) after 3 and 6 months of DT. The mean% of CTX reduction for the first 3 months was 73±11%, and for 6 months 87.96±2.66%. The mean% of O reduction for the first 3 months was 28.98±34.83% and for 6 months 36.37±15.77%. The mean% of IOR increase for the first 3 months was 153±122, and for 6 months 328±240.

**Conclusion:** DT enabled significant O decrease, highly more significant CTX and CTX% decrease, IOR significant increase, which confirmed bone formation predomination compared to bone resorption and decreased bone turnover. This indicated lower bone loss and reduced osteoporotic risk in postmenopausal women on DT. Determination of the relation of the two processes, bone resorption and bone formation through IOR will greatly assist in the conduction and evaluation of clinical trials, and follow-up of the level of the osteoporotic risk and the efficacy of the treatment. IOR confirmed very high efficacy of DT in postmenopausal osteoporosis.

## P599

## WORK RELATED MUSCULOSKELETAL DISORDERS AND WORK ANXIETY PROFILE AMONG GREEK PHYSIOTHERAPISTS

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**Objective:** It is known that physiotherapists are often affected by musculoskeletal injuries[1]. The purpose of this study was to record the musculoskeletal symptoms in each anatomical body region in Greek physiotherapist. Also, to investigate if these symptoms can be associated with anxiety profile.

**Methods:** The Greek version of the Nordic questionnaire for the musculoskeletal symptoms (NMQ)[2] and the State Trait Anxiety Inventory (STAI-X)[3] were given to professional Greek physiotherapists in 2017. Participants in NMQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulder, elbow, wrists/hands, upper back, lower back, hips/thighs, knees, ankles/foots) during the preceding 12 months and if those symptoms prevented their normal activity during the last year as well as the 7 previous days. In STAI physiotherapists were asked to fill in an inventory of 40 questions which measures two types of anxiety: a) State-anxiety and b) Trait-anxiety.

**Results:** 65 (36 male, 29 female) Greek physiotherapists (age: 41.9±10.9 y, BMI: 25.5±3.8 k/m$^2$, working years: 16.6±10 y, working h/week: 42.1±9.4 h) competed the NMQ. The 12-month prevalence rate of pain/discomfort was 67.7% in lower back, followed by the neck (63.1%), shoulders (53.8%), upper back (47.7%), wrists/hands (43.1%), knees (32.2%), elbows (21.5%), hips/thighs (15.4%) and ankles/feet (15.4%). The same group competed the STAI-X, scoring 48±5.8 in State-anxiety and 43.1±6.7 in Trait-anxiety. Trait-anxiety associated

with musculoskeletal symptoms in the area of the wrists/hands in the last 12 months (r=0.264/p=0.033) and in the area of upper back pain/discomfort in the last 7 days (r=0.259/p=0.037).

**Conclusion:** Physiotherapists own a high place in the appearance of musculoskeletal symptoms. Correlation of trait anxiety with musculoskeletal injuries was found.

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## P600
## OSTEOPOROSIS AND DENTISTRY CORRELATIONS

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Osteoporosis and its treatments has some negative effects on periodontal tissues of the patients and also on some treatments including oral surgery, dental implants insertion, and alveolar bone augmentation.

Bisphosphonates related osteonecrosis of the jaws is a potential complication that may happen after any oral surgery, and also osteoporotic patients has lower success rates for bone augmentation and dental implantation.

This lecture proposes area of cooperation between physicians and dentists in these fields:

- Oral features of osteoporosis and how can dentist predict osteoporosis
- Antiresorptive agent-related osteonecrosis of jaws (ARONJ)
- Dental treatments for patients who receive antiresorptive therapy
- Dental implants placement with/without bone augmentation for osteoporotic patients

This cooperation aims to ensure the optimum control of oral health status and beneficial dental treatments for osteoporotic patients.

## P601
## THE BENEFITS OF REGULAR WEIGHT BEARING ACTIVITY THROUGHOUT THE LIFE-COURSE: DO MEN AND WOMEN REAP THE SAME REWARDS?

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**Objective:** Higher levels of physical activity (PA) are thought to be beneficial for musculoskeletal health but few studies have considered relationships between reported PA levels at different stages of life, and musculoskeletal outcomes in late adulthood, particularly in men. We considered this in the Hertfordshire Cohort Study, a cohort of free living men and women born 1931-9.

**Methods:** The study population comprised 128 men and 130 women from the Hertfordshire Cohort Study. Participants completed a questionnaire that asked about participation in sports/ leisure time exercise involving weight bearing activity up to age 18 y; aged 18-29 y; aged 30-49 y and since age 50 y. Responses were coded as none/ once a month/ once a week/ more than once a week. Current lifestyle and PA levels were recorded in the same questionnaire. Grip strength was assessed using a Jamar dynamometer. Bone densitometry was performed at the total femur (Hologic QDR 4500).

**Results:** The mean age of participants was 75.4 (SD 2.5) years in men and 75.7 (SD 2.6) years in women. Women were currently more physically active than men, recording a median activity time/d of 206 (IQR 146-277) min daily, vs. 194 (IQR 110-298) min daily in males. However, men tended to report higher levels of past PA through the life-course, with significant differences in weight bearing activity up to the age of 18 y ($p=0.006$) and also 18-29 y ($p<0.001$), when only 15.6% of women reported PA more than once a week, compared to 41.6% of men. In women, we observed greater BMD at the total hip in women who reported regular weight bearing PA at ages 18-29 y (β weekly exercise 0.72, $p=0.02$; β more than once a week exercise 0.83, $p=0.01$), and 30-49 y (β weekly exercise 0.52, $p=0.04$; β more than once a week exercise 0.78, $p=0.02$). compared with those who reported no weight bearing PA, even after adjustment for age, BMI, social class, smoker status, alcohol consumption, current physical activity and dietary calcium intake. No such relationships were apparent in men, before or after adjustment. No relationships were observed between past PA and grip strength in this sample.

**Conclusions:** Regular weight bearing activity around the time of peak bone mass acquisition was less common in women than men in this historical cohort. However, we observe higher hip BMD in those women participating in regular PA throughout the life-course, highlighting the need to promote exercise among young women.

## P602
## EFFECTS OF PHYSIOTHERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objective:** The aim of the study was to evaluate effects of physiotherapy (electro and kinesitherapy) in patients with knee osteoarthritis (KOA).

**Methods:** The study included 16 patients (15 women and 1 man), with diagnosis KOA based on the ACR criteria. All patients were submitted to electrotherapy and kinesitherapy (combination of elements strength training and active range of motion exercise) for a period of 15 d. We measured the range of motion (ROM), with goniometer and strength of quadriceps femoris muscle (QFM) based on manual muscle testing (MMT) in diseased knee, before/after therapy. All patients completed the short form McGill Pain Questionnaire (SF-MPQ) before/after therapy, which consisting of 15 descriptors (descriptors 1-11 represent the sensory dimension of pain experience and 12-15 represent the effective dimension), which are rated on an intensity scale as 0=none, 1=mild, 2=moderate or 3=severe.
**Results:** Mean value of baseline characteristics of subjects in the sample were: age 62.31±6.97 y, body weight 76.81±7.96 kg, height 167.81±5.94 cm, BMI 27.4±3.34. There were more patients with right KOA 68.75% than left 31.25%. There is statistically significant difference (Single sample t-test t=39.92, df=15, p-value < 2.2e-16) in mean value flexion of the knee before 109.87±20.43° and after the therapy 122.18 ±12.24°. There is a statistically significant difference in mean value of MMT QFM before 2.81±0.54 and after the therapy 3.25±0.45 (single sample t-test t=29.069, df=15, p-value=1.324e-14). A statistically significant difference was found between all descriptor pain experience, rated on an intensity scale, before/after therapy, the most expressive in mild level (single sample t-test t=4.1414, df=15, p-value=0.0008701). A statistically significant correlation between all descriptors SF-MPQ and ROM after therapy was not found (using Pearson's correlation).
**Conclusion:** Physiotherapy in patients with KOA, influenced the improvement flexion of the diseased knee, MMT QFM, as well as mild level pain experience.

## P603
## DETERMINING THE EFFICACY OF PLATELET RICH PLASMA ON PATIENTS DIAGNOSED WITH LATERAL EPICONDYLITIS

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**Objective:** We wanted to evaluate the Platelet Rich Plasma (PRP) efficacy on patients diagnosed with lateral epicondylitis based on patient related outcomes (PROs).
**Method:** After obtaining the approval of our Hospital Ethics Committee, we recruited 16 patients who were primarily diagnosed with lateral epicondylitis from January to December 2018 and had no other treatment before the application of a PRP preparation. All the participants have given written consent and answered voluntarily and anonymously the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire before and 2 months after the application of 2 ml of PRP on their lateral epicondyle. None of the participants had physiotherapy or any other additional treatment until the second assessment. The DASH questionnaire is a self-administered specific measurement tool which has been previously validated for the Greek population. It uses 30 items to measure physical function and symptoms in persons with musculoskeletal disorders of the upper extremity for the previous seven days. The scoring system is on a 0-100 scale and higher values mean greater disability. [1]
**Results:** From the initial group of participants, 2 patients did not attend their follow-up assessment and were not included in the final data analysis. In our cohort (n=14) there were 12 males and 4 patients (2 females) who have been diagnosed with lateral epicondylitis of their nondominant hand. The average DASH score was 69 before the PRP application and 31 at the 2 month assessment.
**Conclusion:** According to our data based on PROs, the application of PRP on patients diagnosed with lateral epicondylitis has a favorable effect on their symptoms and disability.
**Reference:** 1. http://www.dash.iwh.on.ca/sites/dash/files/downloads/quickdash_info_2010.pdf

## P604
## FOOT PRONATION INCREASED MEDIAL KNEE LOADING AFTER LONG DISTANCE RUNNING

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**Objective:** This study aimed to investigate the changes of foot postures, joint kinematics, moments and contact forces to the lower extremity after a 5k treadmill run, and analyse correlation of foot posture index with knee and ankle loading.
**Methods:** Twenty recreational male heel strike runners participated in this study. All had history of running and free from lower extremity injuries or foot deformities. Foot posture, three-dimensional markers trajectories, ground reaction force and surface electromyography (EMG) were recorded pre and post 5k treadmill running with standard running shoes. Customized knee joint was adapted for modelling the medial and lateral compartment loadings in this study, and musculoskeletal modelling techniques from OpenSim were employed to calculate the joint kinematics, moments and contact forces. Simulated EMG activations were compared against experimental EMG signals to validate the model. One-dimensional statistical parametric mapping (SPM1d) package was used for statistical analysis.
**Results:** Hip moments and contact forces to joint increased significantly and temporally during initial contact and mid stance post 5k. Knee abduction moment and medial contact force increased but extension moment decreased significantly

and temporally. The significantly increased ankle plantarflexion moment and contact forces were observed temporally during stance. Foot posture index showed increased correlations with peak knee moment and medial contact force.
**Conclusion:** Recreational male runners presented pronated foot postures after 5k treadmill running with neutral shoes. Changes of lower extremity angles, moments and contact forces during stance could integrate into etiological framework of loads magnitude and distribution to investigate the causation of running-related injuries.

## P605
## LIVER CANCER DERIVED EXOSOMES PROMOTE OSTEOCLAST DIFFERENTIATION THROUGH TRANSFER OF TUMOR NECROSIS FACTOR

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**Objective:** Bone is the common extrahepatic site for cancer metastasis. Hepatic cancer is associated with higher incidence of pathological fracture, however this important regulatory mechanisms remains unexplored. Thus, exosome mediated cell-cell communication between tumor and bone might be key to osteolytic bone destruction.
**Methods:** RAW264.7 cells were stimulated with RANKL and M-CSF for osteoclast differentiation in the presence/absence of exosomes. Exososme uptake was determined using fluorescent labelling of exosomes. The osteoclasts formation was visualized using TRAP staining. Exosomal marker expressions, TNFα, TNFR1, NF-κB, CTSK, TRAP expressions were determined by western blot.
**Results:** We found that exosomes released by liver cancer cells (Huh-7) promoted osteoclast differentiation. Exosomes showed exosome marker expressions such as CD63, TSG101 and Alix. RAW 264.7 cells readily uptakes huh-7 exosomes as evidenced by cellular uptake of PKH labelled exosomes by fluorescent staining. TRAP staining showed that, exosomes significantly increased the number of osteoclasts formation in the presence of minimal RANKL/M-CSF levels. In specific, these exosomes were predominantly enriched with tumor necrosis factor-α. Importantly, exosomes induced TNFR1 activation in the RAW 264.7 cells and promoted osteoclast differentiation through NF-κB/CTSK/TRAP pathway. Thus, studies from neutralizing exosomal TNFα and knockdown TNFR1 expressions in RAW 264.7 cells showed that TNFα-TNFR1 signaling is key to liver cancer induced osteoclast differentiation.
**Conclusion:** Collectively, our findings show cellular communication of liver cancer derived exosomal TNFα regulates osteoclast differentiation through TNFR1/NF-κB/CTSK/TRAP signaling. Thus, exosomal TNF-α might act as important therapeutic target to prevent pathological bone disease during cancer metastasis.

## P606
## EXOSOMAL MIRNAS FROM LIVER CANCER CELLS PROMOTE OSTEOCLAST DIFFERENTIATION THROUGH CHIP /TRAF6 REGULATION

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**Objective:** Exosomes orchestrate multiple systemic pathophysiological processes through cellular communication. Exosomes are 40-100 nm nanosized vesicles released into the extracellular space and act as messenger cargo to modulate recipient cell function. Exosomal miRNA are small, noncoding RNAs that are involved in various biological processes, including cancer metastasis and cellular differentiation.
**Methods:** RAW264.7 cells were stimulated with RANKL and M-CSF for osteoclast differentiation in the presence/absence of exosomes. Exososme uptake was determined using fluorescent labelling of exosomes. The osteoclasts formation was visualized using TRAP staining. Exosomal miRNA expressions were determined using miRNA RT-qPCR analysis. CHIP expression and osteoclast αarkers such as TRFA6, NFATc1, TRAP, CTSK were determined by western blot.
**Results:** We identified novel findings that, liver cancer regulates bone remodeling through exosome mediated cell-cell communication. Released exosomes from the liver cancer cells (Huh-7) promoted osteoclast differentiation under stimulation of RANKL/M-CSF at low levels. The isolated exosomes showed exosome specific marker expressions such as CD63, TSG101 and Alix. Fluorescence staining showed that liver cancer exosomes was taken up by RAW cells and further promoted osteoclasts formation as observed by TRAP staining. Exosomes regulated CHIP degradation and thereby upregulated TRAF6 expressions during osteoclast differentiation. Expressions of miRNA targeting CHIP protein expression such as miR-30a-5p, miR-26b-5p, miR-21-5p, mir-1178-3P, miR-764-5p were determined in the huh-7 exosomes. We found that, exosomes promoted osteoclast formation through TRAF6/NFATc1/TRAP signaling.
**Conclusion:** Altogether, exosome mediated CHIP degradation and subsequent regulation of TRAF6/NFATc1 axis is important for liver cancer mediated osteoclast differentiation. Thus, liver cancer exosomal miRNA might serve as biomarker and therapeutic targeting of miRNA might suppress cancer mediated osteolytic bone disease.

## P607
## EVALUATION OF THE CAUSAL ASSOCIATION BETWEEN BLOOD METABOLITES AND OSTEOARTHRITIS: A MENDELIAN RANDOMIZATION STUDY

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**Objective:** Osteoarthritis (OA) is a prevalent chronic joint disease which the incidence is rising because of the ageing population and the epidemic of obesity. Metabolism is important for cartilage and synovial joint function and drastically altered in OA. In this study, we explored the causal associations between blood metabolites and OA using Mendelian randomization (MR).
**Methods:** We used four summary-level genome-wide association studies (GWAS) data for blood metabolites involving 963 metabolites as exposures. And then selected near-independent GWAS SNPs for each blood metabolites using the clumping algorithm in PLINK at a suggestive threshold ($P<1\times10^{-5}$, $r^2$ threshold=0.05 and window size=1 Mb). To ensure a strong power, we selected the metabolites with more than 10 independent SNPs for later study. The summary-level GWAS data for OA was from UK Biobank in a total of 108,039 subjects. We then performed the GSMR method to test the causal associations between blood metabolites and OA.
**Results:** We analyzed a total of 905 blood metabolites which had more than 10 independent SNPs after clumping. We identified 13 blood metabolites had risk effects on OA and 27 blood metabolites had protective effects on OA with a suggestive *P* value (P<0.05). However, there are no significant causal association between blood metabolites and OA after multiple testing corrections ($P<5.52\times10^{-5}$). It indicated that glycine (beta=0.48, $P=7.64\times10^{-4}$) had the most risk effect on OA and choline (beta=1.60, $P=8.3\times10^{-4}$) had the most protective effect on OA.
**Conclusions:** We investigated the causal effect of global blood metabolites on OA using summary data-based Mendelian randomization analyses. Our results suggest the modest risk/protective effects of blood metabolites for association with RA.
**Acknowledgements:** The study was supported by grant from National Science Foundation of China (81573241).

## P608
## OSTEOPOROSIS RISK ASSESSMENT TOOLS TO SCREEN POSTMENOPAUSAL WOMEN IN SRI LANKA

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**Objective:** This study aimed to develop and validate Osteoporosis risk assessment tool for Sri Lankan postmenopausal women (PMW) to be used either with or without quantitative ultrasound data.
**Methods:** Community-dwelling PMW were enrolled to development (n=602) and validation (n=339) samples. Clinical risk factors of osteoporosis were assessed. BMDs (by DXA) in the total hip and lumber spine were assessed. Radial ultrasound (US) bone scan was done. Linear regression models were used with regional BMDs as the dependent and clinical risk factors as independent variables to develop formulae. WHO criteria based on BMD were used to diagnose osteoporosis. Sensitivity (sn), specificity (sp), positive and negative predictive values (PPV and NPV) were assessed to validate the new tools.
**Results:** Mean (SD) age of the development and validation samples were 67.3 (8.3) years and 63.8 (9.3) years respectively. Age, body weight (BW) and US T-scores showed positive correlations with BMDs of all three sites. Osteoporosis risk assessment tool 1(OPRAT-1) was built with age, body weight and US T-score. Osteoporosis risk assessment tool 2 (OPRAT-2) was built with age and BW. OPRAT-1 included following formulae.
T.Hip.E1=-1.635+(-0.029*age)+(0.044*BW)+(0.18*T_US)
T.FN.E1=-1.889+(-0.028*age)+(0.045*BW)+(0.171*T_US)
T.Spine.E1=-6.203+(0.019*age)+(0.052*BW)+(0.287*T_US)
OPRAT-2 included following formulae.
T.Hip.E2=-1.696+(-0.038*age)+(0.049*BW)
T.FN.E2=-1.984+(-0.036*age)+(0.050*BW)
T.Spine.E2=-5.239+(-0.01*age)+(0.058*BW)
Prevalence of osteoporosis, in the validation sample was 74.3%. It was 75.4% and 75.5% according to OPRAT-1 and OPRAT-2, respectively. Sn were high (OPRAT-1 and OPRAT-2; 83.2% and 82.5%) while Sp were moderate (44.8% for both). PPV of OPRAT-1 and OPRAT-2 were 79.5% and 81.2%. Both tools showed moderate NPV (OPRAT-1 and OPRAT-2:51% and 47%).
**Conclusion:** Both OPRAT-1 and OPRAT-2 have high performance in screening postmenopausal women in Sri Lanka for high risk of osteoporosis. OPRAT-2 is more convenient and can be used in any healthcare setting with limited resources to identify women who will be benefitted by DXA. OPRAT-1 can be used if the radial US facility is available.
**Acknowledgement:** Funded by the University of Wolverhampton.

## P609
## BIOLOGICAL FEEDBACK THERAPY IN THE COMPREHENSIVE TREATMENT OF RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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**Objective:** Psychological rehabilitation is a seminal adjunct to the common therapeutic approaches in rheumatoid arthritis (RA) and ankylosing spondylitis (AS) that influence treatment outcomes. One of upcoming methods of psychological rehabilitation is biological feedback therapy (BFBT) technique. This study was a comparative estimation of BFBT efficiency in RA and AS against the background of its common treatment strategies.
**Methods:** 47 patients with verified AS and 68 patients with verified RA were included in the study. Each of these groups was randomized into BFBT subgroup or placebo control (PC) subgroup. Both BFBT subgroups were treated with Reacor rehabilitation equipment (Medicom MTD, Russia) in combination with the standard pharmacological therapy, PC was performed by BFBT simulation. Complete course consisted of 10 BFBT sessions. Disease activities were assessed using either BASDAI or DAS28 scores, pain severity was estimated by VAS. State anxiety and depression levels were tested according to Khanin modification of the STAI and the BDI, respectively.
**Results:** All 4 subgroups were comparable in basic demographic features, RA and AS paired subgroups were also well matched in terms of initial disease activity, psychological pattern, and basic treatment. We revealed significant decrease of pain intensity, anxiety, and depression levels in RA-BFBT subgroup (n=41) as compared to RA-PC subgroup (n=27). DAS28 response to basic immunosuppressive therapy was also slightly higher in RA-BFBT subgroup, while being below the significant level. There was consistent and significant decrease in pain intensity, anxiety, and depression after BFBT therapy of AS (n=27) comparing to placebo (n=420); BASDAI score was also lower after BFBT. Differences between BFBT and PC subgroups in anxiety, depression, and VAS scores after treatment were significantly higher in AS than in RA.
**Conclusions:** BFBT is therefore a useful and safe tool that enables to improve outcomes of standard RA and AS treatment.

## P610

## TRACKING OF MUSCLE STRENGTH AND MASS FROM ADOLESCENCE TO EARLY ADULTHOOD AND FACTORS ASSOCIATED WITH DEVIATION FROM TRACKING

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**Objectives:** Analogous to peak bone mass, optimising muscle strength and mass in young adulthood is also important to the prevention of falls and fractures in later life, but factors affecting the development of muscle strength and mass from childhood to adulthood are poorly studied. This study aimed to assess whether muscle strength and mass track from adolescence to adulthood and identify factors associated with deviation from tracking.
**Methods:** Participants (N=201) were followed from 16-25 years old. Outcomes were handgrip and leg strength measured by dynamometer, and total body lean mass by DXA at ages 16 and 25. Other factors measured were physical activity (strenuous, light activities), time spent in watching TV (or videos) / play computer games and competitive sports participation by questionnaires, anthropometrics, serum 25-hydroxyvitamin D, fitness (by physical work capacity ($PWC_{170}$)) at ages 16 and 25.
**Results:** From age 16-25, muscle strength increased by 18% in males and 10% in females and lean mass by 12% in males and 7% in females. There was a moderate to strong tracking of muscle strength (correlation coefficients: males, 0.41-0.59; females, 0.54-0.64) and stronger tracking of lean mass (males, 0.74; females, 0.75) from age 16 to 25. Overall, 47-58% of participants kept their muscle strength and 63-69% kept their lean mass tertile positions over 9 years follow-up. For males, strenuous activity, $PWC_{170}$ at age 16, change of $PWC_{170}$ were associated with a positive deviation of tracking in muscle strength and mass. In females, light physical activity was associated with a positive deviation of tracking in lean mass; no other associations were found.
**Conclusions:** Muscle strength and mass track from adolescence to early adulthood in both males and females. Improving fitness and strenuous activity in males and light activity in females during adolescence might be effective strategies to improve muscle strength and mass in early adulthood. These findings highlight the importance of preserving high muscle strength and mass in early life to reduce fracture risk in later life.

## P611

## A REAL-WORLD PILOT STUDY ON ZOLEDRONATE-BASED TREATMENT OF OSTEOPOROSIS IN JAPANESE WOMEN AGED OVER 65 YEARS INCLUDING VERY ADVANCED AGE: CASE REPORT

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**Objective:** One of the results demonstrated that the increase in hip BMD was negatively correlated with age.
**Methods:** The age of the study patients ranged from 65-95 y (mean, 79.1±8.6 y), and BMI ranged from 14.6-29.0 kg/m$^2$ (mean, 20.6±2.8 kg/m$^2$). We introduced two cases for typical gain and loss after zoledronate (Zol, Asahi Kasei Medical Co., Ltd.) treatment.

**Results: Two typical cases**

Case 1. A 65-year-old woman with postmenopausal osteoporosis with a BMI of 18.2 kg/m$^2$. She could perform independent gait and did not have complications or a history of surgery. Following treatment with VD (Edirol) and BP (risedronate), her hip BMD decreased from 67% to 62%. Because a painless vertebral compression fracture occurred, treatment was switched to VD + Zol infusion. After the administration of two courses, her hip BMD increased from 62% to 79%, and the bone resorption marker (cross-linked N-terminal telopeptides [NTX]) level decreased from 18.0 to 13.4. During the study period, we did not observe low-trauma fractures or adverse reactions. The case patient was a relatively young, lean woman without complications or a history of surgery.

Case 2. A 92-year-old woman with osteoporosis with a BMI of 16.3 kg/m$^2$. This patient was kyphotic and had undergone a surgery for a bilateral proximal femoral fracture. She was also hypertensive and had chronic gastritis and dementia. She used complete dentures and was chair- and/or bed-bound. Because she had been treated with VD alone, Zol infusion was initiated. Although two courses were administered, her hip BMD decreased from 52% to 44%, and her NTX level increased from 10.1 to 21.6. This was a case of an extremely advanced age patient with a low BMI, complications, a history of surgery, and high need of care.

**Conclusion:** When the analysis was limited to seven women aged 90 years and older, Hip-BMD increased by a mean of 1.4% (range, −8% to 9%) after treatment. Because Japan now has reached an era when people commonly live up to 100 y, various drugs for very advanced age citizens need to be assessed in future studies. Zol is an effective drug for elderly and lean Japanese women.

## P612

## A REAL-WORLD PILOT STUDY ON ZOLEDRONATE-BASED TREATMENT OF OSTEOPOROSIS IN JAPANESE WOMEN AGED OVER 65 YEARS INCLUDING VERY ADVANCED AGE

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**Objective:** This study included 50 elderly Japanese women aged 65 years and older with osteoporosis treated with zoledronate (Zol, Asahi Kasei Medical Co., Ltd.) infusion who were followed up for 1 year or longer across three participating institutions.

**Methods:** The age of the study patients ranged from 65-95 y (mean, 79.1±8.6 y), and BMI ranged from 14.6-29.0 kg/m$^2$ (mean, 20.6±2.8 kg/m$^2$). There were 23 women who had received one course of infusion and 27 who had received two courses or more. Surgery for bone fractures were performed prior to infusion in 20 women, and 30 women had no history of surgery. Observed complications included periodontitis, kyphosis, osteoarthritis/spondylosis, hypertension, diabetes mellitus, and dementia. Various pretreatment procedures were used that ranged from vitamin D monotherapy to PTH replacement.

**Results:** There was no significant correlation between age and BMI (r=0.07). The increase in H-BMD was negatively correlated with age (r=−0.50), but it tended to show a positive correlation with BMI (r=0.31). The increase in H-BMD was 1.45±3.93 in the surgery group and 3.32±5.32 in the nonsurgery group, indicating a larger increase in the latter. The proportion of patients showing an increase of 3% or more between before and after infusion was 7/20 (35%) in the surgery group and 16/30 (53%) in the nonsurgery group. Moreover, the increase in H-BMD was 2.35±5.29 in the one-course group and 2.81±5.45 in the two-course group with no significant differences.

**Conclusions:** During the study period, Zol infusion was not discontinued in any patients and the incidence of low-trauma fractures was only 6%. This was deemed to be an effective treatment procedure that can be administered even for lean, very advanced age patients. Zol infusion can be reliably administered rapidly over 15 min once a year, and is an effective drug for elderly and lean Japanese women as long as CKD is considered.

## P613

## ASSOCIATION BETWEEN BONE TURNOVER MARKERS AND BMD AND TBS IN THE LUMBAR AREA IN ELDERLY WOMEN: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Introduction:** Increased bone turnover markers (BTMs) can suggest bone microarchitecture deterioration and may predict the risk of osteoporotic fractures in addition to low BMD in elderly population. The aim of this study was to assess the relationship between BTMs including osteocalcin (OC), bone specific alkaline phosphatase (BAP), C-terminal telopeptide of type 1 collagen (CTX), and Tartrate-resistant acid phosphatase (TRAP), and bone status determined with lumbar spine BMD and trabecular bone score (TBS).
**Methods:** This study was conducted on a subsample of 214 elderly women, with the mean age of 69.5 (±6.6) y, who were randomly selected from 2426 participants of Bushehr Elderly Health Program. The levels of BTMs were measured using electrochemiluminescence (for OC and CTX) and ELISA (for BAP and TRAP). Association of BTMs with lumbar spine BMD and TBS were assessed using univariable and multivariable linear regression analysis by adjustment for age, BMI, years since menopause, delivery times, smoking, physical activity, and vitamin D levels.
**Results:** All BTMs showed significant negative correlation with BMD (OC: β=-0.0017, P<0.001; CTX: β=-0.1565, P<0.001; BAP: β=-0.0032, P=0.008; TRAP (β=-0.0245, P=0.004) in univariable analysis. OC, CTX, and BAP were negatively correlated with TBS (β=-0.0006, P=0.031; β=-0.0601, P=0.006; β=-0.0018, P=0.019, respectively); however, no significant association was detected for TRAP. In multivariable analysis, after adjustment for possible confounders, only CTX and BAP showed significant association with BMD (β=-0.0943, P=0.005; β=-0.0032, P=0.049); none of the markers were significantly associated with TBS after adjustment.
**Conclusions:** CTX and BAP were negatively associated with lumbar BMD in women, adjusted for conventional risk factors. However, bone turnover markers were not associated with TBS in elderly women.

## P614
## KLOTHO, A CALCIUM AND PHOSPHATE REGULATOR, NOT ONLY MODERATE CALCIUM ABSORPTION BUT ALSO MALE REPRODUCTION

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The *KLOTHO* gene encodes the α-KLOTHO, β-KLOTHO protein, and Klotho-related protein through alternative splicing. They are involved in regulating the absorption of calcium, phosphate, and vitamin D, as a hormone. In mouse model, an insertion mutation in the 5'region of *Klotho* revels the premature aging phenotypes, including soft tissue calcification, hyperphosphatemia, osteoporosis, hypoglycemia, arteriosclerosis, skin atrophy, gonadal dysplasia, and infertility. However, whether mutation of *KLOTHO* in clinical also affect male reproduction is still unknown. In this study, we screen the genetic variants from 12 cases with teratozoospermia through next generation sequencing. We found two genetic variants in *KLOTHO* gene. One is within *α-KLOTHO* (c.911A>G; p.Asn304Ser; 1/12); the other is localized at *β-KLOTHO(*c.1825A>G; p.Thr609Ala; 1/12). And, this two variants localized within its function domains. This is first time to link *KLOTHO* functions with male reproduction in clinical cases. We suggest that KLOTHO may also be involved in mammalian spermatogenesis through regulating the absorption of calcium, phosphate, and/or vitamin D.

## P615
## TRAJECTORY ANALYSIS COMBINING PAIN AND PHYSICAL FUNCTION IN PATIENTS WITH KNEE AND HIP OSTEOARTHRITIS: RESULTS FROM THE FRENCH KHOALA COHORT

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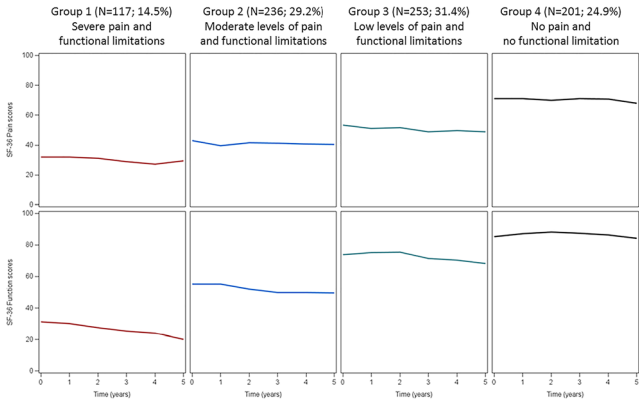
**Objectives:** Self-perceived severity of pain and functional limitations levels may not be always matched. Thus, combining pain and physical function outcomes in trajectories may better reflect the patients' experience over the course of the disease. The aims of this study were 1) to identify homogeneous subgroups of knee and/or hip osteoarthritis (OA) patients with distinct trajectories of the combination of pain and physical function over time and 2) to determine the baseline predictive factors associated with these trajectories.
**Methods:** The KHOALA cohort is a French population-based multicenter cohort of 878 patients with symptomatic knee and/or hip OA (ACR criteria), aged between 40-75 years old. Pain and physical function were measured annually with the SF-36 questionnaire over 5 years, with lower scores indicating greater pain and functional limitations. They were fit into a multitrajectory model using SAS Proc Traj. The choice of models was based on maximizing the Bayesian information criterion, the proportion of patients in each group (>5% of the total sample) and the statistical significance of the modelled equation. Multinomial logistic regressions were performed to determine the predictive baseline characteristics associated with each group and were adjusted for sociodemographic and clinical factors.
**Results:** Comparison of separate trajectories of pain and physical function showed that 41% of patients included in the

trajectory of severe functional limitations did not belong to the more severe pain trajectory. Multitrajectory modeling revealed 4 distinct trajectories of pain and physical function (see Figure). In multivariate analyses, female sex (odds ratio [OR]=5.38, 95%CI=2.46-11.76), an older age (OR=1.10, 1.06-1.15), a high BMI (OR=1.17, 1.10-1.24), a high number of comorbidities (OR=1.46, 1.16-1.84), a low vitality score (reflecting a low vitality)(OR=0.88, 0.86-0.90) and a high Kellgren grade (OR=7.66, 3.18-18.43) were associated with the more severe symptoms trajectory membership.




**Conclusion:** Over 5 years, we identified four distinct trajectories combining pain and physical function. The management of comorbidities, weight and fatigue seems important to maintain function and limit pain in patients with lower-limb OA.

## P616
## EVALUATION OF LIPID METABOLISM, INFLAMMATION AND BONE TURNOVER IN A RAT MODEL OF OVARIECTOMY-INDUCED BONE LOSS

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**Objective:** Ovariectomized (OVX) rat is an animal model which simulates the clinical findings in postmenopausal conditions. The aim of the present study was to make a complex evaluation of lipid metabolism, inflammation and bone turnover in an ovariectomized (OVX) rat model of postmenopausal bone loss using anthropometric and biochemical indices.
**Methods:** Female Wistar rats were divided into 2 groups, each of 14 animals: SO (sham operated) and OVX. Three months after the operation, femur BMD was measured by DXA using a computer program for small subjects. Weight was measured throughout the experiment and weight gain was calculated. At termination of the experiment, fat deposits (total, retroperitoneal and mesenteric) and blood lipids were measured. Inflammation was evaluated by serum concentrations of TNFα. Serum alkaline phosphatase (ALP) was determined as a marker of bone turnover.
**Results:** Three months after ovariectomy, the femur BMD of OVX rats was reduced but not significantly. OVX rats had a significantly higher ($p<0.05$) weight gain (12.4%) than SO rats (3.9%). The total and retroperitoneal fat deposits of OVX group were significantly higher ($p<0.01$) than those of SO group while the mesenteric fat was also increased but not significantly. This accounted for significantly higher ratios of total fat/animal weight ($p<0.05$) and retroperitoneal fat/animal weight ($p<0.01$) of OVX rats compared to SO rats. Blood cholesterol level of OVX group was significantly higher ($p<0.05$) than that of SO group. The ALP concentration was significantly elevated ($p<0.05$) in OVX group showing an increased bone turnover. TNFα was significantly higher ($p<0.05$ vs. SO) in the OVX group indicating the development of inflammation.
**Conclusion:** At the stage when the reduction in BMD was not significant, estrogen deficiency in OVX rats caused a state of obesity, dyslipidemia and inflammation.
**Acknowledgements:** This research was funded by project 14016 of Science Fund of Medical University Prof. Dr. Paraskev Stoyanov, Varna, Bulgaria.

## P617
## XANTHINOXIDASE AND XANTHINE DEHYDROGENASE ACTIVITIES IN RHEUMATOID ARTHRITIS: ENZYMATIC PROFILING OF BLOOD PLASMA

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**Objective:** Rheumatoid arthritis (RA) is a chronic systemic autoimmune disease. Recent evidences suggest that aberrant formation of neutrophil extracellular traps (NETs) could play important roles in the pathogenesis of RA. However, the participation of prooxidant enzyme systems in the mechanisms of NETosis are still poorly understood. This study aimed to disclose enzymatic patterns of xanthinoxidase (XO) and xanthine

dehydrogenase (XDG) in blood plasma in patients with RF-negative and RF-positive RA.
**Methods:** 75 adult RA patients and 35 healthy controls were included in the study. Diagnosis of RA had been established using ACR/EULAR 2010 criteria. RF-positive RA was observed in 49 (65.3%) patients. Enzymatic activity in plasma was determined by spectrophotometric method (1). Statistical comparison tests are selected in line with common guidelines, differences were considered significant when $p<0.05$.
**Results:** Reference intervals ($M\pm2\sigma$) for XO activity was 2.60–3.96 nmol/min/ml and the XDG activity was 4.49–5.93 nmol/min/ml. Enzymatic profile in plasma of RA patients are characterized by increased XO activity ($p<0.001$). XO activity is increased ($p<0.001$), CDG activity is decreased ($p<0.001$) in patients with RF-negative RA. XO activity ($p<0.001$) and CDG activity ($p<0.05$) is increased in patients with RF-positive RA. Plasma XO and XDG activities is also higher in patients with RF-positive RA than in patients with RF-negative RA ($p<0.001$).
**Conclusion:** The results demonstrate that activation of the xanthine oxidase/xanthine dehydrogenase enzyme complex to play an important role in induction and maintenance of the autoimmune rheumatoid process.
**References:** Martemyanov VF et al. Int J Applied Fundamental Res 2015;12:1048.

## P618
## THE RATE OF MODIC II FINDINGS ON MRI IN POSTMENOPAUSAL WOMEN AND BONE MINERAL DENSITY

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**Objective:** Modic II pathological MR finding represents the replacement of bone marrow by fat. Some studies suggest that vertebral marrow fat increase with age and decreasing of BMD. Out aim was to observe the rate of Modic II in postmenopausal women and to investigate the correlation between age and vertebral marrow fat, as well as vertebral marrow fat and BMD.
**Methods:** In this pilot study we observed 100 patients (50-65 y of age) with lumbar (L1-L4) MRI scans, which were performed on GE Signa HDxt 1,5 T or 3T Siemens Verio. Some of them were additionally referred for a DXA scan. The measurements of BMD at the lumbar spine (L1-L4) were performed on a DXA machine Hologic Discovery A.
**Results:** In 70% of the cohort was observed Modic II in L1-L4. In 62%, 2 or more lumbar vertebrae have any Modic II. In 32.8% of the patients, the size of Modic II zones was <10 mm, and in 67.2% - it was above 10 mm. In 40,8% of the examined vertebrae was found any Modic II pathological finding. No association between the presence of Modic II and age was confirmed ($p=0.15$). We noted a slight correlation between age and the number of vertebrae with Modic II ($r=0.28$; $p=0.005$) and the number of Modic II zones in the region of interest - L1-L4, ($r=0.31$; $p=0.001$). In patients who both have undergone MRI and DXA scan we observed that the greater the Modic II zone, the greater the decrease in BMD of the respective vertebra. However, their number is pretty insufficient and the results did not achieve statistical significance.
**Conclusion:** In our study no association was confirmed between age and Modic II, but it was found that there is a discrete correlation between age and number of Modic II zones, as well as age and number of vertebrae engaged with it. Limitations of the study: 1. Small number of patients in the cohort. 2. Limited number of patients, who have undergone both MRI and DXA scan.

## P619
## THE RATE OF LUMBAR VERTEBRAL HAEMANGIOMAS IN POSTMENOPAUSAL WOMEN AND BONE MINERAL DENSITY

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**Objective:** Vertebral haemangiomas (VHs) are the most common type of noncongenital benign spine neoplasms. Some studies report that they are age- and sex-dependent and have proved that there is a relationship between vertebral haemangiomas and osteopenia/osteoporosis. Our aim was to observe the rate of lumbar vertebral hemangiomas in postmenopausal women and to investigate their correlation with age and with BMD.
**Methods:** In this pilot study 100 patients (50-65 y of age) were examined with lumbar (L1-L4) MRI scans, which were performed on GE Signa HDxt 1,5 T or 3T Siemens Verio. Some were additionally referred for a DXA Hologic Discovery A scan.
**Results:** In 36% of the patients one or more hemangiomas have been found in L1-L4 as an incidental finding. 74% of them have 2 or more hemangiomas. 14,3% of the vertebrae are engaged with any hemangiomas. In 88% of the patients, the size of the hemangiomas was <10 mm, and in 22% - it was above 10 mm. No association between the presence of a hemangioma and age was confirmed. We were not able to find an association neither between the size of the hemangioma, nor with the number of the vertebra with hemangiomas. In patients who both have undergone MRI and DXA scan, we observed that the greater the size of the hemangioma, the greater the decrease in BMD of the respective vertebra. However, their number is pretty insufficient and the results do not achieve statistical significance.

**Conclusion:** In the target population we were able to establish that the frequency of the hemangiomas is 36%! No association has been proven neither between age and the presence of hemangiomas, nor between age and the number of the engaged vertebra. Correlation was not confirmed also between age and the size of the hemangiomas. Limitations of the study: 1. Small number of patients in the cohort. 2. Limited number of patients, who have undergone both MRI and DXA scan.

## P620
## QUALITY OF LIFE FOR ASSESSMENT OF TREATMENT EFFICIENCY IN OSTEOARTHRITIS PATIENTS

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**Objectives:** To study the quality of life (QoL) of patients suffering from osteoarthritis (OA), and its changes depending on the clinical features of the disease and the psychological characteristics of the patients.
**Methods:** We examined 50 OA patients before and after treatment. The control group comprised of 30 healthy residents of the same age and gender who did not suffer from serious somatic diseases. We used the SF-36 questionnaire (Ware JE, 1993) for QoL investigation.
**Results:** The QoL scores on all SF-36 scales were significantly lower in patients with OA than in the control group ($p<0.05$). This showed the lowest scores in QoL of OA patients ever had before treatment. The physical activity in OA patients was considerably affected due to the physical ($p<0.001$) and role functioning (RF, RP) ($p<0.001$), as well as indicators of somatic pain (BP) ($p<0.01$). Factors that significantly impaired the physical component of QoL in OA patients were age of patients, stage of disease, the severity of joint pain on a visual analogue scale (VAS), and presence of clinically manifested anxiety ($p<0.05$). Factors that significantly impaired social and psychological component of QoL in OA patients were stage and duration of the disease and increased functional insufficiency of the joints ($p<0.05$). Therapeutic measures significantly had a positive impact on the basic parameters of QoL in patients with OA by improving of physical components of health (physical and role functioning, somatic pain) and psychological components (role emotional functioning, mental health) ($p<0.05$). Role physical (RP) and role emotional (RE) functioning significantly changed by more than 42% ($p<0.001$). The regularities were significantly associated with decreasing functional failure of the joints, decrease in the intensity of joint pain in VAS and decrease in ESR ($p<0.05$).
**Conclusions:** Thus, OA patients had a significant improvement in physical health, noted by pain reduction and physical limitations, and, as a consequence, improved performance after the treatment. The effectiveness of therapy in a hospital environment contributed in the formation of a positive subjective assessment of the health status in patients with OA.

## P621
## PRO-OXIDANT ACTIVITY OF LYMPHOCYTES IN RHEUMATOID ARTHRITIS

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**Objective:** Increased levels of neutrophil extracellular traps (NETs) in rheumatoid arthritis (RA) patients have been found in previous studies. ROS are essential for formation of NETs. In this connection, the study of the pro-oxidant activity of the enzymes is an issue of considerable interest. Our aim was to disclose enzymatic patterns of xanthinoxidase (XO) and xanthine dehydrogenase (XDG) in lymphocytes in patients with RF-negative and RF-positive RA.
**Methods:** 75 adult RA patients and 35 healthy controls were included in the study. Diagnosis of RA had been established using ACR/EULAR 2010 criteria. RF-positive RA was observed in 65.3% patients. Enzyme activity in lymphocytes was measured spectrophotometrically and expressed as nmol/min/ml (1). Enzyme activities were normalized to $1x10^7$ cells/ml. Statistical tests are selected in line with common guidelines, differences were considered significant when $p<0.05$.
**Results:** Reference range ($M\pm2\sigma$) for XO activity was 14.2-27.8 nmol/min/ml and the XDG activity was 22.5-40.7 nmol/min/ml. Enzymatic profile in lymphocytes of RA patients are characterized by decreased XO and CDG activities. XO activity and CDG activity is decreased ($p<0.001$) in patients with RF-negative RA and RF-positive RA. Lymphocyte XO and XDG activities is lower in patients with RF-positive RA than in patients with RF-negative RA ($p<0.001$).
**Conclusion:** Lymphocyte pro-oxidant enzyme activities *in* patients *with* rheumatoid arthritis depends on the presence rheumatoid factor. We consider these enzymes to play a role in development and progression of RA.
**References:** Martemyanov VF et al. Int J Applied Fundamental Res 2015;12:1048.

## P622
## COST-EFFECTIVENESS OF SEQUENTIAL TREATMENT WITH ABALOPARATIDE FOLLOWED BY ALENDRONATE VS. ALENDRONATE MONOTHERAPY FOR USA WOMEN AT INCREASED RISK OF FRACTURE

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**Objective:** Emerging evidence supports sequential therapy with osteoanabolic followed by antiresorptive in patients at high-risk of fragility fractures. Further cost-effectiveness evaluation of sequential abaloparatide (ABL) followed by alendronate (ALN) vs. ALN monotherapy is needed to inform prescribers about the economic value of anabolic first for those at high risk of fracture. This study aims to assess the cost-effectiveness of sequential ABL followed by ALN (ABL/ALN) vs. ALN monotherapy for postmenopausal osteoporosis, from the US payer perspective.
**Methods:** A Markov microsimulation model was developed to estimate the cost-effectiveness of sequential ABL/ALN vs. ALN with a lifetime horizon from the US payer perspective. Patients were assumed to receive 18 months ABL followed by 5 years ALN. The effects of ABL on fracture risk were derived from the ACTIVExtend trial and were assumed to be maintained during subsequent ALN treatment, consistent with ACTIVExtend. Evaluation was completed for high-risk patients 50-80 years old with a BMD T-score ≤-3.5 or BMD T-score between -2.5 and -3.5 and a history of ≥1 osteoporotic fracture.
**Results:** In simulated populations, sequential ABL/ALN was cost-effective (threshold of $150,000/QALYs) vs. generic ALN monotherapy, in women ≥60 years with a BMD T-score ≤-3.5 without a history of prior fracture and in women with BMD T-score between -2.5 and -3.5 and history of osteoporotic fracture. In patients aged 70 years with BMD T-score ≤-3.5, sequential ABL/ALN reduced the expected number of fractures per patient by 0.340 and increased lifetime QALY gained by 0.163 over a patient's lifetime.
**Conclusion:** Sequential ABL/ALN therapy is cost-effective vs. ALN monotherapy for US postmenopausal women at increased risk of fractures.
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## P623
## DYSLIPIDEMIA AND ATHEROSCLEROSIS WITHIN THE FRAMEWORK OF RHEUMATIC AUTOIMMUNITY: ADVANCES AND CURRENT TRENDS

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Cardiovascular risk is significantly increased in rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis, and other autoimmune rheumatic diseases (ARD), being a prominent factor of elevated mortality. The risk is strongly related to the traditional factors; it however remains elevated even among rheumatic patients without the relevant history. So called "lipid paradox" exists even when respective patients with increased cardiovascular risk tend to have lower total cholesterol and LDL levels than non-rheumatic adults. Particular features of lipoprotein structure in these individuals lead to misjudgments when ubiquitous lipoprotein markers are involved, as opposed to apoA1, apoB, and other particle concentration markers. Systemic inflammation itself is suggested to underlie this phenomenon and contribute significantly to atherosclerosis, endothelial dysfunction, as well as triggering of plaque vulnerability and atherothrombotic events. Active systemic inflammation can also substantially alter HDL function. Other disease specific factors are antiphospholipid antibodies, glucocorticoid treatment, and possibly cyclosporin A. The metabolic syndrome is also associated with ARD and cardiovascular events. The management of dyslipidemia and atherosclerosis in ARD remains suboptimal. Increasing evidences indicate that prolonged control of disease activity with disease-modifying agents can lead to substantial reduction of cardiovascular risk. Several antirheumatic drugs, including anticytokine agents, methotrexate, hydroxychloroquine, can markedly reduce CV risk, as opposed to glucocorticoids and NSAIDS. In view of demand for more aggressive primary and secondary cardiovascular prevention statins are now a common tool to decrease atherosclerotic lesions in ARD. The wide variety of their pleiotropic effects on vascular and immune systems additionally contribute to the beneficial action. Emerging lipid-lowering and modulating agents are also extensively discussed with regard to their possible implementation in clinical practice.

## P624
## EFFECT OF BISPHOSPHONATE ON URINARY ALBUMIN EXCRETION IN TYPE 2 DIABETES PATIENTS

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**Objective:** Diabetes mellitus is often complicated by osteoporosis. However, there is few information about the effect of anti-osteoporotic drugs on diabetic complications. In the present study, we aimed to evaluate the effect of bisphosphonates (BPs) on urinary albumin excretion, which is a surrogate marker for early diabetic nephropathy in diabetes patients.

**Methods:** A total of 40 medical records of diabetes patients including 10 males and 30 females (67.1±13.9 years old), treated with BPs between April 2013 and March 2018, were retrospectively reviewed. Estimated glomerular filtration rate (eGFR) of the investigated subjects was above 30 ml/min/1.73m$^2$. Urinary albumin/creatinine ratio (UACR, mg albumin/gram creatinine) was examined before and after BP treatment. The breakdown of BPs was 17 alendronate, 11 risedronate, 11 minodronic acid and 1 ibandronate. The increment of UACR/duration of treatment (days) was defined as delta-UACR. Statistical analyses were performed by multiple regression analysis or single regression analysis as appropriate.
**Results:** Median UACR of before and after BP treatment was 19.6 (9.23-76.7, 25 th-75th) and 24.2 (9.03-52.0, 25th-75th), respectively. Median duration of BP treatment was 151 days (91-330, 25th-75th) . In univariate analysis, UACR before BP administration correlated negatively to delta-UACR. There was no statistically significant correlation between delta-UACR and duration of BP treatment. In multivariate analysis, regression coefficient of UACR before BP administration was statistically significant and there was a causal relationship between decrease in UACR and UACR before BP administration adjusted by duration of BP treatment. Conclusion: Our results suggest that BPs does not affect the progress of diabetic nephropathy in type 2 diabetes patients.

## P625
## INDIVIDUAL AND SOCIAL FACTOR CAN INFLUENCE THE QUALITY OF LIFE OF KNEE OA PATIENTS: A SYSTEMATIC REVIEW

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**Objective:** Knee OA (KOA) associates with remarkable functional restrictions due to the pain that seriously affects social and emotional well-being, reducing the quality of life (QoL). The identification of therapies and factors that influence QoL in KOA patients may mitigate the clinical, economic, and social burden of this disease. Thus, the assessment of QoL in KOA, and individual factors associated, has a great interest in research and clinical practice. Still, a general recompilation of these data is missing. Our aim was to recapitulate the existing information on QoL in KOA patients as an international tool to raise awareness on their condition and guide future actions for patient's management.
**Methods:** A systematic review of QoL in KOA patients (up to 2017). We identify articles in scientific databases using relevant keywords as KOA, QoL, and well-being. Articles were reviewed by 3 independent reviewers. Original articles were included when containing information on QoL of KOA patients. Inclusion criteria were QoL compared to one or more demographic, lifestyle or comorbidity factors, or a control group. A quality appraisal was performed.
**Results:** We retrieved 610 articles, 62 fulfilled inclusion criteria. The instrument used to assess QoL were SF-36 and EQ-5D. The participants' mean in the studies was 561, the majority were female, the mean age was 63 years. KOA patients report a worse QoL compared to a control group, having women worst QoL than men. Obesity, little physical activity, and higher energy expenditure correlate with worse QoL. Higher educational level and mindfulness can improve QoL while poverty, physiological distress, depression and having dysfunctional families can reduce it. The delivery of a knee self-management program by health professionals can improve QoL. Surgical interventions result in good outcomes but the results were influenced by individual factors.
**Conclusion:** This is the first review pertaining to QoL in KOA patients. KOA has a strong impact on QoL. Individual factors (sex, weight, exercise, mental health, education) can influence QoL. These factors affect treatment outcomes and should be considered for a better patient's management. These data are a valuable tool for health professionals, to better understand the disease and to implement a more adequate standard of care.

## P626
## CORRELATION OF BONE TURNOVER MARKERS, VITAMIN D LEVELS AND STEROIDAL HORMONES WITH BONE DENSITY IN HEALTHY MALE POPULATION

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**Objective:** To find any possible factors which may influence bone density in otherwise healthy male population. More specific to examine if there is any correlation between bone turnover markers, vitamin D levels and steroidal hormones with BMD measured by DXA scan.
**Methods:** 300 men of relatively young age participated in the study. They all had a DXA scan in both the lumbar spine and the femoral neck. Additionally we measured the following: bone turnover markers: (osteocalcin, alkaline phosphatase and PINP for bone formation, and CTX for bone resorption), 25(OH)vitamin D levels, steroidal hormones (testosterone and estradiol), and calcium and phosphorus levels.

Finally using the SPSS statistical program we examined if there is any correlation between all the above measurements with the bone density.

**Results:** The mean age of the population of the study was 33.9 ±7.7 years, mean weight 84.1±10.8 kg, and mean BMI 26.1 ±4.2 kg/m$^2$. The mean BMD was 1.26±0.15 g/cm$^2$ for the lumbar spine and 1.08±0.14 g/cm$^2$ for the femoral neck. The mean values for the markers that were described above were as following: Osteocalcin 18.3±7 ng/ml, alkaline phosphatase 63 ±17.2 IU/l, PINP 51.7±25 ng/ml, CTX 0.36±0.18 ng/ml, 25(OH)vitamin D 21.7±9.2 ng/ml, testosterone 5.5±2.3 ng/ml, estradiol 43.6±17.3 pg/ml, calcium 9.5±0.6 mg/dl and phosphorus 3.2±0.5 mg/dl. As for the correlations we found the following: Positive correlation between BMD and osteocalcin, PINP and CTX respectively ($p<0.05$), negative correlation between BMD and alkaline phosphatase ($p<0.05$). We did not find any correlation either positive or negative between BMD and 25(OH)vitamin D, testosterone, estradiol, calcium and phosphorus. Additionally we found positive correlation between BMI and BMD ($p<0.05$), and negative correlation between BMI and 25(OH)vitamin D and testosterone, while we found no correlation between BMI and estradiol.

**Conclusion:** Our study showed that in relatively young healthy male population, bone turnover markers (apart from the alkaline phosphatase) are positively correlated with BMD, while in that age steroidal hormones, vitamin D, calcium and phosphorus are not correlated with BMD. Additionally, body weight is positively correlated with BMD and negatively correlated with vitamin D and testosterone.

## P627

## INFLUENCE OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS ON INFLAMMATORY SONOGRAPHIC FEATURES IN EROSIVE HAND OSTEOARTHRITIS

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**Objectives:** Erosive hand osteoarthritis (HOA) is a subtype of hand osteoarthritis affecting the interphalangeal (IP) finger joints, characterized by a more inflammatory burden. Hitherto, pharmacologic treatment options are restricted to symptomatic. NSAIDs may affect the presence of inflammatory features on ultrasound (US). The aim of this study was to examine whether inflammatory US features (i.e. synovial proliferation (SP), effusion (EFF) and Power Doppler (PD) signal) in erosive HOA patients change when discontinuing NSAIDs intake for two weeks before US.

**Methods:** 99 patients with erosive HOA were enrolled. The patients were allocated to the NSAIDs or control group according to their intake at baseline (no NSAIDs use=control group; intake of NSAIDs on a regular base=NSAIDs group). US was performed at baseline (T0) and 2 weeks after discontinuation of all NSAIDs (T1). The inflammatory features were scored using a semi-quantitative scale ranging from 0-3 (1). Binomial mixed models with logit function were fitted for ultrasound scores SP (score>2), EFF (score>2), and PD (score>1) with a random intercept for patient and with age, sex, duration of illness, joint, side, anatomical phase group, NSAID group, time, and a two-way interaction between NSAIDs group * time as fixed factors. The Odds ratios (OR) of having an ultrasound score of at least '2' vs. at most '1' for SP and EFF, and '0' vs. '≥1' for PD are shown.

**Results:** 47 patients were included in the NSAIDs group and 52 in the control group. Both groups were comparable at baseline for VAS pain, disease duration, number of radiographic affected joints and BMI, but not for age ($p=0.005$). The US baseline data were comparable between both groups (all $p>0.05$). At T1, in the NSAIDs withdrawal group, more SP and PD was seen compared to baseline ($p=0.018$ and 0.031, respectively). However, the interaction term time*NSAIDs was not found significant for any variable (Table 1).

**Conclusion:** No significant changes in inflammatory US features were seen in erosive HOA patients after withdrawal of NSAIDs for two weeks. This study suggests that an NSAIDs free period is not necessary before assessing inflammatory disease activity in erosive HOA patients.

**References:** (1) Mathiesen A et al. Arthr Rheumat [Abstract] 2017;69(S10).

Table 1:

| Variable | Group | OR* | 95%CI | P-value |
|---|---|---|---|---|
| Synovial proliferation | No Nsaids | 1.304 | 0.958 - 1.775 | 0.091 |
| | Nsaids withdrawal | 1.552 | 1.079 - 2.232 | 0.018 |
| | Interaction term time*Nsaids | - | - | 0.470 |
| Effusion | No Nsaids | 1.027 | 0.761 - 1.387 | 0.860 |
| | Nsaids withdrawal | 1.164 | 0.872 - 1.554 | 0.303 |
| | Interaction term time*Nsaids | - | - | 0.560 |
| PD | No Nsaids | 1.016 | 0.715 - 1.444 | 0.929 |
| | Nsaids withdrawal | 1.480 | 1.036 - 2.116 | 0.031 |
| | Interaction term time*Nsaids | - | - | 0.140 |

## P628

## ASSOCIATION OF 25-HYDROXY VITAMIN D WITH BONE TURNOVER MARKERS AND BONE MINERAL DENSITY IN AN IRANIAN ELDERLY POPULATION: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** To investigate the associations between serum 25-hydroxyvitamin D (25-OH D), bone turnover markers, and BMD in an elderly population.

**Methods:** The present study was conducted within the framework of the Bushehr Elderly Health (BEH) programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran. In brief, 400 persons (186 men and 214 women) from participants of the second stage were selected; serum bone turnover markers (bone-specific alkaline phosphatase (bALP), amino-terminal procollagen propeptide of type I collagen (PINP), osteocalcin (OC), tartrate-resistant acid phosphatase isoenzyme 5b (TRAP)) and vitamin D were measured. Vitamin D deficiency and insufficiency were defined as serum 25-OHD below 50 ng/mL and between 50-75 ng/mL, respectively. Nonparametric Spearman's rho was used to assess the correlation between different measurements.

**Results:** Vitamin D deficiency and insufficiency were detected in 253(63.25%) and 71(17.75%) of participants, respectively. Vitamin D status was significantly different in men and women (chi-square=15.55, p=0.001). We found a significant inverse association between vitamin D levels and bALP in the total population (rho=-0.20, p<0.001). In vitamin D deficiency group, there were inverse correlations between vitamin D levels and both OC, and CTX (p<0.001) and direct correlation with BMD of all sites (p<0.001). We also found a significant reverse correlation between bALP and vitamin D levels among women (rho=-0.27, p<0.001)

**Conclusions:** Our findings suggest that in elderly participants with vitamin D deficiency, 25(OH) D levels were significantly and negatively related with serum CTX and serum OC and negatively associated with L1L4, femoral neck, and total hip BMD.

## P629

## ASSOCIATION OF OPIUM USE AND OSTEOPOROSIS IN OLD MEN: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Over 200 million people worldwide suffer from osteoporosis and 15-30% of elderly men will experience ≥1 fragility fractures in their lifetime. Worldwide, nearly 27 million people are estimated to suffer from drug abuse disorders or drug dependence. The knowledge behind the association of illicit drug use and bone health is scarce. This study aimed to investigate this possible association among elderly men of Bushehr, Iran.

**Methods:** Retrospectively, the data of Bushehr Elderly Health program was used. Drug use referred to current consumption of illicit drugs, regularly or occasionally. Femoral and spinal osteoporosis were defined as a T-score ≥2.5 standard deviations (SD) below the mean of a young healthy reference population in the femoral or lumbar spine site, respectively. Total osteoporosis was noted to have osteoporosis at either mentioned site. Using multivariable logistic regression models, the association of drug use and osteoporosis was assessed adjusting for age, education, smoking, BMI and physical activity.

**Results:** In all, 1075 men aged ≥60 y were included in this study. Drug use was detected in 9.71% and 3.22% of nonosteoporotic populations (p-value<0.001). Among drug users, opium was the most prevalent consuming drug (82.6%). Total osteoporosis was detected in 37.0% (23.9%-52.2%) of drug users, while the values in nonusers was 15.3% (13.2%-17.6%). Figure 1 compares the prevalence of osteoporosis in different age groups, by drug use situation. Adjusting for the conventional risk factors, drug use was associated with total,

femoral and spinal osteoporosis. The odds of total osteoporosis in drug users is almost 2.75 (1.39-5.40) folds higher than those who never consumed illicit drugs. Opium use increased the chance of total osteoporosis by 2.95 (1.43-6.11).

**Conclusion:** The study result indicates that the opium consumption has positive association with osteoporosis, independent of other conventional risk factors. Since drug use may also increase the fracture risk through cognitive effects, osteoporosis among opium users should be considered carefully, especially in countries where drug use is prevalent.

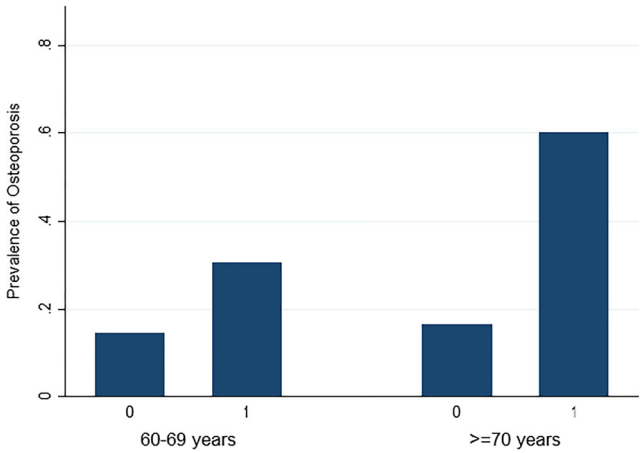


Figure 1: The prevalence of total osteoporosis in different age groups, by drug use situation (0: nondrug users 1: drug users)

## P630

## DICHOTOMIZED MUSCLE MASS CAN ACTUALLY DISCRIMINATE WEAKNESS, BUT A NEW CUTOFF POINT IS NEEDED IN WOMEN WITH HIP FRACTURE: A CROSS-SECTIONAL STUDY

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**Objective:** To investigate the relationship between measures of muscle mass and grip strength in women with subacute hip fracture. Firstly, we aimed to assess the capability of the current thresholds for appendicular lean mass (aLM), aLM-to-BMI ratio and aLM/height$^2$ to separate weak and nonweak women. Secondly, we aimed to explore alternative thresholds for the 3 measures of muscle mass to discriminate weakness.

**Methods:** We performed a cross-sectional study of 160 women with hip fracture admitted consecutively to a rehabilitation hospital. We assessed aLM by DXA and grip strength by a Jamar hand dynamometer. Weakness was defined as grip strength <16 kg according to the definition released from the Foundation for the National Institutes of Health.

**Results:** We found a significant positive correlation between aLM and grip strength ($\rho$=0.227; p=0.004). 134 of the 160 women (i.e., 84%; 95%CI 78%-90%) had aLM < 15.02 kg whereas 81 women (i.e., 51%, 95%CI 43%-58%) had handgrip strength < 16 kg. No significant association was found between aLM <15.02 kg and grip strength <16 kg: $\chi^2$ (1, n=160)=0.86 (p=0.476). ROC curve analysis showed that aLM significantly discriminated the patients with grip strength either ≥16 kg or <16 kg (area under the curve=0.62; 95%CI 0.53-0.71, p=0.01). By using the optimal threshold (aLM=11.87 kg), low aLM and low grip strength were significantly associated: $\chi^2$ (1, n=160)=10.77 (p=0.001). We correctly classified 42 of the 81 women with low grip strength and 59 of the 79 women with non-low grip strength (sensitivity=52%, specificity=75%, positive predictive value=68%, negative predictive value=60%). The association between aLM <11.87 kg and grip strength <16kg persisted after adjustment for age and BMI (odds ratio=2.50; 95%CI 1.17 - 5.34; p=0.018). 71 of the 160 women (i.e., 44%; 95%CI 37%-52%) had aLM/BMI < 0.512, whereas 129 women (i.e., 81%; 95%CI 74%-87%) had aLM/height$^2$ < 5.67 kg/m$^2$. Grip strength was significantly correlated neither with aLM/BMI ($\rho$=0.009; p=0.905), nor with aLM/height$^2$ ($\rho$=0.09; p=0.235). ROC curve analyses showed that neither aLM/height$^2$ nor aLM/BMI were able to discriminate the women with grip strength either <16 kg or ≥ 16 kg: the areas under the curve were 0.56 (95%CI 0.47-0.65, p=0.158) and 0.504 (95%CI 0.41-0.59, p=0.939), respectively.

**Conclusions:** Data show that the current thresholds for measures of muscle mass do not discriminate weakness in women with subacute hip fracture. For aLM an alternative cutoff point actually separated weak and nonweak women.

## P631

## CULPRIT HIDDEN IN PLAIN SIGHT (INTRATHYROIDAL PARATHYROID CYST)

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Parathyroid cysts are uncommon 0.8 -3.4% of all parathyroid lesions and usually arise secondary to cystic degeneration of parathyroid adenoma. Intrathyroidal parathyroid cysts are extremely rare. We present a 32 years old female with clinical and biochemical features of primary hyperparathyroidism (PHPT) but no obvious lesion found for years.

**Case report:** Patient presented with features of diffuse bone pains and proximal weakness for 2 years and osmotic symptoms for 4 months. She had biochemical evidence of hypercalcemia, hypophosphatemia, elevated intact PTH (iPTH) and skeletal imaging suggestive of PHPT. She had severe proximal muscle weakness in both lower limbs. No culprit lesion was revealed in Tc99m sestamibi scan. Neck ultrasonography (USG) revealed 24 X 20 mm cystic lesion in lower pole of left lobe of thyroid suggestive of simple thyroid cyst. Patient was managed conservatively for last 3 years and presented to us with same biochemical features of PHPT and gradually increasing calcium levels (calcium 13.2 at presentation). Patients calcium levels were stabilised and re-evaluation did not show any tracer uptake on sestamibi scan. USG guided fine needle aspiration (FNA) was done of thyroid cyst followed by iPTH measurement from the needle washing (FNA-iPTH). 2 ml of serous fluid was aspirated, iPTH measurement of which revealed a level of 2450 pg/ml. Patient underwent left hemithyroidectomy. She had a fall of >90% in preoperative and 20 min postoperative iPTH (880 pg/ml to 20.5 pg/ml), indicating surgical cure of PHPT. Postoperative period was uneventful. Histopathology of surgical specimen revealed a cystic lesion lined by chief cell variant parathyroid cells without any nuclear atypia, capsular or vascular invasion, surrounded by normal thyroid follicular cells, suggestive of Intrathyroidal cystic parathyroid adenoma. Patient is asymptomatic postsurgery (during follow-up at 6 months).
**Conclusion:** Sometimes culprit lesion is hidden in plain sight and needle tip iPTH can help in differentiation of thyroid cyst from parathyroid cyst when in doubt.

## P632
## SECONDARY PREVENTION OF OSTEOPOROTIC FRACTURES: EVALUATION OF THE LILLE UNIVERSITY HOSPITAL'S FRACTURE LIAISON SERVICE BETWEEN JANUARY 2016 AND JANUARY 2018

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**Objective:** A fracture liaison service (FLS) was implemented at Lille University Hospital in 2016. The main purpose of this study was to assess the performance of the FLS using criteria proposed by the International Osteoporosis Foundation.
**Methods:** The criteria used were patient identification, patient evaluation, postfracture assessment timing, vertebral-fracture identification, blood and BMD testing, falls prevention, multifaceted health and lifestyle risk factor assessment, and medication initiation and review.
**Results:** Between January 2016 and January 2018, 736 patients (≥50 years old) with a recent history of fragility fracture (≤12 months) were identified. The identification rate for hip fractures was 74.2%. However, patient evaluation was quite low (30.3%) since many patients failed to attend the FLS unit. The reasons for nonattendance were refusal, agreed but subsequently failed to attend, and still waiting to be seen. In all, 256 patients (76.6% female, mean (SD) age 74.3 (11.0) y) were seen at the FLS. Mean (SD) postfracture assessment timing was 13.3 (9.3) weeks. Of the 139 patients seen for a nonvertebral fracture, 103 were assessed for vertebral fractures, and at least one new vertebral fracture was found in 45 of them (43.7%). Osteoporosis medication was prescribed for 243 (94.9%) patients. The main osteoporosis drug prescribed was zoledronic acid (60.2%).
**Conclusion:** Secondary prevention of osteoporotic fractures has improved since the implementation of the FLS. However, patient identification, patient evaluation, and postfracture assessment timing still need to be improved.

## P633
## EFFECT OF DENOSUMAB ON LOW BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS AND POSTMENOPAUSAL WOMEN (2-YEAR RESULTS)

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**Objectives:** To compare the effect of denosumab treatment on BMD in female osteoporosis (OP) patients with rheumatoid arthritis (RA) and postmenopausal women.
**Methods:** 79 women enrolled in the study: 27 patients with RA (mean age 60±7 y) and 52 women with postmenopausal OP (mean age 62±11 y). All patients were prescribed denosumab 60 mg every 6 months for 2 y. All patients additionally take 500-1000 mg of calcium and 800-1000 IU of vitamin D per day. BMD was measured in the lumbar spine (LS), total hip (TH) and one-third radius ($R_{1/3}$) by DXA (Hologic 4500A) at baseline and annually. Reports of adverse events including information about new clinical fractures were collected at each visit. Serum chemistries measurements were performed also at each visit.
**Results:** Denosumab significantly increased LS, TH and $R_{1/3}$ BMD by 6.0%, 2.8%, and 2.2%, respectively, in patients with RA and by 7.6%, 3.6% and 1.6%, respectively, in postmenopausal women without any difference between two groups. The effect of denosumab did not

depend on the initial level of immunological markers of inflammation and the use of glucocorticoids in patients with RA. Long-term therapy with denosumab did not have effect on the activity of RA. Adverse event rates were 3.8%, but they did not lead to denosumab withdrawal. There were no cases of hypocalcemia; the average level of serum calcium did not significantly change in the both groups. Creatinine values for the entire observation period did not significantly change. There were no clinical fractures and infection events during the study. Adherence to denosumab treatment was 85% after 2 years.

**Conclusion:** Denosumab significantly increased BMD in the LS, TH and $R_{1/3}$ in female patients with RA and in postmenopausal women for 24 months of treatment. Denosumab is effective for OP treatment in RA patients with and without glucocorticoids use. Adherence to denosumab treatment was 85%.

## P634
## THE DAILY MONITORING OF ARTERIAL STIFFNESS PARAMETERS IN WOMEN WITH OSTEOPOROSIS

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**Objective:** To estimate arterial stiffness parameters in women with osteoporosis.

**Methods:** 79 postmenopausal women were examined. All patients were divided into groups. The first group included 36 women with osteoporosis, mean age was 69.4±9.1; the second group included 43 women without osteoporosis, mean age was 66.7±9.5. An anamnesis of fractures, an assessment of other risk factors for osteoporosis, a calculation of the FRAX and X-ray densitometry were conducted. Daily monitoring of aortic pressure and parameters of arterial stiffness was performed in all patients. Both group were similar in age, level of arterial pressure and BMI. For statistical analysis we used Statistica 10.0. We used Wald Wolfowitz criterion, Spirman correlation and γ-correlation.

**Results:** In women with osteoporosis average daily parameters of systolic aortic pressure (SPao), diastolic aortic pressure (DPao) and mean aortic pressure were higher on 4.52% (p=0.014), 8.3% (p=0.0008) and 5.24%(p=0.03) respectively, than in the control group. Some parameters of arterial stiffness differed between groups. Mean pulse wave velocity (PWV) was higher on 2% (p=0.01) in patients with osteoporosis. Also in this group the index of arterial stiffness, ambulatory rigidity index and augmentation index were higher on 1.6% (p=0.0002), 25.9% (p=0.0004) (p=0.0004) respectively, then in the control group (Table 1).

Table 1. The parameters of central aortic pressure and arterial with daily monitoring in women with osteoporosis.

| Parameter | Women with osteoporosis, n=36 | Control group, n=43 | P |
|---|---|---|---|
| Systolic Pressure ao, mmHg | 123.23±11.45 | 117.66±10.05 | 0,014 |
| Diastolic Pressure ao, mmHg | 77.17±9.19 | 70.73±9.98 | 0,0008 |
| Mean pressure ao, mmHg | 99.47±10.41 | 94.26±9.47 | 0,32 |
| Pulse pressure ao | 46.05±8.31 | 46.04±9.43 | 0,03 |
| Alxao,% | 31.75±10.43 | 34.9±13.28 | 0,001 |
| PPA, mmHg | 118.7±4.41 | 110.73±22.57 | 0,09 |
| PWV, m/s | 8.4±1.62 | 8.24±0.9 | 0,01 |
| ASI, mmHg | 164.64±32.79 | 162.06±32.53 | 0,0002 |
| Alxao cp.,% | 1.64±18.06 | 5.12±18.03 | 0,000078 |
| Alxao mean PR,% | -6.11±25.20 | -13.13±27.73 | 0,0004 |
| Pulse pressure, mean | 52.87±10.05 | 52.16±10.67 | 0,00000 |
| AASI | 0.54±0.23 | 0.40±0.22 | 0,0004 |

To clarify the relationship between the parameters of rigidity and osteoporosis, we conducted a correlation analysis between the parameters of arterial rigidity and aortic pressure and the history of fractures, as well as their number and indicators of the 10-y risk of osteoporotic fractures. It was established a direct correlation between the levels of SPao, DPao, augmentation index, ambulatory index of rigidity and the presence of osteoporotic fractures in history. A positive relationship was found between the number of osteoporotic fractures, the index of the absolute ten-year risk of fractures and the levels of SPao, DPao, mean arterial pressure in the aorta, augmentation index, and ambulatory rigidity index (Table 2).

Table 2. The correlation relationships between central pressure, arterial stiffness and a history of osteoporotic fractures, their number, the risk of FRAX fractures.

| Parameter | Systolic pressure ao | Diastolic pressure ao | Mean pressure ao | Alxao mean with PR | ASI | AASI | Mean pulse pressure |
|---|---|---|---|---|---|---|---|
| History of fractures | γ=0.45 p=0.00075 | γ=0.43 p=0.0024 | γ=0.46 p=0.0002 | γ=0.37 p=0.0021 | - | γ=0,37, p=0,0021 | - |
| Number of fractures | r=0.33 p=0.0016 | r=0.34 p=0.002 | r=0.33 p=0.0018 | r=0.33 p=0.0016 | - | r=0,36 p=0,0012 | - |
| MO | r=0.33 p=0.004 | r=0.27 p=0.018 | r=0.35 p=0.003 | r=0.29 p=0.0012 | - | r=0,27 p=0,018 | - |
| HF | r=0.25 p=0.02 | - | r=0.3 p=0.0042 | r=0.38 p=0.0002 | r=0.28 p=0,016 | r=0,25 p=0,02 | r=0,27 p=0,018 |

**Conclusion:** In women with osteoporosis, an increase in average daily indices of SPao, DPao and mean aortic pressure were revealed. Parameters of arterial stiffness in the group of women with osteoporosis were increased compared with the control group. Correlations between the pressure levels in the aorta, the stiffness parameters and the history of osteoporotic fractures, their number and the 10-y risk of fractures according to FRAX have been established.

## P635
## THE EVOLUTION OF PAIN AND RECOVERY IN POSTTRAUMATIC SHOULDER PATIENTS QUANTIFIED WITH DASH (DISABILITIES OF THE ARM, SHOULDER AND HAND)

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**Objective:** From the point of view of the post-traumatic pathology of the shoulder, it can be seen: contusions, dislocations, fractures, wounds, burns. The shoulder, along with the entire scapular belt, arm, forearm and hand, provides the mobility required to complete ADLs, mobility that is affected by trauma at any level of the upper limb. The objectives of recovery are to combat pain and local inflammation, increase mobility and joint stability, and to restrict kinetic and open chain mobility with gesture recovery. The purpose of the study was to follow the evolution of the functional deficit caused by the shoulder trauma through the DASH score that quantifies disability in the upper limb.

**Method:** 43 patients with shoulder trauma (who addressed the specialty ambulatory of Clinical Hospital "Avram Iancu" from Oradea, Romania) were included in the study, in the period 5 January 2018 - 4 January 2019. All patients met the established inclusion criteria and were included in a complex recovery program: antiallergic electrotherapy, articular massage, passive mobilizations, active, neuroproprioceptive facilitating techniques. For evaluation, the DASH Questionnaire (which included 30 pain and ADL scores, ranging from 0-100, the maximum values representing the functional deficit) were applied.

**Results:** The age of patients benefiting from the recovery program was between 34-82 y, the mean age being 57.4. Depending on trauma, patients were divided into 3 categories: 73% with contusions, 21% with fractures, and 6% with dislocations. Of the 9 cases with shoulder fractures, 5 cases were osteoporotic fractures, so about 55% of the cases included in the study. The mean DASH score at baseline was 83.37, representing a significant functional shortage, and at the end of the treatment an average of 28.41 was obtained. The best results were achieved in patients with fractures (89% improvement in DASH score), followed by patients with contusions (78% improvement). On the last place there were the cases with dislocations, with improvement of just 65%.

**Conclusion:** It is important to mention the increased incidence of osteoporotic fractures in the study group, known as the risk of an osteoporotic fracture in women worldwide, is 40%. Improving allegiance and joint mobility has been achieved with the best results for fractures due to the orthopaedic conduction that enabled active mobilization with early articular deco exercises as well as due to the lack of damage to the rotator coil. In the case of contusions, MRI images demonstrated the presence of subacromylodeltoid bursius, "a minima" rupture of the supra-spinal muscle tendon, with significant joint damage

to the shoulder. Also, in the case of dislocations, the results were modest, on the one hand, due to the rotator coat damage, on the other hand their relapse, encountered in 2 of the cases included in the study.

## P636

## SARCOPENIA AND OSTEOPOROSIS ARE INDEPENDENTLY ASSOCIATED WITH PREVALENT VERTEBRAL FRACTURES: A CROSS-SECTIONAL STUDY OF 350 WOMEN WITH SUBACUTE HIP FRACTURE

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**Objective:** To evaluate the association between the burden (number and severity) of vertebral fractures and sarcopenia, osteoporosis, or the concurrent presence of both the conditions (osteosarcopenia) in women with hip fracture.

**Methods:** We investigated 350 women with hip fracture. Lateral radiographs of the spine were taken 18.2±4.5 d after fracture occurrence. For each vertebra the extent of fracture deformation was graded by Genant's method. To obtain a summary measure of the vertebral fracture status of the spine, we calculated the spinal deformity index (SDI) by summing the fracture grades of all vertebrae (T4 to L4). Body composition was assessed by DXA. Low muscle mass was identified with appendicular lean mass < 15.02 kg. Low BMD was diagnosed with a T-score <-2.5 at the unfractured femur.

**Results:** Osteoporosis was diagnosed in 256 of the 350 women. These women with osteoporosis had an SDI score (median 2, IQR 0-4) higher than the one found in the 94 women without osteoporosis (median 1, IQR 0-3): U=9388, z=-3.23, p=0.001. Sarcopenia was diagnosed in 299 of the 350 women. These women with sarcopenia and an SDI score (median 2, IQR 0-4) higher than the one found in the 51 women without sarcopenia (median 1, IQR 0-2): U=5862, z=-2.70, P=0.007. A linear multiple regression showed that the SDI scores were significantly associated with the presence of both sarcopenia (P=0.033) and osteoporosis (P=0.032) independently of each other and independently of age, percentage of body fat and type of hip fracture. The 350 women were categorized into 3 groups according to the absence of both osteoporosis and sarcopenia (N=25), presence of either osteoporosis or sarcopenia (N=95) or presence of both osteoporosis and sarcopenia (N=230). We found a significant difference in SDI scores across the 3 groups: $\chi 2$ (2, N=350)=15.29; p<0.001. By comparing pairs of groups, we found that SDI scores were significantly lower in the 25 women who had neither osteoporosis nor sarcopenia (median 0; IQR 0-2) than in the 95 women with either osteoporosis or sarcopenia (median 1; IQR 0-3): U=848; z=-2.29; P=0.022. These 95 women had in turn lower SDI scores than the 230 with both osteoporosis and sarcopenia (median 2; IQR 0-4): U=9260; z=-2.21; P=0.027). A linear multiple regression showed that the SDI scores were significantly associated with the categorization of the 350 women into the 3 groups (P=0.001) independently of age, percentage of body fat and type of hip fracture.

**Conclusions:** Data show that both osteoporosis and sarcopenia are independently associated with the burden of prevalent vertebral fractures in women with hip fracture. The concurrent presence of sarcopenia and osteoporosis is associated with a higher SDI score than the presence of only one the two conditions. Despite caution due to the cross-sectional design of our study, we support a role for sarcopenia independent of osteoporosis in the genesis of bone fragility.

## P637

## KNOCKOUT DISCOIDIN DOMAIN RECEPTOR 1 SUPPRESSES TERMINAL DIFFERENTIATION AND APOPTOSIS OF CHONDROCYTES IN AMELIORATING OSTEOARTHRITIS

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**Objective:** Discoidin domain receptor 1 (DDR1) plays a major role in skeletal development, but undefined role in osteoarthritis (OA) progression. Because there is no drug specifically for OA treatment, it can only relieve pain. Herein, we hypothesized that DDR1 regulates chondrocyte function and terminal differentiation during OA progression.

**Method:** The roles of DDR1 in OA progression were evaluated in an anterior cruciate ligament transection (ACLT)-induced OA model for knee-functional evaluation (weight-bearing distribution), histological OA Research Society International (OARSI) scoring and immunohistochemical analysis.

**Results:** We first demonstrated that DDR1 was overexpressed in ACLT-induced OA in rats and mice articular cartilage. Chondrocyte-specific *Ddr1* knockout mice with ACLT (CKOΔ*Ddr1*-ACLT) exhibited amelioration of weight-bearing performance than those without *Ddr1* KO, accompanied with OA features improvement presenting in

Hematoxylin and eosin (H&E), Safranin-O/Fast-Green stains and OARSI scoring of articular cartilage in CKOΔ*Ddr1*-ACLT mice. Terminal differentiation markers ColX, Ihh and MMP-13, and apoptotic marker caspase-3 were down-regulated in CKOΔ*Ddr1*-ACLT mice compared with $Ddr1^{f/f}$-ACLT mice. Moreover, enhanced autophagy with down-regulating mTOR and elevating LC3 contributed to the chondroprotection of CKOΔ*Ddr1* mice during OA progression. Furthermore, DDR1-absence induced reduction of HtrA1 may also involve in this chondroprotective effect.

**Conclusions:** Our findings suggest that DDR1 plays a novel OA-related marker in promoting OA progression by regulating chondrocytes terminal differentiation, autophagy, and apoptosis. The results revealed the great potential of DDR1-silencing in providing chondroprotection to articular cartilage and ameliorating OA progression.

## P638
## BILATERAL ASEPTIC NECROSIS OF A FEMORAL HEAD IN A PREGNANT WOMAN AFTER AN IN VITRO FERTILIZATION PROCEDURE

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The pathogenesis of femoral head aseptic necrosis development during pregnancy has not been studied. The literature describes 40 cases only.

**Case presentation:** A 45-year-old woman came to a rheumatologist with complaints of ankle and left knee joint pain of a mechanical nature, a change of gait to a waddling type. It was the second pregnancy at the age of 44 - IVF with her own oocytes. Considers herself sick from the 24th week of pregnancy, when the above symptoms appeared and gradually progressed. She did not apply for specialized help. In the postpartum period, meloxicam was prescribed. (During laboratory examination of signs, laboratory activity was not detected, RF, antibodies to DNA were negative.) 1.5 months after delivery, the patient noted a decrease in pain. During this period, she had the primary consultation of a rheumatologist. Comorbidities: hypothyroidism, taking levothyroxine sodium 50 mg/d. The knee, ankle and hip joints have no visual changes. During palpation no pathology was revealed. The abduction in the left hip was 50, the flexion was 110°, the extension was 180°. Movement in other joints - in full range. Pain by VAS - 48 mm. The level of vitamin D was 10.20 ng/ml (the standard is over 30), the level of calcium and phosphorus was at the normal rang. There were no data of antiphospholipid syndrome detected. CT of the hip: symmetric areas of bone loss were 15x8 mm on the left and 10x6 mm on the right, with smoothness of the bone spongy substance pattern and eggshell type solution of continuity of the cortical plate. CT of the ankle joints: regional osteoporosis, Looser zones were not identified. Diagnosis: III A bilateral aseptic necrosis of the femoral heads by Steinberg. Vitamin deficiency. Due to the small size of the damage zone, a decision was made on conservative treatment: relief of joints, meloxicam 15 mg/d on demand and cholecalciferol 50,000 IU/week for 2 months.

After 2 months - the absence of complaints of pain, the full range of movements in the hip joints, the normalization of vitamin D level.

**Conclusion:** A feature of the presented case is the development of aseptic necrosis after the IVF procedure. It is not excluded that stimulation of the ovaries, as well as additional support with progesterone, could be a risk factor for the disease.

## P639
## DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS IS A NEW RISK FACTOR FOR VERTEBRAL FRACTURE IN OLDER MEN: THE PROSPECTIVE MINOS STUDY

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**Objective:** Diffuse idiopathic skeletal hyperostosis (DISH) is associated with high prevalence of vertebral fractures. We studied the association of DISH with bone status in 782 men aged 51-85 y followed up prospectively for 8 y.

**Methods:** DISH was diagnosed on the antero-posterior radiography of the spine using Resnick's criteria. BMD was measured by DXA at the lumbar spine, hip, whole body, and distal forearm. Incident vertebral fracture was diagnosed as a 20% decrease in any vertebral body height vs. baseline.

**Results:** In 170 men with DISH, BMD did not differ from the controls. After adjustment for age, BMI, BMD, prior vertebral fractures, endplate irregularities and disc space narrowing (DSN)[1,2], DISH was associated with higher vertebral fracture risk (OR=2.89, 95%CI: 1.15–7.28, $p<0.05$). Low spine BMD and DISH contributed to the vertebral fracture risk (OR=11.91 vs. men who without these two characteristics, 95%CI: 2.99–47.39, $p<0.05$). Men who had multilevel DSN and DISH, had higher vertebral fracture risk vs. men who did not (OR=11.60, 3.25–41.46, $p<0.001$). DISH was associated with higher vertebral fracture risk in men free of other risk factors for this fracture, e.g., endplate irregularities (OR=6.60, 95%CI: 1.66–26.33, $p<0.05$) or prior vertebral fracture (OR=3.98, 95%CI: 1.52–10.44, $p<0.05$). Men who had at least one degenerative spine disorder (multilevel DSN, endplate irregularity, DISH) had higher vertebral fracture risk vs. men who were free of these diseases (OR=4.05, 95%CI: 1.47–11.11, $p<0.01$). The risk increased with the number of these disorders (p for trend <0.001). DISH was not associated with nonvertebral fractures.

**Conclusion:** In older men DISH is associated with higher risk of vertebral fracture. Along with our prior studies[1,2], these data show that in older men, degenerative spine disorders increase the risk of vertebral fracture.
**References: 1)** Estublier C Rheumatology 2017;56:37. 2) Gaudé M Bone 2018;117:116.

## P640
## CHEMICAL AND MECHANICAL STIMULATION OF THE SUBCHONDRAL BONE INDUCES MICROCOMPUTED TOMOGRAPHY AND HISTOLOGICAL CHANGES OF BONE AND CARTILAGE IN AN OVINE MODEL

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**Objectives:** Subchondral bone (SB) alteration has been suggested to be responsible for osteoarthritis initiation. Our aim was to assess early changes of bone and cartilage associated with SB mechanical and chemical stimulation.
**Methods:** 18 ewes were anaesthetized. Stimulation of the medial femoral condyle SB was achieved either by ethanol injection or by force impact, via extra-articular access. Sheep were euthanized at 2, 4, 6 and 8 weeks after stimulation (N=4x4) or the day of the stimulation (N=2). Microcomputed tomography (μCT) and histology were performed on osteochondral plugs.
**Results:** Apparent bone density showed a significant increase at 4 weeks poststimulation in both models. This was associated with an increase in trabecular thickness (259.00 μm ±12.00), a decrease of trabecular separation (338.00 μm ±24.00), and a slight decrease in trabecular number (2.18 ±0.12) for the ethanol-stimulated limbs; while it was associated to a slight increase in trabecular number for the impact-stimulated limbs. Histology revealed a slight degradation of cartilage overtime in the ethanol-stimulated limbs; and a slight improvement in the impact-stimulated limbs. A high number of osteoblasts around the trabeculae of the SB of the condyle were observed in 4 of 9 ethanol-stimulated limbs and in 5 of 9 impact-stimulated limbs. Impact-stimulated limbs showed TUNEL stain in 5 of 9 limbs for SB. The drill hole was filled with fibrous tissue and multinucleated giant cells (osteoclasts).
**Conclusions:** These results indicate that the SB stimulation induces a transitory increase in bone volume rather due to increase of trabecular thickness than to change in organization of the bone itself . These changes have been proven to occur in SB in the course of osteoarthritis in man. Moreover, it seems that the mechanical stimulation was mimicking changes associated to micropicking, a procedure where microfracture of the SB is induced to stimulate cartilage repair.

## P641
## DIFFERENT EFFECTS OF ETHANOL ON BONE MICROSTRUCTURE OF MICE AFTER SUBACUTE AND SUBCHRONIC ADMINISTRATION

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**Objective:** Alcohol is considered a leading risk factor for osteopenia. Our study aimed to compare in detail bone microstructure of mice after subacute and subchronic administration to ethanol.
**Methods:** 15 clinically healthy 12-week-old Swiss mice (males) were randomly divided into three groups: E1 group - mice drank a solution of 15% ethanol and water (1.7 g 100% ethanol $kg^{-1}$ b.w. per day) during 2 weeks; E2 group - males received equal solution of ethanol for 8 weeks; and a control (C) group. Modern 2D and 3D imaging methods were used to determine bone microstructure. The study was approved by the First Local Ethic Committee on Experiments on Animals in Cracow (No. 175/2012).
**Results:** Alcohol consumption negatively affected compact bone microstructure in both E1 and E2 groups. Increased cortical porosity (four times more resorption lacunae in E1 group, five times more of these structures in E2 group), decreased relative bone volume and BMD ($P<0.05$) were detected in ethanol-fed mice. These results were also supported by consistent findings of reduced serum alkaline phosphatase and glutathione ($P<0.05$) in E1, E2 groups. No changes in trabecular bone morphometry were observed in E1 group. On the contrary, relative bone volume, trabecular number, trabecular thickness, bone surface were significantly decreased ($P<0.05$) in E2 group. Serum calcium, phosphate were significantly lower ($P<0.05$) in mice after subacute exposure to ethanol. However, they remain unchanged after subchronic administration.
**Conclusion:** Our results suggest different effects of ethanol on bone microstructure after subacute and subchronic consumption. They also support recent findings that compact and trabecular bones should be considered two separate entities because of their dissimilar bone remodeling levels.
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## P642
## BENEFITS OF THE COMPLEX RECOVERY TREATMENT ON CEREBELLAR ATAXIA SYNDROME

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**Objective:** The posture characteristic of the human species is the vertical one; this is done by maintaining balance, a function that allows awareness of the body's position. Affecting balance leads to disruption of body stability in sitting, orthostates, walking. Ataxia is loss of stability, impairment of initiation and movement support. It can be hereditary, idiopathic or acquired. The acquired ataxia has the following causes: craniocerebral traumas, vascular accidents, multiple sclerosis, compressive tumors, intoxications, inflammatory lesions, cerebellar atrophy, etc. The purpose of the paper. Trace the benefits of complex recovery treatment to cerebellar ataxia syndrome.
**Method:** The study group consisted of 15 patients with cerebellar ataxia syndrome diagnosed in the Rehabilitation Clinical Hospital, Baile Felix, Romania. Patients followed a complex recovery program; the means used were kinetotherapy for increasing static, dynamic and coordination equilibrium, occupational therapy, hydro-kineto-therapy, electrotherapy and virtual reality. Improving gait and balance play an essential role in preventing deconditioning syndrome, resulting in loss of muscle and bone mass, increased risk of falls and the incidence of osteoporotic fractures, female sex being the most exposed. Over time, a number of scales have been used to evaluate the ataxia. For the patients' evaluation we used the Hauser Ambulation Index and the SARA scale. Studies show that the latter is one of the most reliable methods of evaluating ataxia. Patient evaluation is performed in sitting, orthostatic and on the go, on the day of admission and after 10 d of treatment.
**Results:** The age of patients was between 27-65 y, with an average of 46.13. The gender distribution shows that 80% of the patients are males, the urban environment being the urban one. The SARA scale demonstrates significant improvement in all patients in terms of sitting equilibrium. Twelve patients made significant progress in orthostates and walking during the 10 d of treatment, by increasing the duration of their orthostates, walking distance and walking speed. Using the Hauser Ambulation Index to measure mobility, monitoring the time and the degree of assistance, we obtained the following results: 25% of the patients were in the 4th stage, went with unilateral support; 55% are in stage 3, requiring supervision; 20% were in stage 5 with bilateral support. At the end of the 10 d of treatment, the following distribution was obtained: 60% in stage 3 with stage assistance, 21% in stage 4, and 19% in stage 5.
**Conclusion:** The intensive recovery program should be initiated immediately after the onset of equilibrium disturbances, with significant results in equilibrium in sitting, orthostates or walking. It should also be sustained throughout life, the results being influenced by the time of initiation and the age of the patients, as shown by the specialty studies.

## P643
## LEVEL OF OSTEOPOROSIS AWARENESS AND ITS RELATED FACTORS IN LOW DENSITY DISTAL RADIUS FRACTURES PATIENTS AGED 50 YEARS AND OLDER IN ASIAN COUNTRY

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**Objective:** Osteoporosis is an important health problem with regard to morbidity, mortality, and negative effects on quality of life as well as health-related costs. With rapid ageing of the Asian population, osteoporosis has become one of the most prevalent and costly health problems. Distal radius fracture is one of the most frequent fractures and it has been shown to be associated with an increased risk of further fractures. Not much is known about the level of awareness of the condition among these patients of distal radius fracture in Asian country. Awareness and treatment of osteoporosis is important to prevent further fractures in patients with osteoporosis. The aim of this study was to evaluate the awareness of osteoporosis and related factors in distal radius fracture patients.
**Method:** Cross-sectional study conducted on low energy distal radius fracture patients aged 50 y and over came in Emergency Department of tertiary care hospital Karachi, Pakistan from Jan 2016 to Dec 2016. A questionnaire was designed had three sections: demographic information, knowledge about osteoporosis and risk factors for osteoporosis, applied in all patients after they gave their consent. Data was analyzed on SPSS 21 for statistical significance.
**Results:** Total number of patient with distal radius fracture were 480, 352(73.33%) female and 128(26.66%) male. only 98(20.41%) had awareness about osteoporosis, and 382(79.58%) did not. About the educational levels 210(43.75%) of patients were not able to read and write or goes primary school, 52.5%, 158(32.91%) did not get primary education and 112(23.33%) were secondary or high school graduates. Awareness of osteoporosis was positively correlated with education. With regard to sources of information, 312(65%) of patients reported physicians/doctors as the main source of information, followed by TV, newspaper. Other sources of information included: books (%), family members (%), friends (%), radio (%), pharmacists (%) and internet (%). 382(79.58%) indicated they did not know anything about osteoporosis and could not answer the remainder of the questionnaire. The average age was 72.5 y, with a minimum of 50 and a maximum of 95 (standard deviation=31.81 years). Lifestyle practices varied considerably. While nearly 15% reported smoking or having smoked mostly in male patients, 20% indicated they exercised at least 30 minutes daily, and 1% reported drinking alcoholic beverages occasionally. Only

small number of patients indicated that they take calcium and vitamin D supplements on regular basis (25% and 15%, respectively). 382(79.58%) patients did not know what factors contribute to the development of osteoporosis. More than three quarters of patients could not identify risk factors such as vitamin D deficiency, family history of osteoporosis, poor eating habits, smoking, alcohol consumption, increasing age, some medications and menopause. There appeared to be a relationship between education and awareness of risk factors. When compared to respondents with a lower educational level (high school or less), a greater proportion of respondents with higher educational level (college or postgraduate education) were able to identify risk factors such as lack of exercise (32% vs. 11%), vitamin D deficiency (22% vs. 8%), family history (18% vs. 8%), smoking (12% vs. 6%), alcohol consumption (6% vs. 2%), and certain medicines (5% vs. 1.5%).

**Conclusion:** We demonstrated that the level of awareness of osteoporosis is associated with educational level in distal radius fracture patients. Awareness of osteoporosis and thus to begin treatment earlier is important to prevent further fractures in distal radius fracture patients especially in Asian population. Public education campaigns must address risk factors and the strategies to overcome those that are modifiable in order to prevent the development of osteoporosis and its complications.

## P644
## HYPOPHOSPHATEMIA AND MULTIPLE BONE FRACTURES AFTER DENOSUMAB DISCONTINUATION IN HEMODIALYSIS PATIENT WITH TYPE 1 DIABETES MELLITUS

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Denosumab is widely used for therapy of postmenopausal osteoporosis. It is not absolutely contraindicated for patients with chronic kidney disease, however it cannot be widely used for patients receiving hemodialysis therapy due to risk of hypocalcemia and rebound bone loss after denosumab therapy discontinuation.

We report a 44-year old woman with diabetes mellitus type 1, receiving hemodialysis therapy for 6 y. She was directed to the center for osteoporosis due to multiple fractures. 4 y ago low BMD was revealed. The patient consulted with endocrinologist and therapy with denosumab 60 mg given subcutaneously every 6 months was started. Two years of therapy (four injections of denosumab) was quite successful. She also received alfacalcidol and supplements of calcium carbonate. BMD increased after first year of treatment, and did not change significantly after the second year. Four injections of denosumab were performed, the last one in December 2016. Then the patient stopped the therapy with denosumab. Eight months had passed since the last injection, and in August 2017 she suffered bilateral femoral neck fracture after falling down from dialysis chair. Bilateral endoprosthetic total hip replacement was performed. In 6 months after hip replacement the patient was examined for bone pain and chest deformity. Multiple rib and scapular fractures were revealed. Laboratory analysis showed low level of phosphates (0.42 mmol/l), 25(OH) Vit D (22 ng/ml), high level of alkaline phosphatase and bone metabolites (β-isomers of CTX - 1.620 ng/ml; PINP - 1425 ng/ml. Intact PTH was 12.1 pmol/l (lab reference ranges: 0.7-5.6 pmol/l). This condition was diagnosed as hypophosphatemic osteomalacia complicated by multiple bone fractures. High doses of alfacalcidol and phosphate-rich diet were prescribed. Seven months later plasma phosphates level raised to 0.79 mmol/l, intact PTH lowered to 5.2 pmol/l, level of calcium raised slightly, but alkaline phosphatase did not change significantly.

**Conclusion:** Denosumab should not be used in hemodialysis patients without serious reasons. However, if one starts therapy with denosumab, one must envisage what to do after it discontinuation.

## P645
## EFFECTS OF ANNUAL APPLICATION OF BIOLOGICAL THERAPY ON MINERAL BONE DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Rheumatoid arthritis (RA) is a disease that is triggered and maintained by proinflammatory cytokines. They cause joint destruction and the occurrence of systemic manifestations - osteoporosis. The biological agents used in the treatment of RA are targeted against several proinflammatory cytokines. Our aim was to test the impact of biological drugs on the change in BMD and their mutual difference after 1-y administration in patients with RA.

**Methods:** The study includes 60 patients with rheumatoid arthritis which does not last longer than 10 y and are experiencing menopause for no longer than 5 y. All patients are taking a stable dose of methotrexate of 10 mg per week, without Glucocorticoid therapy and receive some of the biological drugs. Patients are divided into three groups of 20 patients who are on the anti-TNF inhibitors treatment, tocilizumab or on rituximab. At the beginning of the application of the biological drug and after 1 y, BMD T-score on a Lunar-type device were measured on lumbar spine and hip in all patients. Risk factors for osteoporosis and fractures were identified in all patients. Statistical analysis was done in the

computer program SPSS ver. 24 (Statistical Package for the Social Sciences).

**Results:** The measured T-score values in a group of patients at the beginning of treatment with anti-TNF inhibitors were such that 47% of patients had a normal finding, 33% osteopenia and 20% osteoporosis. After a year of administration of these drugs, 50% had a normal finding, 37% osteopenia, while 13% had osteoporosis. In patients on Tocilizumab therapy, the measured T-score at the start of the treatment: 43% had a normal finding, 31% osteopenia and 26% osteoporosis. After one year 48% had a normal finding, 40% osteopenia, and 12% osteoporosis. Patients who had been on therapy with rituximab, at the beginning of therapy 39% had a normal finding of T-score, 42% osteopenia and 20% osteoporosis. After a year 39% had a normal finding, 42% had osteopenia and 19% had osteoporosis. There were 4.4% of patients without risk factors, 37.8% had one risk factor, two 31.1%, and three or more risk factors had 26.7% of subjects. 9% of patients had fractures. 6% had 1 fracture, 2% two fractures and 1% of patients had more than 3 fractures.

**Conclusion:** The application of all tested biological drugs has led to an improvement in BMD. The greatest improvement was observed in the group of patients treated with tocilizumab.

## P646

## CLINICAL UTILITY OF FOCAL BONE MINERAL DENSITOMETRY IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

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**Objective:** Evaluate the clinical utility of bone mineral densitometry and bone mineral content (BMC) in patients with complex regional pain syndrome (CRPS).

**Methods:** 37 patients with CRPS were included. All the patients underwent whole body bone mineral densitometry by DXA. The affected region was compared with its respective contralateral with specific ROI. Also nearest articulation and homolateral limb were compared to contralateral. In addition, bone scintigraphy, clinical features, time of evolution, lumbar spine, femoral neck and total hip BMD were evaluated. BMC ≥3% for lower limbs and ≥10% for superior limbs as pathological asymmetry were considered. Changes in BMC between 5-10% were considered as probable.

**Results:** Females (n=27) and male (n=10) were included. The most frequent affected sites were wrists (57.9%), ankles (7.9%), feet (7.9%) and others (26.3%). The mean time between the bone event and scan BMD was 4 months in patients without changes in focal BMD (35%) and 6.5 months in patients with significant changes in focal BMD (65%) compared to its contralateral limb. The BMC was -17.6% and the BMD -11.8% in the affected region while BMC was -11.5% and the BMD were -8.3% in the whole homolateral limb. In 35.1% the whole homolateral limb was also affected. In the specific ROI analysis, 15/37 patients has BMC criteria for pathological asymmetry and 3/37 patients has probable asymmetry. All the patients had bone scintigraphy which was negative for diagnosis in 2/37. Only one patient bone scintigraphy was not concordant with BMD. The BMC measured by DXA has sensitivity: 60% and specificity: 83% (Fisher´s exact test; p=0.01)

**Conclusion:** Our study confirms focal DXA is useful for the assessment of unilateral bone loss caused by limb RSDS. In other wise its useful is important because can estimate BMC and it allows the bone evolution with a quantified parameter.

## P647

## EVALUATION OF ASYMMETRIES IN BONE MINERAL DENSITY, BONE MINERAL CONTENT AND LEAN MASS BECAUSE DOMINANCE OF PHYSIOLOGICAL LATERALITY

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**Objective:** Evaluation of asymmetries in BMD, bone mineral content (BMC) and lean mass between both right and left superior and lower limbs.

**Methods:** A retrospective analysis of 857 whole body densitometry by DXA were done. Healthy subjects ≥20 years old were included. Bone, muscle and neurological diseases were excluded. The following variables were analyzed in both right and left arm and leg: BMD (g/cm$^2$), BMC (g) and lean mass (g). The results were stratified by sex, superior and lower limbs, BMD, BMC, lean mass, and decades (20, 30, 40, 50, 60, 70-80), nondominant (ND) and dominant (D). The results are expressed as % of the mean difference between left and right mean (% MD), and % that represent the lower 95%CI (% L95%CI). Differences between groups were analyzed using Student t-test and $p<0.05$ were considered significant.

**Results:** Only statistically significant differences are shown. In women in superior limbs Δ BMD was 3.72% (ND BMD: 0.621 vs. D: 0.645, $p<0.0001$); Δ BMC: 5.33 (ND 128 vs. D: 135, $p<0.0001$). In lower limbs Δ BMD: 0.47, (ND BMD: 1.051 vs. D: 1.056, $p<0.0001$); Δ BMC: 0.77 (ND: 363 vs. D: 366, $p<0.0001$). In men in superior limbs ΔBMD was 3.52% (ND: 0.777 vs. D: 0.806, $p<0.0001$); Δ BMC: 4.65%, ND 204 vs. D: 215, $p<0.0001$); In lower limbs ΔBMD was 0.22% (ND BMD: 1.302 vs. D: 1.305, p: ns); ΔBMC: 0.45 (ND BMD: 548 vs. D: 549, p: ns). We found differences between both arms in all decades and both sex in BMD and BMC. The maximum difference for BMD and BMC in both sex was found at 20´s decade in arms: women BMD (%MD: 4.3%; L95%-CI: 5.3%), men BMD (%MD: 4.1%; L95%-CI: 5%), women BMC: (%MD: 5.1%; L95%-CI: 8.0%). The highest difference in lean mass was found at since 60´sdecade.

**Conclusion:** The asymmetry because of physiological the dominance by laterally is observed in upper limbs. The knowledge of physiological values of asymmetry would allow us to evaluate pathologies with focal demineralization and its follow-up control.

## P648

## ANALYSIS OF BONE STRUCTURAL PARAMETERS BY DXA-3D IN CERVICAL AND TROCHANTERIC HIP FRACTURES

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**Objective:** Analyze bone structural parameters by DXA-3D and by type of hip fracture (cervical (CHF) or trochanteric (THF) of elderly patients.
**Method:** A case-control study with patients (225) with hip fracture and a control group (305) matched by age, sex, BMI and WHO BMD classification was carried out. The interval between fracture and DXA scan was <15 days. BMD (g/cm$^2$) was determined by DXA (Prodigy). 3D analysis of the femur was performed with 3D-SHAPER software (Galgo Medical). The results are expressed as mean±SD. t-test were used to compared groups and lineal regression for correlations.
**Results:** 530 patients (75.9% postmenopausal women, 24.1% men) were included (57.7% controls (CG), 42.3% with hip fractures (HF), trochanteric (n=119) and cervical (n=106). According WHO classification we found in the CG 18.8% normal BMD, 43.4% low BMD and 37.8% osteoporosis. We found 10.1% and 3.8% normal BMD, 38.7% and 50% low BM and 51.3% and 46.2% osteoporosis in THF and CHF respectively. There were no significant differences between THP and CHP in normal BMD patients. In low BMD patients we found in THF significantly lower trabecular trochanter vBMD (mg/cm$^3$, CHF: 104.97±25.56; THF 94.83 ±16.56). In addition, cortical. Th lateral and medium FN (mm) were significantly lower in CHF. In patients with osteoporosis we found in THF significantly lower cortical trochanter BMC (g, CHF: 2.430±0.073; THP: 2.150±0.068), intertrochanteric cortical. Th (mm, CHF: 1.65±0.14; THF: 1.59±0.14), lateral intertrochanteric cortical. Th (mm, CHF: 1.16±0.19; THF: 1.09±0.15). In patients with THF the cortical trochanter BMC has correlation with leg lean mass in nonfracture leg (r: 0.573). In patients with cervical hip fractures the cortical femoral neck BMC has correlation with the lean mass (r: 0.619).
**Conclusions:** DXA-3D would be useful for the differentiation among the different bone structural parameters according cervical or trabecular hip fractures.

## P649

## AN OVERVIEW OF THE ETIOLOGY, CLINICAL MANIFESTATIONS, MANAGEMENT STRATEGIES AND COMPLICATIONS OF HYPOPARATHYROIDISM FROM THE CANADIAN NATIONAL HYPOPARATHYROIDISM REGISTRY

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**Objectives:**

- identify the etiology and presenting symptoms of patients with hypoPTH.
- evaluate current treatment practice in Canada.
- assess differences in presentation based on etiology of the disease.
- compare parameters of calcium homeostasis amongst those developing complications of nephrolithiasis or nephrocalcinosis vs. those without complications.
- assess fracture risk and microstructure in Canadian patients with hypoPTH.

**Methods:**

- Prospective observational registry of 116 patients >18 y of age.
- The inclusion criteria:
  1. Chronic hypoPTH (low PTH in the presence of low serum calcium [total or ionized] for at least 6 months prior to enrolment)
  2. HypoPTH (including postsurgery) requiring calcium/calcitriol replacement to maintain normal calcium (total or ionized) level for at least 6 months prior to enrolment
  3. Pseudohypoparathyroidism with elevated PTH and low serum calcium (total or ionized), normal vitamin D and hyperphosphatemia
- Exclusion criteria: Transient hypoPTH which resolved within <6 months of treatment.
- We reviewed etiology, initial clinical presentation, laboratory investigations, management strategies, markers of skeletal health including fractures, BMD, and complications including nephrolithiasis/nephrocalcinosis, and basal ganglia calcification. Fracture risk was determined using the Canadian Association of Radiologists and Osteoporosis Canada (CAROC) tool

**Results:** Most patients (84/116) had postsurgical hypoparathyroidism, followed by idiopathic/autoimmune disease (29/

116) and pseudohypoparathyroidism (3/116). The mean age of onset was 41.6 y. All patients were receiving calcium supplements (100%) with calcitriol being used by 82.8% and 4 patients received PTH. Nephrolithiasis or nephrocalcinosis were present in 25.4% of treated patients despite a mean calcium phosphate product <4.4 mmol2/L2. Basal Ganglia calcification was present in 7 of the 30 patients reviewed. A substantial number of patients (31.0%) required hospitalization at initial presentation. Patients with idiopathic/autoimmune disease were twice as likely to be hospitalized compared to those with postsurgical disease.

**Conclusions:**

1. HypoPTH is associated with a significant disease burden and leads to hospitalization in a large number of patients.
2. Renal complications of nephrocalcinosis and nephrolithiasis were present in 25.4% of treated patients despite maintenance of a calcium phosphate product in the desired range (<4.4 mmol2/L2). The ideal calcium phosphate product needs to be reconsidered.
3. Fracture risk was low in the absence of traditional osteoporosis risk factors.

## P650
## TOTAL ANTIOXIDANT CAPACITY AND FRAILTY IN OLDER MEN

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**Objective:** There is some evidence that frailty, a clinical syndrome characterised by multisystem dysregulation, is associated with elevated oxidative stress. We investigated the association between serum total antioxidant capacity (TAC) and frailty in older men.

**Methods:** This cross-sectional study included men (age 60-90 y) from the Geelong Osteoporosis Study. Frailty referred to ≥3 of the following: unintentional weight loss, exhaustion, low physical activity, slowness and weakness. TAC was measured by quantitative colorimetric determination, using Cell Biolabs' OxiSelect™ Total Antioxidant Capacity (TAC) Assay Kit, with results expressed as uric acid equivalents. TAC values were expressed as standard deviation units in Pearson's correlation tests and multivariable logistic regression models for determining their relationship with frailty. Adjustments for potential confounders and effect modifiers were made. A sensitivity analysis excluded participants in the upper quartile of TAC, who were likely to have hyperuricemia.

**Results:** Among 581 men, 50 (8.6%) were frail. TAC was weakly correlated with age (r=0.07, p=0.1) and BMI (r=0.1, p=0.01). Higher TAC was associated with increased likelihood of frailty (OR 1.34, 95%CI 0.99-1.80), with borderline significance. Adjustment for age and BMI attenuated the association (OR 1.26, 95%CI 0.93-1.71). No effect modifiers or other confounders were identified. Sensitivity analysis revealed a positive association between TAC and frailty, which was significant before (OR 1.79, 95%CI 1.02-3.13), and after adjustment (OR 1.79, 95%CI 1.01-3.17).

**Conclusion:** These results suggest a positive association between TAC levels and frailty, supporting the notion that this biomarker could be useful in identifying individuals at risk of frailty. We speculate that a milieu of heightened oxidative stress in frailty may elevate the oxidative stress regulatory set-point, raising antioxidant activity. This warrants further investigation.

## P651
## PROSPECTIVE COMPARISON OF INTRA-ARTICULAR SHAM VS. PLACEBO INJECTIONS: DATA FROM A RANDOMIZED, CONTROLLED PHASE 2B TRIAL OF SM04690, A WNT PATHWAY INHIBITOR FOR KNEE OSTEOARTHRITIS

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**Objectives:** Intra-articular (IA) placebo (PBO) comparators in knee osteoarthritis (OA) trials demonstrate consistent and durable symptom improvements over baseline. There is controversy concerning whether responses to IA saline represent a true PBO effect vs. actual physiologic benefit.[1] To test if the effects are due to intrinsic saline properties, one arm of a 24-week phase 2b study of SM04690 (IA Wnt pathway inhibitor in development as a potential disease-modifying knee OA drug) compared effects of IA vehicle PBO to sham. Primary study results are presented separately.

**Methods:** Subjects with knee OA, Kellgren-Lawrence grade 2 or 3, and Pain Numeric Rating Scale (NRS) scores ≥4 and ≤8 in the target knee and <4 in the contralateral knee were randomized to receive a blinded single IA 2 mL injection of vehicle (PBO, 0.5% carboxymethylcellulose sodium and 0.05% polysorbate 80 in pH 7.4 saline), sham (dry needle), or SM04690 at baseline. Patient reported outcomes (PROs) included change from baseline in weekly average of daily target knee pain by NRS, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Pain, WOMAC Physical Function, and Patient Global Assessment. Baseline-adjusted analysis of covariance was used to estimate change over time differences in outcomes between sham and PBO.

**Results:** 207 out of 233 PBO and sham subjects completed the 24-week study. Both PBO and sham subjects showed clinically

relevant improvement (>10%) from baseline at first post-baseline measurement that persisted through Week 24.[2] However, no clinically meaningful or statistically significant differences were evident between the two groups at any timepoints (Figure).

**Conclusion:** Subjects with knee OA receiving a single IA injection of PBO reported no differences in changes from baseline in knee OA PROs compared to subjects who received sham injections. These data suggest that the observed effects were "contextual," meaning that they resulted from the injection procedure, rather than from direct therapeutic effects of PBO or saline in the joint.

**References:**

1. Altman, Roy D, et al. *Sem Arthr Rheum*
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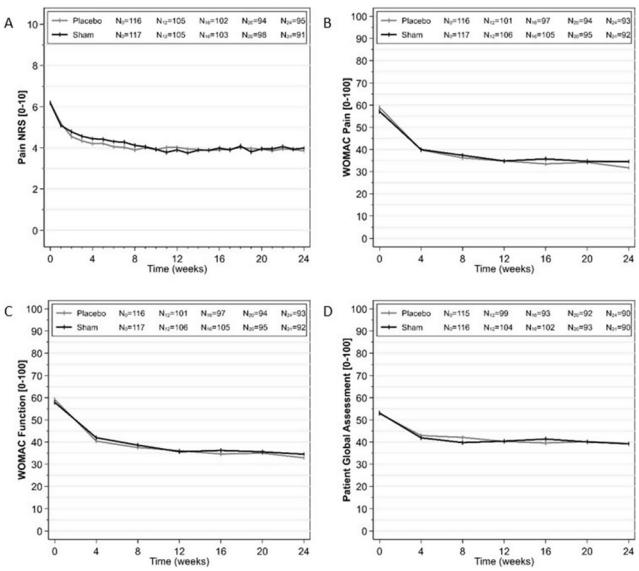
**Disclosures:** All authors are employees or consultants of Samumed, LLC

Figure: Observations over time depicting mean improvements of PBO and sham injection
A. Pain NRS, B. WOMAC Pain, C. WOMAC Function, and D. Patient Global Assessment; in all subjects




## P652

## COGNITION, BODY COMPOSITION AND MUSCLE FUNCTION IN OLDER MEN: GEELONG OSTEOPOROSIS STUDY

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**Objective:** We have reported links between physical and mental health decline, but not with cognition. This study examined body composition (fat and lean mass), muscle strength and muscle quality (MQ) in relation to cognitive function in older men.

**Methods:** For 176 men (ages 60-92 y) in the Geelong Osteoporosis Study, we measured total fat mass (FM, kg), total lean mass (LM, kg), appendicular lean mass (ALM, kg) and arm lean mass (kg) by DXA (Lunar). FM, LM and ALM were also indexed to height ($m^2$). Maximum handgrip strength (HGS, kg) was measured by dynamometer (Vernier, LoggerPro3) and MQ calculated as HGS/arm lean mass. Cognitive function was assessed in four domains: psychomotor function, visual identification/attention, visual learning and working memory/attention (CogState-Brief-Battery) and a composite score calculated, for overall cognitive function (OCF). Higher scores represent better performance. Associations between fat/muscle parameters and OCF were tested using Pearson correlation, and multivariable regression analyses after accounting for age and height.

**Results:** LM, HGS and MQ declined with age (r=-0.19,-0.40,-0.28, respectively, all p<0.012). OCF also declined with age (r=-0.35, p<0.001) and was positively associated with ALM, HGS and MQ (r=0.19, 0.28, 0.23, all p<0.01); weak associations were apparent with LM and ALM/height$^2$ (both r=0.15, p<0.056) and none with FM (r=0.11, p=0.145) or FM/height$^2$ (r=0.08, p=0.288). After age adjustment, positive associations persisted between OCF and ALM (β=0.018, p=0.044), HGS (β=0.018, p=0.030) and MQ (β=0.117, p=0.046); height did not contribute to models.

**Conclusion:** ALM, HGS and MQ were positively associated with cognitive function, independent of age; however, there was little evidence of an association between FM and cognition. Cognitive decline in tandem with loss of muscle mass, strength and quality could place the ageing individual at increased risk for personal injury, poor mobility and loss of independence.

## P653

## PRIOR FRACTURE AND PARENTAL HIP FRACTURE ARE ASSOCIATED WITH LOWER BONE MATERIAL STRENGTH INDEX IN MEN

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**Objectives:** Impact microindentation (IMI) is an emerging technique for measuring bone material strength index (BMSi) in vivo. However, it is unclear how well BMSi discriminates fracture risk. We aimed to investigate if BMSi was associated with prior fracture and parental hip fracture, which are recognised risk factors for fracture.

**Methods:** For 357 men (ages 33-96 y) from the Geelong Osteoporosis Study, BMSi was measured on the tibial plateau using the OsteoProbe according to international guidelines[1]. Prior fracture was any low trauma adult fracture (excluding toe, skull, finger, face) and was self-reported and confirmed radiologically where possible. Parental hip fracture was self-reported. Associations between BMSi and fracture risk factors were identified using Pearson's correlation and 2-sample t-tests. Multiple

regression models were used to determine whether differences in BMSi were independent of age and anthropometry.
**Results:** There were 38 (11.9%) men with prior fracture and 34 (9.5%) with parental hip fracture. Mean (±SD) for BMSi, age and BMI were 82.6±6.9, 63.3±13.8 y and 26.8±3.2 kg/m$^2$ respectively. Inverse associations were observed between BMSi and age (r=-0.131, p=0.014), weight (r=-0.109, p=0.040) and BMI (r=-0.083, p=0.001), no correlations were detected between BMSi and height (r=0.087, p=0.10). Mean BMSi for men with and without prior fracture were (80.2±6.9 vs. 82.8±6.1, p=0.024) and parental hip fracture (80.1±6.1 vs. 82.8±6.9, p=0.029). Best model for BMSi in association with prior fracture included age, and for parental fracture, age and BMI. Adjusted mean(±se) BMSi±prior fracture (80.5±1.1 vs. 82.8±0.4, p=0.044) and for parental fracture, (79.9±1.2 vs. 82.9±0.4, p=0.015).
**Conclusions:** Prior fracture and parental hip fracture were both associated with lower mean BMSi in men from the general population. These data suggest that IMI may be useful for differentiating fracture risk.
**Reference:** 1 Diez-Perez A et al. Bone Rep 2016;5:181

## P654
## INTRODUCING A FRACTURE LIAISON SERVICE: ESTABLISHING BASELINE ABSOLUTE RISK OF SUBSEQUENT FRACTURE

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**Introduction:** One in three women and one in five men are expected to experience a minimal trauma fracture after the age of 50 y, which increases the risk of subsequent fracture. Importantly, timely diagnosis and optimal treatment in the form of a fracture liaison service (FLS), has been shown to reduce this risk of another fracture. However, the baseline risk of subsequent fracture among this group of FLS patients has not been well described. Therefore, this study aims to estimate the absolute risk of subsequent fracture among women and men aged 50 y or more, presenting to a hospital with a minimal trauma fracture.
**Methods:** Women and men aged 50 y or more with a minimal trauma fracture, presenting to hospitals across the South Western Sydney Local Health District (SWSLHD), Australia, between January 2003 and December 2017 were followed to identify representation to a hospital with a subsequent fracture. The absolute risk of refracture was estimated by taking into account the competing risk of death.
**Results:** Between January 2003 and December 2017 - 15,089 patients presented to the emergency departments of the five hospitals in the SWSLHD (11,150, women [74%]), with minimal trauma fractures. Subsequent fractures identified during the follow-up period (median=4.5 years [IQR, 1.6-8.2 y), occurred in 2,023 (13.4%) patients. Death during the initial hospital stay, or during a subsequent hospital visit was recorded among 1645 patients (10.9%). Women were observed to have 7.1% risk of subsequent fracture after 1 y, following an initial fracture; and, the risk of subsequent fracture after 1 y was 6.2% for men. After 5 y the rate among women was 13.7%, and 11.3% for men, respectively. Cumulative risk of subsequent fracture when the initial fracture is classified a proximal or distal are also presented.
**Conclusion:** In the context of implementing a fracture liaison service, this study has estimated the baseline risk of subsequent fracture among the women and men presenting to hospital with minimal trauma fractures. Importantly, this information can be used to communicate risk to patients deciding to participate in osteoporosis refracture prevention programs, and highlight the need for screening, and initial of treatment when indicated, once a minimal trauma fracture has occurred to prevent a subsequent fracture.

## P655
## SARCOPENIC OBESITY AND INCREASED LIKELIHOOD OF ANXIETY SYMPTOMS

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**Objective:** Skeletal muscle activity and adipocytes modulate immune function and redox status that impact neurological pathways. We aimed to determine associations between the components of sarcopenic obesity with anxiety symptomatology.
**Methods:** This cross-sectional study involved 313 postmenopausal women aged ≥60 y, participating in the Geelong Osteoporosis Study; median age 70.6 y (IQR 65.0-75.8), mean weight 73.6 kg (±SD 15.1). Sarcopenia was identified as low DXA-derived appendicular lean mass expressed relative to height (rALM <6.0 kg/m$^2$, Lunar) in combination with low handgrip strength (maximum HGS <16 kg, Jamar) according to EWGSOP2 criteria. Obesity was identified as high DXA-derived body fat mass, expressed as the fat mass index (FMI; FMI ≥11.8 kg/m$^2$). Anxiety symptomatology was documented via the Hospital Anxiety and Depression Scale (HADS-Anxiety score ≥8). Multivariable logistic regression was used to determine the likelihood of anxiety in association with sarcopenic obesity. Potential confounders included age, physical inactivity, smoking, alcohol consumption and energy intake.
**Results:** Among 75 women with anxiety, compared to 238 without, 25 (33.3%) vs. 55 (23.1%) (p=0.08) had low-rALM, 13 (17.3) vs. 32 (13.5%) (p=0.4) had low-HGS, 9 (12.0%) vs. 11 (4.6%) (p=0.03) had sarcopenia, 45 (60.0%) vs. 125 (52.5%) (p=0.3) were obese, 3 (4.0%) vs. 1 (0.4%) (p=0.04) had sarcopenic obesity. There was evidence to suggest that sarcopenia and obesity were independently associated with anxiety: sarcopenia OR 3.35 (95%CI 1.29-8.72) and obesity

OR 1.56 (0.90-2.71). There was no sarcopenia*obesity interaction and no confounders identified.

**Conclusion:** These findings warrant further research to consider the extent of muscle deficit, obesity severity and anxiety subtypes. However, our data suggest that sarcopenia, particularly the low lean mass component, in conjunction with obesity tended to be associated with anxiety symptomatology, and that their effects are additive rather than multiplicative.

## P656
## STRUCTURAL CHANGES OF MYOCARDIUM IN WOMEN WITH OSTEOPOROSIS IN COMBINATION WITH ISCHEMIC HEART DISEASE

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**Objective:** To determine the characteristics of structural changes of myocardium and aorta by echocardiography in women with ischemic heart disease (IHD) cause-specific from the presence of osteoporosis.

**Methods:** we examined 170 postmenopausal women aged from 57-78. Inclusion criteria: female, age over 50 y, the presence of menopause, the presence of IHD. Exclusion criteria: endocrine system disease, severe heart failure, respiratory insufficiency, secondary osteoporosis. All women were divided into 2 groups: group 1 – 72 women with proven diagnosis of osteoporosis and IHD, group 2 – 98 patients with isolated IHD (comparison group). IHD was represented by 2 forms: angina pectoralis and post infarction cardiosclerosis. The frequency of post infarction cardiosclerosis was not statistically different between groups. Also the group were comparable in age, bodyweight index, levels of peripheral (office) blood pressure.

**Results:** In women with osteoporosis and IHD we revealed higher value of interventricular septum thickness (p=0.034), left ventricle posterior wall (p=0.004), and the relative thickness of left ventricular posterior wall (p=0.00038) Table 1.

Table 1. Echocardiography characteristics in women with ischemic heart disease with and without osteoporosis

| Parameters | 1st group, n=72 | 2nd group, n=98 | p |
|---|---|---|---|
| Right ventricle end-diastolic dimensions, mm | 27.54±2.77 | 27.26±2.24 | 0.65 |
| Left ventricle end-diastolic dimensions, mm | 44.18±5.55 | 43.73±5.64 | 0.88 |
| Interventricular septum thickness, mm | 12.71±3.44 | 11.79±1.57 | 0.034 |
| Left ventricular posterior wall thickness, mm | 11.92±2.9 | 11.39±1.55 | 0.004 |
| Left ventricular relative wall thickness, mm | 0.56±1.14 | 0.53±0.55 | 0.0038 |
| Left ventricular mass, g | 197.68±52.35 | 178.44±55.26 | 0.19 |
| Left ventricular mass index, g/m$^2$ | 109.05±24.93 | 107.33±34.14 | 0.17 |
| Ejection fraction,% | 70.33±11.43 | 69.78±8.55 | 0.17 |
| Postsystolic shortening,% | 40,72±9,33 | 36,86±13,2 | 0,65 |
| Systolic volume, ml | 62.41±19.47 | 55.72±15.69 | 0.12 |
| Cardiac output, ml | 4.14±0.84 | 3.83±1.77 | 0.042 |
| Peak velocities of early and late filling ratio (E/A), a.u. | 1.13±0.58 | 1.08±0.35 | 0.47 |
| E-wave deceleration time (DTe), ms | 215.0±40.52 | 203.16±42.16 | 0.0024 |
| Length of the isovolumetric relaxation (IVRT), ms | 113.5±32.27 | 91.66±12.88 | 0.0001 |
| Local wall motion abnormalities, n (%) | 8(11.1) | 8(8.2) | 0.51 |

An increasing rate of left ventricular hypertrophy was observed in patients with combination of osteoporosis and IHD – 51.4% vs. 39.8% in women with IHD without osteoporosis (p=0.002). Osteoporosis was associated with a higher incidence of diastolic left ventricular dysfunction: 90% vs. 70.4%, as well as with pathological types of left ventricular remodeling (p=0.01). Concentric remodeling type dominated among women with combined pathology (p=0.09). A higher incidence of aorta calcification 1.86 times (p=0.00013) and calcified aortic stenosis (13.8% vs. 4.08%, p=0.02) were noted in patients with osteoporosis.

**Conclusion**: We found that osteoporosis in postmenopausal women was associated with an increasing of heart remodeling parameters, an increasing of diastolic dysfunction frequency and pathological types of left ventricle geometric remodeling with prevalence of concentric type remodeling. Patients with osteoporosis had a higher prevalence of aortic calcification and calcified aortic stenosis.

## P657

## HIP STRUCTURE IN ATYPICAL FEMUR FRACTURES: A CASE-CONTROL DENSITOMETRIC STUDY

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**Objectives:** Atypical femur fractures (AFFs) are rare complications of antiresorptive drugs (bisphosphonates/denosumab). Biomechanical strain and femoral morphology have been implicated in the development of AFFs[1]. We aimed to describe hip geometric parameters in an AFF cohort at a tertiary hospital.

**Methods:** Cross-sectional case-control study comparing DXA-derived femoral parameters of 18 women with AFF (cases were confirmed using ASBMR Task Force criteria[1]) to 18 women who sustained typical osteoporotic femur fractures at Monash Health, Victoria, Australia from 2009-2017. Data extraction from hospital records and GE Lunar Prodigy densitometer [femoral neck (FN) BMD, FN T-score, height, BMI]. Hip structural analysis used Advanced Hip Analysis software. Analysis included Mann Whitney U test and logistic regression.

**Results:** Median (range) age of AFF cases and control group were 72 (56-81) and 68 (53-81) y, respectively. Antiresorptive therapy use was more common in AFF cases than controls (100% vs. 33%, p<0.001). Median comorbidity severity index[2] and Asian ethnicity rates were similar between groups. Compared with controls, AFF cases were shorter [151.7 (145.9-159.6) vs. 156 (144.8-168.0) cm, p=0.038] with higher BMI [(27.8 (20.8-36.2) vs. 22.2 (17.4-32.6) kg/m$^2$, p=0.003]. After adjustment (age, antiresorptive use, Asian ethnicity, height), AFF cases had higher FN BMD, FN T-score, and lower FN buckling ratio (BR) conferring lower risk of FN fragility fractures than controls (Table). Intertrochanteric (IT) cortical width, IT cortical ratio, and femoral shaft (FS) cortical ratio was higher in AFF cases than controls (Table). FN BR, IT cortical width and IT cortical ratio remained significant after adjustment for BMI.

| Femoral parameters | AFF cases N=18 | Control group N=18 | P |
|---|---|---|---|
| FN BMD | 0.793(0.554-0.969) | 0.688 (0.354-0.873) | 0.032* |
| FN T-score | -1.6(-3.5 - -0.1) | -2.4 (-5.2 - -0.9) | 0.032* |
| FN BR | 2.71(1.67-5.13) | 5.17 (2.48 - 7.66) | 0.004*# |
| FN cortical width | 5.70(3.44-9.07) | 3.63(2.78-7.20) | 0.016 |
| FN cortical ratio | 19.45(11.36-31.76) | 11.44(8.33-22.25) | 0.009 |
| IT cortical width | 3.79(2.39-4.85) | 2.49(2.17-5.00) | 0.014*# |
| IT cortical ratio | 7.54(4.49-9.85) | 5.00(4.22-8.97) | 0.006*# |
| FS cortical width | 4.33(3.30-8.67) | 3.90(2.12-5.70) | NS |
| FS cortical ratio | 14.77(10.38-29.50) | 12.67(7.76-20.65) | 0.047* |

Data expressed as median(min-max)
*p<0.05 after separate adjustments for age, antiresorptive use, Asian ethnicity and height
#p<0.05 after adjustment for BMI

**Conclusion:** AFF cases have favourable FN parameters and higher IT and FS cortical parameters than controls. These findings may provide insight into densitometric risk profile and pathogenesis of AFFs. Future longitudinal studies controlling for antiresorptive use are needed to examine the role of hip geometry as an AFF risk prediction tool.

**References:**

[1] Shane et al. J Bone Miner Res 2014;29:1
[2] Silverman et al. Osteoporos Int 2016;27:75

## P658

## COST-EFFECTIVENESS ANALYSIS OF FRACTURE LIAISON SERVICE (FLS) MODEL OF CARE FOR HIP FRACTURE PATIENTS IN TAIWAN

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**Objectives:** In Taiwan, the cost-effectiveness of a less intensive fracture liaison service (FLS) is unknown. Thus, the objectives of this study was 1) to examine health resource use of hip fracture patients in hospital-based post-fracture FLS program comparing to patients who received usual care; 2) to perform a cost-effectiveness analysis of the FLS program in Taiwan among the patients newly sustained hip fractures.

**Methods:** This study included patients with newly diagnosed hip fractures who were enrolled in hospital-based FLS program in NTUH from January 2014 to June 2016 with 2 y of follow-up data. Patients who received usual care were selected by propensity score matching using baseline characteristics in claim-based dataset (NHIRD) from January 2012 to December 2013. Each patient was followed up for 2 y. The net monetary benefit (NMB) regression framework was conducted to evaluate cost-effectiveness.

**Results:** The number of the patients enrolled in FLS program was 179, and 1697 patients identified as receiving usual care. The baseline characteristics between two groups were similar. Overall, patients enrolled in FLS had better overall survival days and refracture survival days. FLS program intervention was cost-effective compared to usual care, regardless of the WTP from 1 time of the GDP per capita (approximately $65 US) to infinity. Similar results were observed for the hip refracture free survival days and the overall survival days.

**Conclusion:** This population-based study showed that the FLS program was cost-effective. The government may adopt the program to not only reduce the refracture but also prolong the overall survival among patients who had a history of hip fracture.

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## P659

## ROMOSOZUMAB OR ALENDRONATE FOR FRACTURE PREVENTION IN EAST ASIAN PATIENTS: A SUBANALYSIS OF THE PHASE III, RANDOMIZED ARCH STUDY

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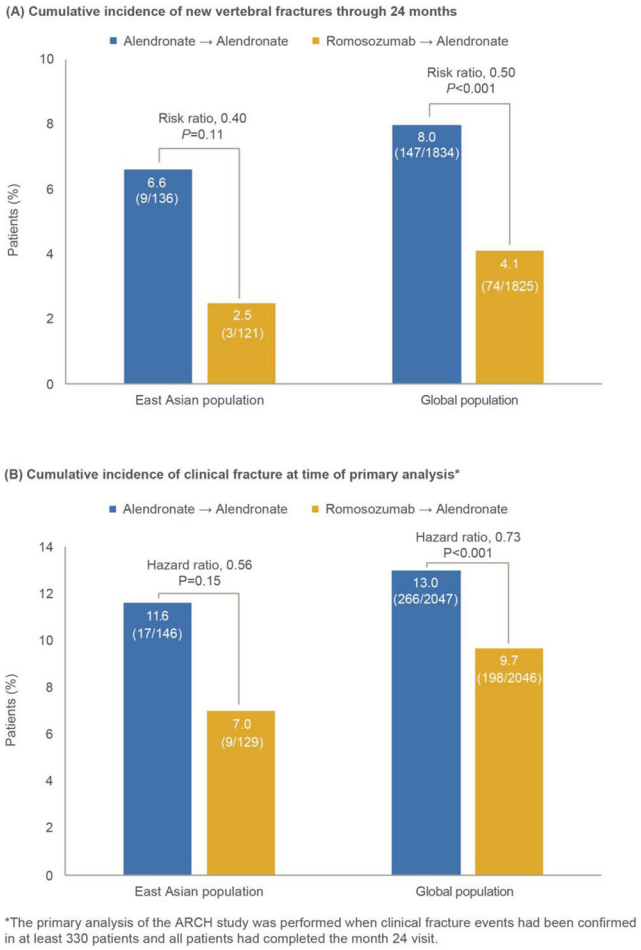
**Objectives:** Romosozumab (Romo) is a sclerostin antibody and bone-forming agent that exerts a dual effect on bone, increasing bone formation and decreasing bone resorption. In the global, double-blind, Phase III ARCH (NCT01631214) study, Romo followed by alendronate (ALN) in postmenopausal women with osteoporosis at high fracture risk showed superiority in reducing the risk of new vertebral, clinical and nonvertebral fractures vs. ALN alone.[1] We report the efficacy and safety of Romo vs. ALN in East Asian patients enrolled in ARCH.

**Methods:** ARCH enrolled 4093 postmenopausal women aged 55-90 y with high fracture risk (BMD T-score ≤–2.5 at total hip [TH] or femoral neck [FN] and either ≥1 moderate/severe or ≥2 mild vertebral fractures [VF], or BMD T-score ≤–2.0 at TH or FN and either ≥2 moderate/severe VF or hip fracture sustained 3-24 months prior). Patients were randomized 1:1 to Romo 210 mg QM or ALN 70 mg QW for 12 months, followed by open-label ALN in both groups. Primary endpoints were cumulative incidence of new VF at 24 months and clinical fracture at primary analysis (clinical fractures in ≥330 patients and all patients completed month 24 visit).

**Results:** 275 patients from Hong Kong, Republic of Korea and Taiwan were included in this *post hoc* subgroup analysis. Romo followed by ALN reduced the risk of new VFs at 24 months by 60% and clinical fractures at primary analysis by 44% vs. ALN alone, although differences were not statistically significant as the analysis was not powered to demonstrate differences between subgroups (Figure). Romo followed by ALN significantly increased BMD at 24 months from baseline by 9.0% at the lumbar spine, 3.3% at TH and 3.0% at FN vs. ALN alone. Efficacy outcomes were generally similar between the global and East Asian populations. Adverse event (AE) rates, including those of positively adjudicated serious cardiovascular AEs (1.4% vs. 1.6% at 12 months for ALN vs. Romo), were similar across treatment groups.




**Conclusion:** Romo followed by ALN reduced the risk of new vertebral and clinical fractures vs. ALN alone among East Asian patients in ARCH.

**Reference:** 1. Saag KG et al. N Engl J Med 2017;377:1417

**Disclosures:** Funded by Amgen Inc, Astellas Pharma, and UCB Pharma. CW has received honoraria from Amgen. RD, JM, CT and WY are employees of Amgen. JG is an employee of UCB Pharma.

## P660

## RELATIONSHIP BETWEEN INAPPROPRIATE MEDICATION USE AND FALLS

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**Objective:** Polypharmacy and inappropriate medication use in older adults is a major public health problem associated with morbidity and mortality. Aging is associated with metabolic changes and decreased drug clearance, increased drug-drug interactions, prescribing cascades, and potentially inappropriate medications (PIMs). The purpose of this study was to evaluate the association between a wide variety of common geriatric syndromes and potentially inappropriate medication use among older adults detected by Beers 2012 criteria.
**Methods:** Study participants were recruited and randomised among patients admitted to Istanbul Medical School Geriatrics outpatient clinic between June 2000-June 2014 and were evaluated retrospectively by a geriatrician using the patients' records according to Beers 2012 criteria.
**Results:** Among the 667 enrolled patients, 421 (63.1%) were women and 246 (36.9%) were men. Presence of PIM was not associated with age or sex. Polypharmacy (OR 4.3, 95%CI 2.8-6.4, p<0.001), presence of fall in the previous year (odds ratio (OR) 3.2, 95%CI 2.1-4.7, p<0.001), depression (OR 2.6, 95%CI 1.7-3.9, p<0.001) constipation (OR 2.0, 95%CI 1.2-3.5, p=0.008), malnutrition (OR 1.5, 95%CI 1.1-1.9, p=0.006) were independently associated with the use of PIM.
**Conclusion:** Identifying the association of inappropriate medication use with common geriatric syndromes in older people can help to prevent, delay, and reduce PIM use and related adverse health outcomes. Especially falls are associated with the risk of osteoporotic fractures in older patients. Falls are a marker of frailty, immobility, and acute and chronic health impairment in older persons. Therefore PIM use should be evaluated in older patients with falls.

## P661
## RUSSIAN VALIDATION OF THE SARQOL®: A QUALITY OF LIFE QUESTIONNAIRE SPECIFIC TO SARCOPENIA

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**Objectives:** The aim of this cross-sectional study was to translate and adjust the SarQoL into Russian and to standardize the validity of this method for the assessment of sarcopenic individuals in Russia with regard to psychometric properties. The English version was used for the translation process.
**Methods:** A total of 100 community-dwelling subjects aged 74.0±6.5 y (70% females) were studied, with 50 participants being diagnosed sarcopenic. Sarcopenia was diagnosed according to the algorithm proposed by the European Working Group on Sarcopenia in Older People (EWGSOP, 2010). The translation and crosscultural adaptation was carried out in five phases according to specific standard guidelines. There were no major linguistic issues in the translation process. To test the psychometric performance, discriminative power, internal consistency, floor and ceiling effects, and construct validity analyses were made. We assessed the correlation between SarQoL and similar/ different domains of other two QoL questionnaires (SF-36 and EQ-5D).
**Results:** The data confirmed a good discriminant validity, i.e., significantly lower scores for all domains (reduced global QoL in sarcopenic subjects compared to nonsarcopenic ones: 50.65±14.23 vs. 75.10±14.46, p<0.001), high internal consistency (Cronbach's alpha coefficient was 0.924), as well as good construct validity with 81.4% of hypotheses confirmed. The moderate correlation of the SarQoL scores with those of other questionnaires (SF-36 and EQ-5D) that are supposed to have similar dimensions indicated the consistent construct validity of the SarQoL (p<0.0001). No floor/ceiling effects were found. An excellent agreement was found between the test and the retest (intraclass coefficient correlation=0.935, 95%CI 0.91-0.96).
**Conclusions:** The first Russian version of the SarQoL questionnaire is valid and consistent and therefore may be used with reliability for clinical and research purposes regarding QoL assessment of sarcopenic individuals

## P662
## AMYGDALIN AFFECTS VIABILITY, CELL SIZE, AND GENE EXPRESSION IN CULTIVATED HUMAN OSTEOBLASTS

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**Objective:** Amygdalin (AMG) is often used as an alternative cancer treatment. However, little is known about the impact of AMG on nontumor cells. This study was designed to investigate the effect of AMG on cultivated human osteoblasts.
**Methods:** Primary human osteoblasts (PromoCell) were incubated without (control group) or with different concentrations of amygdalin (100, 1 000 and 10 000 $\mu g.ml^{-1}$) in growth medium for 72 h. Cell viability was analysed by CCK8 assay (Merck), morphometry was determined using light microscopy. An expression of 10 selected genes associated with osteoblast-specific pathways, oxidative stress and apoptosis was assessed by real-time PCR (RT2 Profiler PCR Array, Qiagen).

**Results:** AMG at the highest concentration decreased osteoblast viability (-27.3%; P<0.05) and reduced their size (-23.2%; P<0.05). The BGLAP, TNFSF11, and WNT5A genes were upregulated by 10 000 $\mu g.ml^{-1}$ AMG, counting 1.31, 1.30, and 1.25 in fold change (P<0.05), respectively. In contrast, this concentration of AMG decreased the expression of COL1A1 (-1.21 in fold regulation, 0.82 fold change), and ALPL genes (-2.14 in fold regulation, 0.47-fold change, P<0.05). The COL1A1 gene was downregulated also at 100 $\mu g.ml^{-1}$ AMG (-1.12 in fold regulation, 0.89-fold change; P<0.01). No changes in expression were identified for RUNX2, BAX, CASP1, SOD1 and GPX1 genes in all experimental groups. The AMG concentration of 1 000 $\mu g.ml^{-1}$ did not affect expression of any analysed gene.
**Conclusion:** AMG in a high concentration negatively affected size and viability of osteoblasts; however, mechanisms other than BAX and CASP1 pathways were involved. The effect of AMG on gene expression showed reduced collagen production, bone mineralization and accelerated bone resorption without modulation of oxidative stress.
**Acknowledgements:** The study was supported by projects VEGA 1/0653/16 and VEGA 1/0505/18.

## P663
## FALLS AND RELATED FACTORS

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**Objective:** Falls are an important health problem in terms of medical and economic consequences that are frequently encountered in the elderly population. In addition to high mortality and morbidity, it causes long-term immobilization and associated complications. Falling injuries and osteoporotic fractures as well as the fear of falling in person; it can cause functional impairment, depression and social isolation by adversely affecting ambulation. To identify individuals at risk for falls and to take preventive measures, factors associated with falls should be identified. In this study, we aimed to investigate the factors associated with falls in older patients.
**Methods:** Study participants were randomized and recruited among patients admitted to Istanbul Medical School Geriatrics outpatient clinic for the first time between June 2000-June 2014. Patients' data about number of chronic diseases and prescribed drugs, falls (in the preceding year), nutritional status, frailty and presence of polypharmacy. SPSS (statistical package for social sciences) version 21 program was used for statistical analysis.
**Results:** Among the 300 patients, 198 (% 66) were women and 102 (34%) were men. The mean age was 75,6±6.8 years. Prevalence of falls was% 39 (117). Frailty, polypharmacy and malnutrition were associated with the presence of falls. In regression analysis frailty was independently associated with falls (p=0.11).
**Conclusion:** The results of our study showed that falls are independently associated with frailty. Clinicians should routinely assess the risk of falls, particularly in frail older people, and regulate underlying modifiable risk factors.

## P664
## COMPARISON BETWEEN 3D-SHAPER® ANALYSIS AND STANDARD 2D DXA SCAN OF THE PROXIMAL FEMUR

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**Objective:** The fracture resistance is mainly determined by volumetric, rather than areal bone mass, but it only could be evaluated by quantitative computed tomography (QCT). The 3D-SHAPER software provides volumetric models of the proximal femur shape and bone density from anteroposterior DXA scans, which parameters are profoundly correlated with QCT. Our aim was to assess the correlation between volumetric BMD (vBMD) at proximal femur derived from 3D-SHAPER software and respective DXA measurements.
**Methods:** In this pilot retrospective study were included 119 scans of 40 Caucasian white healthy women, between 40-60 y of age, with BMI between 21-30 $kg/m^2$. In the research were not included patients with diseases or on medication that deteriorate bone health. All of them have undergone a DXA scan at proximal femur, performed on a DXA machine Hologic Discovery A, which was subsequently analysed with 3D-SHAPER software (version 2.8.0, Galgo Medical S.L, Barcelona, Spain). It was used to obtain a 3D QCT-like patient-specific model of the proximal femur.
**Results:** Our data shows powerful correlation between DXA BMD at total hip and trabecular vBMD ($mg/cm^3$) – r=0.86, p=0.000; integral vBMD ($mg/cm^3$) – r=0.868, p=0.000; and with surface density total (sdensTotal, $mg/cm^2$) – r=0.920, p=0.000. Statistically significant association was confirmed also between DXA BMD at neck and trabecular vBMD – r=0.826, p=0.000; integral vBMD – r=0.766, p=0.000, and with sdensTotal – r=0.732, p=0.000.
**Conclusion:** There is a robust correlation between 3D-SHAPER analysis and standard 2D DXA scan of the proximal femur. Limitations of the study: The design of the study obscured the advantages of the 3D-SHAPER analysis.
**Acknowledgements:** The research could not have been realized without the provided from Galgo Medical S.L. 3D SHAPER software.

## P665

## 3D-SHAPER® ANALYSIS OF VOLUMETRIC BMD AT PROXIMAL FEMUR DURING MENOPAUSAL TRANSITION

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**Objective:** The standard reference BMD curves of DXA manufacturers express BMD as a function of calendar age, but in our preceding study a better correlation was observed between BMD at proximal femur and onset of menopause, rather than with calendar age. Our aim was to assess volumetric BMD (vBMD) at proximal femur during menopausal transition and its dependence on calendar age or onset of menopause.
**Methods:** In this pilot retrospective study was performed a 12-y follow-up of 40 (119 scans) Caucasian white healthy women, between 40-60 y of age, with BMI between 21-30 kg/m$^2$. Exclusion criteria are early onset of menopause and risk factors for secondary osteoporosis. All of them have undergone a DXA scan at proximal femur on Hologic Discovery A, at baseline and follow-up during peri- and postmenopausal period (-5/+5 years after the onset of menopause). Their scans were subsequently analysed with 3D-SHAPER software (version 2.8.0, Galgo Medical S.L, Barcelona, Spain), which was used to obtain a 3D QCT-like patient-specific model of the proximal femur.
**Results:** In this pilot study a strong negative correlation was observed between the onset of menopause and trabecular vBMD (g/cm$^3$) r=-0.860, p=0.01; integral vBMD (g/cm$^3$) r=-0.831, p=0.02; and total surface density (sdensTotal) r=-0.799, p=0.03. Nevertheless, no correlation was found between calendar age and trabecular vBMD r=0.079, p=0.789; integral vBMD r=0.165, p=0.573; and sdensTotal r=0.165, p=0.573.
**Conclusion:** 3D-SHAPER parameters at proximal femur noticeably correlate with the onset of menopause and as expected does not depend on calendar age. Limitations of the study: Relatively small number of the cohort.
**Acknowledgements:** The research could not have been realized without the provided from Galgo Medical S.L. 3D-SHAPER software.

## P666

## PHYTOTHERAPY OF POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Numerous studies indicate that phytotherapy may be a complementary treatment for postmenopausal osteoporosis [1, 2, 3, 4, 5, 7]. Much of the recent research of phytochemical influence on skeletal health has focused on polyphenols, especially the flavonoid subgroup [2, 6, 7]. The effects of these polyphenols are worthy of study considering the need for new therapies to prevent and treat osteoporosis as well as arthritic diseases. Worldwide osteoporosis estimates by WHO are 15% for those 50-59 and 70% for those over 80 [2, 6, 7, 8].
**Methods:** The purpose of the present study was to continue the analysis on the use and evolution of using the herbal remedies in postmenopausal osteoporosis. In our previous study [1] we examined the use of herbal products along three years, between 2011-2013. Our study showed a continuous increase in the use of herbal products. We continued this study between 2014-2018 with analysed the use and evolution of using the herbal products in postmenopausal osteoporosis in Bihor county, Romania. Medicinal plant species recommends in postmenopausal osteoporosis are: *Urtica dioica*, *Valeriana officinalis, Melissa officinalis, Equisetum arvense, Anethum graveolens, Rubus idaeus, Rubus fructicosus, Rosmarinus officinalis.*
**Results:** Our previous study showed a continuous increase in the use of herbal products in the studied three years (2011-2013). In that period all of the recommended postmenopausal osteoporosis herbal products consumption increases with 20% [1, 7]. The current study shows a continuous increase in the use of herbal products. All of the studied herbal products consumption increases with 35% compared to 2013 values.
**Conclusions:** These results are due to a better information of the target population. Patients who used phytotherapeutic remedies along with allopathic treatment observed a better symptom improvement than patients who did not use these remedies.
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## P667

## INFLUENCE OF DIACEREIN ON THE MECHANOSENSITIVE SIGNAL-TRANSDUCTION AND PIEZO1 IN CHONDROCYTES

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**Objectives:** For many years, diacerein in its role as a disease modifying osteoarthritis drug (DMOAD) has been used to treat osteoarthritis (OA). Symptom relief by diacerein has been substantiated by several clinical trials (1). Inhibiting the production and activity of IL-1 represents one main mechanism. Former studies revealed diacerein to be involved in influencing histamine induced $Ca^{2+}$ release (2). Via the present study we expanded the spectrum of diacerein's mode of action, concerning delay of OA progression, by exploring the impact of diacerein on the mechanosensitive signal transduction including the integrin-FAK-MAPKs and the mechanosensitive ion channel Piezo1.
**Methods:** Changes in the expression level were detected by qPCR, the modulation of phosphokinases and transcription factors Stat3 and NFAT was analyzed by western blot. The expression of Piezo1 was additionally visualized by immunofluorescence. Changes in $[Ca^{2+}]_i$ were measured by the calcium imaging technique in Fura-2 loaded cells pretreated with diacerein. Yoda, as an activator of Piezo1, was applied in different concentrations to provoke calcium signaling.
**Results:** We were able to detect the mechanosensitive ion channel Piezo1 by qPCR and immunofluorescence in Tc28/2a cells and in primary OA chondrocytes. The observed concentration dependent increase in intracellular calcium by Yoda (activator of Piezo1) application in both cell types was driven mainly by a $Ca^{2+}$ influx. However, a $Ca^{2+}$ release cannot be excluded when performing experiments on cells preincubated with cyclopiazonic acid. McHugh et al., 2013, showed that Piezo1 (Fam38A) mediates integrin activation by recruiting the small GTPase Ras to the ER (3). In our study diacerein induced a downregulation of Piezo1 (as well as KCNMA1 and TRPV5) accompanied with a reduction in ITGbeta1 expression. According to the downstream situated pathway a decrease in the activation (phosphorylation) of FAK and Stat3 was observed, while preliminary reporter assay analysis revealed increased Stat3 activity by Yoda over time.
**Conclusion:** From our results we conclude that diacerein might influence integrin induced mechanosensitive mechanisms by changing the expression of ion channels, and slows down their signal transduction. From the literature it is well known that mechanical stress counts as a major risk factor for OA. A reduction in sensitivity for mechanical stimulation might therefore protect chondrocytes developing an OA phenotype.
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## P668
## HYALURONIDASE SPAM1 KNOCKOUT PREVENTS SUBCHONDRAL BONE LOSS AND CARTILAGE DEGRADATION IN MICE MODEL OF OSTEOARTHRITIS

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**Objectives:** In osteoarthritis (OA), subchondral bone loss and cartilage degradation are triggered by biomechanical stress and inflammatory signaling pathways. Small molecular weight fragments of hyaluronan (HA) have potent pro-inflammatory properties. Their production is due to the acid-active hyaluronidases 1 and 2, and the neutral-active hyaluronidase Spam1. Preliminary studies in mice indicate up-regulation of the expression of Spam1 in both OA chondrocytes and OA osteoblasts. Therefore, we induced knee OA in $Spam1^{-/-}$ mice and assessed the impact of Spam1 deficiency on OA joint lesions.
**Methods:** We resected the medial meniscus and transected anterior cruciate ligament in the right knee of 10-week-old $Spam1^{-/-}$ and wildtype (WT) mice. Mice were euthanatized at day 0, 3, 7, 14, 28, 56 and 70 postsurgery. The right knees were analyzed by pQCT, microCT and histology. The right knee of nonoperated $Spam1^{-/-}$ and WT mice was analyzed as control at the different experimental times and later, until 365 d.
**Results:** In nonoperated mice, BMD of the tibial subchondral bone was significantly lower in $Spam1^{-/-}$ than WT from age 70-365 days. In the operated mice, microCT and histology revealed that osteophytes were significantly fewer and smaller in $Spam1^{-/-}$ than in WT. Histological OA joint damages were less extensive in operated $Spam1^{-/-}$ than WT mice. At day 3 postsurgery, microCT based BMD of the tibial subchondral bone was significantly decreased ($p<0.001$) in WT mice and significantly increased ($p<0.05$) in $Spam1^{-/-}$ mice. The subchondral bone fraction (BV/TV) showed similar results: -8% in operated WT mice and +14% in operated $Spam1^{-/-}$ mice. This changes were associated with a reduction of trabecular thickness (-12%) in operated WT mice and an increase (+23%) in operated $Spam1^{-/-}$ mice.
**Conclusion:** The absence of Spam1 expression contributed to counteract subchondral bone loss in the early stage of OA and to reduce OA severity during all the disease process up to 70 d postsurgery.

## P670
## COST-EFFECTIVENESS ANALYSES OF INTERVENTIONS TO IMPROVE OSTEOPOROSIS MANAGEMENT

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**Objective:** Osteoporosis (OP) is a major public health concern leading to a large number of fractures and important economic burden. As OP management is far from meeting guidelines, interventions have been developed since 2003 to improve appropriate BMD and treatment prescriptions. A

recent meta-analysis (1) showed that three types of interventions were effective, but in the current context of limited resources, it is of major importance to evaluate their efficiency. Our objective was to perform a cost utility analysis of existing effective intervention designed to improve osteoporosis management.

**Methods:** The two effectiveness criteria of interventions were BMD and treatment prescription. We developed a model consistent with the management of a 50 years old woman with a first fragility fracture. We adopted the collectivity perspective and chose a 30-y time horizon. Markov models with a 1-y cycle length were applied according to different patient situations: normal T-score, low T-score (<-1) not treated and low T-score treated. Analyses were conducted on 3 intervention types: structural (I), educational by exchanging (II) and educational by sending (III). Types II and III were respectively composed of two and three subtypes according to the involvement of patient and/or healthcare professional (HCP) in the intervention.

**Results:** Interventions type I and III (all subtypes) are cost-saving strategies. Interventions type II subtype 1 (educational intervention by exchanging, with patient involvement) had an incremental cost effectiveness ratio of €13,684 per quality adjusted life year (with a fixed €50 000 willingness-to-pay).

**Conclusion:** Our results suggest that structural interventions and interventions consisting in sending educational material to improve OP management are at least cost-effective and cost-saving.

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## P671

## BONE MICROINDENTATION AND TRABECULAR BONE SCORE IDENTIFY PRIOR FRACTURE IN MEN WITH AND WITHOUT CHRONIC KIDNEY DISEASE

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**Objective:** Patients with chronic kidney disease (CKD) are at higher risk of fracture. Studies using BMD to predict fractures in CKD patients have shown inconsistent results[1], though measures such as trabecular bone score (TBS)[2] and impact microindentation (IMI)[3] show promise. This study determined whether these methods identify prior fracture in men with and without CKD.

**Methods:** Men (n=305, age 33-96 y) enrolled in the Geelong Osteoporosis Study were included. Femoral neck BMD was measured using DXA (Lunar Prodigy). TBS was determined from lumbar spine scans using TBS iNsight software (Version 2.2). BMSi was measured according to guidelines[4]. CKD was defined as an eGFR <60 mL/min/1.73m$^2$ (n=51). Prior low trauma fractures (n=32) were ascertained from radiological reports. Associations were examined using binary logistic regression, adjusting for other potential confounders (e.g., age, lifestyle factors).

**Results:** Higher BMSi was associated with a lower likelihood of prior fracture (odds ratio (OR) 0.949; 95%CI 0.901-0.999, p=0.046) and men with CKD were at a higher likelihood of prior fracture (OR 2.463, 1.075-5.641, p=0.041). There was no interaction between BMSi and CKD detected (p=0.773), indicating that BMSi performed similarly in identifying the likelihood of prior fracture, regardless of CKD status. Femoral neck BMD was not associated with prior fracture (p=0.280), however higher TBS was associated with lower likelihood of prior fracture (OR 0.867, 0.774-0.971, p=0.021). There were no interactions with CKD for BMD or TBS (p=0.352 and p=0.410).

**Conclusions:** Both BMSi and TBS were associated with prior fracture in men with and without CKD. BMD was not associated with prior fracture in this group of men. Men with CKD were at a two-fold higher likelihood of fracture.

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## P672

## THE RELATIONSHIP BETWEEN SUPPLEMENTATION OF CHOLECALCIFEROL IN VARIOUS DOSES AND PTH LEVELS IN PATIENTS WITH TYPE 2 DIABETES AND DEFICIENCY/ INSUFFICIENCY OF VITAMIN D

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**Objective:** Common among patients with type 2 diabetes mellitus (TDM2): deficiency/insufficiency of vitamin D (VD) and secondary hyperparathyroidism are modifiable factors. We studied the relationship between the addition of different doses of cholecalciferol in deficiency/insufficiency of VD and levels of 25(OH)D and PTH in patients with TDM2.

**Method:** A single-center controlled clinical trial involving 62 patients with TDM2. Serum levels of 25(OH)D and PTH were studied before and after 24 weeks of treatment with cholecalciferol in dose of 5000 IU/week (Gr1, n=31, F 16) and 40000 IU/week (Gr2, n=31, F 15). Groups of patients were

comparable in age, sex, BMI, duration of diabetes (more than 5 y), the level of HbA1c (up to 9%), the treatment received, which did not change during the study period. Comparisons between groups were made using covariance analysis (ANCOVA).

**Results:** Initially, deficiency/insufficiency was detected in 78% of the examined (n=48. 25 (OH) D 23.1±12.9 ng/ml), the level of PTH corresponded to 41.1±34.1 pg/ml. There were no differences between the groups in the levels of 25 (OH) D and PTH (p=0.7482 and p=0.6328, respectively). After 24 weeks in Gr1, level 25 (OH) D changed from 22.6 ±14.6 ng/ml to 28.5±13.2 ng/ml (p=0.0012), and in Gr2 from 23.7±11.1 ng/ml to 77.4±27.2 ng/ml (p=0.0001). PTH level decreased in Gr1 from 37.6±21.1 pg/ml to 30.0±15.3 pg/ml (p=0.0594), and in Gr2 from 41.1±34.1 pg/ml to 32.1±13.0 pg/ml (p=0.0967). A negative correlation was established between the level of VD and PTH (r=-0.150), however, the strength of communication is weak and the dependence of symptoms is not statistically significant (p=0.0972).

**Conclusions:** For starting therapy of VD deficiency/ insufficiency in patients TDM2, it is preferable to use supraphysiological doses of cholecalciferol. With the normalization of VD status, there is a tendency to a decrease in the level of serum PTH.

## P673

## USING ARTIFICIAL INTELLIGENCE TO PREDICT INCIDENCE OF KNEE OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE (OAI) AND THE MULTICENTER OSTEOARTHRITIS STUDY (MOST)

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**Objective:** Osteoarthritis (OA) is the most common joint disorder worldwide. However, predicting its incidence at the individual level has remained a challenge. Here, we aim at a prognosis model that deploys deep learning techniques to leverage the large image datasets in OAI and MOST to predict the incidence of OA based solely on image data.

**Methods:** We screened conventional posterior-anterior knee radiographs of men and women from the Osteoarthritis Initiatives Study (OAI) and Multicenter Osteoarthritis Study (MOST) database for modality and digitalization artifacts, resulting in a total of 2900 images. These were classified as incident or non-incident over the observation period, based on Kellgren & Lawrence scoring (KL>1). This dataset was split into train- (1885), validation-(508) and test- (507) datasets. Class imbalance between incident/non-incident images was approximately 1:4 and was controlled by oversampling the minority class. We trained a convolutional neural network to predict OA incidence on these images, with or without clinical data (such as JSW and KL score).

**Results:** We show that the accuracy and sensitivity of the convolutional neural network at predicting the incidence of OA based solely on image-data is significantly above 50%.

**Conclusion:** This study provides evidence that applying deep convolutional neural networks has the potential to predict incidence knee OA based solely on the information contained in a conventional 2D radiograph before any radiographic signs of the disease. Adding additional clinical data could potentially further increase the prediction of OA.

## P674

## TRENDS IN HIP FRACTURE INCIDENCE IN WOMEN AND MEN OVER 1980-2015 IN OLMSTED COUNTY, MINNESOTA, USA

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**Objective:** Hip fracture incidence, which has been generally declining in North America, may have recently plateaued in women (Lewiecki, et al 2018). We examined the trends in hip fracture incidence over 1980-2015, in both women and men, from Olmsted County, Minnesota, USA.

**Methods:** Using the Rochester Epidemiology Project, a unique medical records linkage system that allows access to all (inpatient and outpatient) community medical records for Olmsted County residents, we identified all incident hip fractures among residents age ≥18 y between 1980-2015. Available medical records were reviewed by trained nurse abstractors to validate hip fractures identified and to determine their antecedent cause (pathological process [e.g., malignancy], severe trauma [e.g., motor vehicle accidents] and those due to no more than moderate trauma [by convention, equivalent to a fall from standing height or less]). Overall incidence rates were summarized separately for women and men, as well as by 5 y strata for different age groups (ages 18-39, 40-59, 60-79 and ≥ 80 y). Rates for women and men were each directly age-adjusted to the population distribution of US whites in 2010.

**Results:** Between 1980-2015, we identified 2488 hip fractures in women (73%, median age 84 y) and 918 hip fractures in men (27%, median age 80 y), 97.4% of which were in whites. The majority of hip fractures were due to no more than moderate trauma (88% in women; 81% in men). The overall age-adjusted annual incidence of first hip fracture over 1980-2015 was 154 per 100,000 person-years (p-y) for women and 98 per 100,000 p-y for men. Hip fracture rates have decreased overall in women since 1980 (Table), however since 2005, there has been a trend for increasing hip fractures among women age 40-59 and since 2010, a possible plateau vs. slight increase in hip fracture rate for women age ≥ 80 y. In men, there has been a general decrease in rates among those age 60-79 and, at least since 2005, in men age ≥ 80 y, but there may be

a trend for increasing hip fractures since 2010 in men age 40-59 (Table).

| | Hip Fracture Incidence per 100,000 p-y by Age Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 18-39 y | | 40-59 y | | 60-79 y | | ≥ 80 y | |
| Years | Women | Men | Women | Men | Women | Men | Women | Men |
| 1980-84 | 2 | 4 | 43 | 7 | 345 | 175 | 1954 | 1173 |
| 1985-89 | 4 | 4 | 32 | 11 | 329 | 163 | 1892 | 1188 |
| 1990-94 | 2 | 3 | 26 | 19 | 282 | 122 | 1914 | 771 |
| 1995-99 | 4 | 3 | 20 | 17 | 302 | 168 | 2117 | 1116 |
| 2000-04 | 2 | 6 | 10 | 9 | 199 | 132 | 1788 | 1300 |
| 2005-09 | 5 | 4 | 27 | 10 | 203 | 134 | 1320 | 1148 |
| 2010-15 | 4 | 4 | 27 | 29 | 162 | 125 | 1413 | 811 |

**Conclusion:** There appears to be different trends in hip fracture rates for women and men and by age groups. The factors contributing to the observed recent increases in hip fracture rates among women and men ages 40-59 warrant further attention. As suggested by others, there may be a recent plateau vs. slight increase in hip fracture rates in older women, which we noted in women age ≥ 80 y since 2010.

**Reference:** Lewiecki EM et al. Osteoporos Int 2018;29:717

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## P675

## 24,25(OH)2D AS A MARKER OF VITAMIN D DEFICIENCY IN CHILDREN: A RETROSPECTIVE ANALYSIS ON 1200 CASES

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**Objective:** Vitamin D deficiency definition is a matter of intense debate. CYP24A1, the enzyme responsible for 25(OH)D degradation metabolite of 25(OH)D, has been shown to be induced when 25(OH)D levels started to reach sufficiency levels. In this study, we retrospectively measured 25(OH)D and 24.25(OH)2D, the metabolite of CYP24A1, in a population of 1200 children to evaluate the 25(OH)D threshold above which the enzyme was induced.

**Method:** Serum samples from 1200 children (from 5 months to 20 years old, mean age: 12±5.5 years old) who underwent a blood sampling for allergy exploration were used to simultaneously quantify 25(OH)D and 24,25(OH)2D with our previously described LCMS/MS method. The limits of quantification of 24,25(OH)2D and 25(OH)D were 0.5 and 2 ng/mL, respectively.

**Results:** Median levels were 20.6 ng/mL (interquartile range: 14.4; 27.2 ng/mL) for 25(OH)D and 1.40 (IQR: 0.78; 2.20) ng/mL for 24,25(OH)2D. None of the children presented a 25(OH)D/24.25(OH)2D ratio higher than 50, the threshold generally used to detect idiopathic infantile hypercalcemia. The Spearman coefficient of rank correlation between 25(OH)D and 24,25(OH)2D was 0.83 ($p<0.001$). The relation between 25(OH)D and 24,25(OH)2D and the Loess representation showed an inflexion point around a 25(OH)D value of 20-25 ng/mL. Above this point, the slope is steeper, showing 2 different kinetics modes for the enzyme.

**Conclusion:** The relation between 25(OH)D and 24,25(OH)2D in children shows that CYP24A1, the enzyme responsible for 25(OH)D degradation has a bimodal role: below a 25(OH)D value of about 20-25 ng/mL, the slope between moieties shows a smooth increase, whereas this slope becomes steeper above the threshold. Our data confirm that the value defining vitamin D sufficiency should be around 20-25 ng/mL.

## P676

## NOVEL ELISA ALLOWS ACCURATE QUANTIFICATION OF INTACT FIBROBLAST GROWTH FACTOR 23 (FGF23) IN SERUM AND PLASMA

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**Objective:** FGF23 is a bone-derived hormone, suppressing renal phosphate reabsorption and vitamin D synthesis, and stimulating calcium reabsorption in distal tubules of the kidney. The bioactive intact FGF23 contains 251 amino acids and is glycosylated and phosphorylated. Its activity is mediated by binding to FGFR/Klotho receptor complex at the target cell surface. FGF23 is cleaved between Arg179 and Ser180 to an inactive N- and C-terminal fragment. Increased serum concentrations of intact FGF23 are a hallmark of renal phosphate-wasting diseases such as ADHR, X-linked hypophosphatemia (XLH), tumor-induced osteomalacia, or autosomal recessive hypophosphatemic rickets.

**Methods:** Here, we show the development, characterization and validation of a new intact FGF23 ELISA. Epitopes of both monoclonal antibodies were analyzed by overlapping linear peptides spotted to a microarray and binding kinetics were determined with biolayer interferometry. The assay was validated according to standard quality guidelines regarding its specificity, precision, robustness, accuracy, and linearity. Assay performance as well as sample measurements of apparently healthy and diseased human subject were compared with other commercially available assays.

**Results:** The structural epitope of the coating antibody is located in the N-terminal part of FGF23, whereas the horseradish peroxidase labelled detection antibody detects a linear epitope at the C-terminal fragment. Both antibodies bind with high affinity to the intact FGF23 molecule. The sandwich immunoassay generates highly specific signals for human intact FGF23 and does not interfere with FGF3, FGF19 and FGF21. Accuracy, parallelism, as well as intra- and inter-

assay precision are within the standard of acceptance according to the international ICH quality guidelines. The intact FGF23 ELISA correlates well with other existing commercial assays ($R^2 > 0.95$) when apparently healthy and diseased samples are compared. The assay shows a broader overall calibration range and samples require a shorter incubation period when compared to other assays.

**Conclusion:** This well characterized ELISA can be used for the reliable measurement of intact FGF23 in human serum and plasma samples and may support further FGF23 research in the field of bone and mineral diseases.

## P677

## A MULTICENTER STUDY TO EVALUATE HARMONIZATION OF ASSAYS FOR N-TERMINAL PROPEPTIDE OF TYPE I PROCOLLAGEN (PINP): A REPORT FROM THE IFCC-IOF WORKING GROUP FOR THE STANDARDIZATION OF BONE MARKER ASSAYS

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**Objective:** Biochemical bone turnover markers (BTM) are useful tools to assess bone remodeling at the cellular level. N-terminal propeptide of type I procollagen (PINP) has been recommended as a reference marker for bone formation in research studies.

**Methods:** We describe the results of a multicenter study for routine clinical laboratory assays for PINP in serum and plasma. Four centers (Athens GR, Copenhagen DK, Liege BE and Sheffield UK) collected serum and plasma (EDTA) samples from 796 patients presenting to osteoporosis clinics. Specimens were analyzed in duplicate with each of the available routine clinical laboratory methods according to the manufacturers' instructions. Passing-Bablok regressions, Bland-Altman plots, V-shape evaluation method and Concordance correlation coefficient for PINP values between serum and plasma specimens and between methods were used to determine the agreement between results. A generalized linear model was employed to identify possible variables that affected the relationship between the methods.

**Results:** We showed that both EDTA plasma and serum were suitable for PINP determination. We observed a significant proportional bias between Orion radioimmunoassay and the automated methods for PINP (Roche Cobas and IDS iSYS), which both gave very similar results. The multivariate model did not improve the excellent correlation that was observed between the methods.

**Conclusion:** Harmonization of PINP assays is possible by applying a correction factor or correctly assigning the values of the calibrators. This work will benefit from further collaboration between assays manufacturers and clinical laboratory professionals.

## P678

## THE ROLE OF VITAMIN D IN OSTEOPOROSIS

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According to definition of the WHO, osteoporosis is a disease that is characterized by losing mineral bone density and losing bone mass through determined period of time which leads to fractures. Vitamin D is the most important in maintaining human bone health and in specific cases it needs supplementation. The goal of this essay, besides its educational character, is to show that the lack of vitamin D affects the quality of life of those diseased with osteoporosis, as well as the development of the disease. In accordance with that, the working and null hypothesis are set.

Working hypothesis: Subjects that have DXA diagnosed osteoporosis and that started menopause early have a lower bone mass, lower concentration of vitamin D and worse quality of life compared to the women that entered menopause later.

Null hypothesis: Subjects that have DXA diagnosed osteoporosis and that entered menopause early have the same concentration of vitamin D and the same quality of life compared to the women that entered menopause later.

The research is a comparative, descriptive and prospective study conducted within a group of women aged between 42-60. Results of the research show that subjects that entered menopause earlier have smaller concentration of vitamin D and worse quality of life compared to the subjects who started menopause in the physiologically expected time frame or later and also the statistical data, related to the bone mass, shows significant changes. This research shows that osteoporosis and vitamin D are closely connected.

## P679
## THE GLOBAL OSTEOARTHRITIS PATIENT PERCEPTION SURVEY (GOAPPS): A PILOT STUDY

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**Objective:** Globally, osteoarthritis (OA) is the third condition associated with disability. Science holds the key to finding better treatments and a cure. Still, it is essential to learn what's important to patients from them to implement the most effective global management of OA. We created the Global OA Patient Perception Survey (GOAPPS)-the first global survey to compare the quality of life (QoL) & patient perceptions of care across countries. The goal was to help all OA stakeholders develop a better understanding of patients' perceptions and how they may differ between cultures by collecting data on OA patient perceptions regarding their OA care.
**Methods:** Observational, cross-sectional study by online survey data collection translated into three languages. We collected data on patient demographics, symptomology, OA impact on daily activity and QoL to investigate the relationship between patient perceptions of their OA care, symptoms and impacts, and QoL. The questionnaire comprised of 4 sections: clinical characteristics, relationship with physicians and treatment, perception of attention, treatment and information received, and auto-evaluation of QoL. Inclusion criteria included resident age 18 or older with an OA.
**Results:** 1485 surveys were completed from 7 countries (1264 in English, 218 in Spanish, 3 in Italian); data prevented the analysis of cultural differences in this pilot. The majority of the respondents were female (90%), > 55 years (82%). The majority had knee (73%), hand (57%) and spine (54%) OA. Comorbidities included hypertension (50%) and obesity (43%). Patients stated limitations related to physical activities (97%), work activities (49%), social interaction (43%) and sex life (23%). The 37% of patients had emotional or mental health issues. The 58% says the doctor adequately explained the diagnosis, 55% understand the treatment options. The 41% was unsatisfied with the treatment and 79% would like access to no-drug/no-surgical treatments. While 52% of respondents rate their QoL as good, 95% would rate it better if their OA was removed.
**Conclusion:** The results emphasize the significant impact of OA on patients' daily activities and their desire to play an active role in managing their disease. The majority asks for access to additional options for no-drug/no-surgical treatments proving the need for an OA management improvement.

## P680
## EVALUATION OF THE STABILITY OF IONIZED MAGNESIUM AND IONIZED CALCIUM ON THE "STAT PROFILE PRIME PLUS ANALYZER" OF NOVA BIOMEDICAL

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**Objective:** Magnesium (Mg) is an abundant (mostly) intracellular ion in the human body and can be found as free ionized (65-70%), bound (35%) or complexed forms. The bound form is the most frequently measured in routine. Ionized Mg (iMg) is however the active form but is poorly described in the literature, mainly due to a lack of methods allowing its determination. Recently, Nova Biomedical developed concomitant measurement of iMg and iCa on the *Stat Profile PRIME Plus* blood gas analyzer. If it is well known that iCa is not very stable and must be measured rapidly after sampling, nothing is known about iMg stability. In this study, we aimed at evaluating iMg and iCa stability in a population of 10 healthy individuals.
**Methods:** Ten healthy subjects (6W/4M, mean age 32.6 yo, ranging from 26-60) agreed to participate and gave consent to give each 7 lithium heparin samples. One sample was immediately measured (T0) and the others were kept unprocessed during 1 and 4 h at room temperature (RT) and during 1, 4, 8 and 24 h at +4°C and were measured after homogenization on the Nova Biomedical Stat Profile PRIME Plus Analyzer blood gas analyzer. Evaluation of the stability was achieved with the Wilcoxon test and with the Acceptable Change Limit (ACL) and the Total Change Limit (TCL) concepts, using published results for intra-individual biological variation ($CV_i$) .
**Results:** iMg was shown to be unstable whatever method used for stability evaluation. iCa was shown to be stable 1 h at RT or +4°C according to ACL and TCL concepts, but not with the Wilcoxon test.
**Conclusions:** Our results show that storage-induced pH decrease leads to iMg and iCa concentrations increase. This increase is already significant after 1 h at RT or +4°C for iMg. Hence, iMg determination must be performed as fast as possible after sampling. We also confirm that iCa must be measured within the hour after sampling. These results are of importance for the further evaluation of clinical role of iMg.

## P681
## RISK FACTORS FOR OSTEOPOROSIS IN WOMEN WITH RHEUMATOID ARTHRITIS

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**Objective:** To identify the most important risk factors (RF) for OP in women with rheumatoid arthritis (RA); estimate 10-y risk of fractures using FRAX calculator.
**Methods:** 50 women (mean age 48.15±10.89 y) with RA were examined. BMD measurement of lumbar spine (LS) and proximal femurs (PF) was performed by DXA (Lunar Prodigy, GE, USA). OP was diagnosed according WHO criteria. RA activity was determined by DAS28. 10-y risk of fracture was calculated with FRAX. Statistical analysis was carried out using the software Statistica 6.0.
**Results:** The frequency of OP in the studied sample was 22.2% in LS; 11.1% in FN. 10 women (20%) had preserved menstrual function, 40 women (80%) were menopausal. In postmenopausal women OP was determined in 37.5% of cases (n 15), osteopenia in 55% (n 22), normal BMD in 7.5% (n 3). In patients with preserved menstrual OP was determined in 10% (n 1), osteopenia in 40% (n 4), normal BMD in 50% (n 5). The average age in patients with high and moderate RA activity was 57.3 (±14.3) and 61.5 (±16.02) y, respectively. The average age in patients with low RA activity or remission was 50.6 (±18.14) and 49.95 (±18.01), respectively. The sample was divided into 3 groups: I - patient with OP (n 20, mean age 66.65±13.5), II - osteopenia (n 21, mean age 63.2±12.65), III - normal BMD (n=9, mean age 48.15±10.89). Mean RA duration in group I was 174. II - 169.14. III - 91.1 month.% of patients with high RA activity in group I was 43%, II - 36%, III - 20%. Mean CRP level: I - 19.4 mg/l; II- 32.48 mg/l; III - 16,.5 mg/ l. Mean period of GC treatment: I - 18 months, II – 31.23; III - 16.8, average daily dose of GC during the year (I- 3 mg/d, II- 3.23 mg/d, III- 3.3 mg/d). OP in GC users was diagnosed in 56%: in LS - 89%, in FN - 11%. 10-y probability of fracture by FRAX was higher with a combination of factors: menopause, GC, family history of OP.
**Conclusions:** OP in patients with RA is associated with RF of the disease itself (duration and activity of RA, duration of GC therapy, annual dose of GC), as well as with generally accepted RF OP: menopause, family history of OP. The most significant factors of FRAX questionnaire that increase the 10-y probability fractures in patients with RA are long-term GCS therapy, older age.

## P682
## CHONDROCYTE SIZE IS A PATHOPHYSIOLOGY MARKER IN OA

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**Objective:** Terminal differentiating growth plate chondrocytes are mainly characterized by an increase of their cell size and by the expression of hypertrophic markers such as type X collagen. Likely, during osteoarthritis (OA) progression, articular chondrocytes acquire a similar protein profile, and, therefore, they have been commonly described as hypertrophic-like chondrocytes. We aimed to assess whether an increase in chondrocyte size might be a feature of the articular cartilage (AC) hypertrophic-like phenotype both in experimental and in human OA. The anatomical location of these enlarged cells in the cartilage layers was also evaluated.
**Methods:** New Zealand female rabbits were randomly assigned to four groups: healthy (n=8), osteoporosis (OP, n=7), OA (n=8) and OA preceded by OP (OPOA, n=8). OP was induced by ovariectomy followed by metilprednisolone administration (1 mg/kg/d) during four weeks. OA was induced by anterior cruciate ligament section and partial medial meniscectomy, lasting over a period of 6 weeks. All animals were euthanized and tibias were collected for histological analysis. Cartilage damage and chondrocyte size were assessed in Safranin-O fast green stained sections. Type X collagen and metalloproteinase-13 presence was analyzed by immunohistochemistry. Nine human samples were obtained during total knee replacement surgery to perform identical histological studies after the informed consent was gained. Both the cell size and the gene expression of type X collagen were further analyzed in primary murine chondrocyte cultures. Statistical comparisons were performed using Kruskal-Wallis and Mann Whitney tests, whereas correlations were done with Spearman test.
**Results:** Mankin score showed an increase in cartilage damage in all groups in comparison to healthy rabbits. The most severe cartilage damage was observed in the OPOA group (Healthy: 1.0 (0-1.5), OP: 2.3 (1.5-4.5), OA: 8.0 (7-13), OPOA: 13 (11-16)). Chondrocyte size in OA and OPOA cartilages were greater than that in healthy cartilage, and significantly greater in OPOA vs. OA (Healthy: 133.0 (91.1-158.7), OP: 140.7 (119.7-198.3), OA: 180.9 (120.5-266.4), OPOA: 217.4 (183.6-303.5). However, no differences in the mean chondrocyte size were found between the deepest and in the most superficial regions of the AC in any of the groups analyzed. Chondrocyte size and cartilage damage were significantly and positively correlated ($p<0.001$, $r=0.718$). In addition, chondrocyte size was also associated with immunoreactive type X collagen staining ($p<0.05$, $r=0.444$). Regarding human OA cartilage, chondrocyte size also correlated with cartilage damage and with type X collagen presence ($p<0.001$, $r=0.921$ and $p<0.05$, $r=0.663$ respectively). In cell cultures, accretion of hypertrophic markers and cell enlargement were found to occur synchronized.
**Conclusions:** We observed an enhancement in the mean size of chondrocytes at the OA cartilage, which showed correlation with cartilage damage, both in human and in experimental OA. The enlarged chondrocytes were homogeneously distributed throughout the AC. Our results suggest that chondrocyte size could be a reliable measure of disease progression, of potential use in the histopathological assessment of OA cartilage.

## P683

## EFFICACY OF HIGH-INTENSITY LASER THERAPY IN THE MANAGEMENT OF LOW BACK PAIN

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**Objective:** Chronic low back pain lasts longer than 12 weeks and is characterized by pain, muscle weakness, reduced functional ability and psychosocial burden. Our aim was to compare the effects of two physical modalities, high-intensity laser against ultrasound therapy in treatment of patients with chronic low back pain.
**Method:** This was a prospective, monocentric, controlled clinical study comprising a group of 54 patients at the age between 25-65 y. Patients were divided into two groups: examined group of 27 patients (high-intensity laser and exercises) and control group of 27 patients (ultrasound therapy and exercises). The results were evaluated by the Numeric Pain Rating Scale, Oswestry Disability Index and Schober's test. Clinical findings were evaluated at same time points for all patients, prior to treatment, at two weeks and at three months following treatment. Statistical analyses were made in order to compare the differences between the results obtained on admission and on the two consecutive control checkups. Statistical significance was defined as a P value $<0.05$.
**Results:** The examined group showed statistically significantly better results than control group after completion the treatment (at two weeks) and at follow-up after three months.
**Conclusion:** This study has shown that patient with chronic low back pain treated with high-intensity laser has significantly reduced low back pain, reduced disability and improved range of motion. Its positive effect maintained for 3 months. It seems to be an effective, safe and useful physical modality in treatment of patient with chronic low back pain.

## P684

## AN EXPERT CONSENSUS ON THE APPROPRIATE USE OF ORAL SYSADOAS FOR THE TREATMENT OF THE OSTEOARTHRITIC PATIENT IN PRIMARY HEALTHCARE: A DELPHI STUDY

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**Objective:** Clinical studies have demonstrated that osteoarthritic pain is linked to disability and quality of life (QoL). The therapeutic modalities in the treatment of osteoarthritis (OA) are numerous and despite evidence-based guidelines for OA management, agreement on treatments is lacking. there is disagreement about symptomatic slow-acting drugs (SYSADOA), use in OA clinical practice. Our objective was to prepare a consensus document on the appropriate use of oral SYSADOAs: chondroitin sulfate (CS), glucosamine (G), diacerein (D) and the combination of CS plus G for OA management in primary care (PC).
**Methods:** A two-round Delphi. The questionnaire validated by the expert committee (3 rheumatologists, 2 PC physicians, 1 clinical pharmacologist) included 24 questions, 206 outcomes. 15 experts constituted the Delphi panel with experience in OA treatment and the use of oral SYSADOAs. Items that reached consensus by at least 80% across both panels were included in the guidelines. The fieldwork of the study lasted 4.5 months. This study was promoted by the International Osteoarthritis Foundation (OAFI) with the support of the Spanish Ministry of Health, Social Services and Equality.
**Results:** Consensus statements emerged: (1) patient phenotypes affects SYSADOAs action; (2) SYSADOAs are effective in primary and secondary OA, in the three first grade of knee OA, hand and hip; no appropriate for erosive hands, shoulder, spine, and ankle OA; (3) CS, G and association can reduce pain, inflammation, improve QoL and functional capacity and have a chondroprotective effect; (4) CS and D can reduce synovial membrane inflammation, all oral SYSADOAs, except D, can decrease cell death and the enzymes responsible for cartilage destruction; (5) The maximum therapeutic efficacy is reached after 3/6 months; (6) SYSADOAs can be prescript to patients having comorbidities. There is disagreement in the prescription of oral SYSADOA in patients with liver and kidney disease.
**Conclusion:** This study sheds light on the appropriate use of oral SYSADOAs in PC by providing added value to published evidence. The diffusion of our results among PC practitioners will contribute to improving OA patient management protocols to ensure a personalized treatment to OA patients and to ameliorate their QoL.

## P685

## USEFULNESS OF TRABECULAR BONE SCORE IN DIALYSIS PATIENTS

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**Objective:** The number of patients on dialysis is steadily increasing. Associated comorbidities include impaired mineral and bone metabolism leading to a higher fracture possibility, increased morbidity and mortality rate and decreased quality of life. Representing the structural condition of the bone

microarchitecture DXA is often used in combination with trabecular bone score (TBS) to assess metabolic bone disorders. The aim of this study was to evaluate the clinical relevance of DXA and TBS with regard to fracture prediction in dialysis patients.

**Methods:** 82 patients, who underwent dialysis at the university hospital of Graz, were included. All patients were interviewed for prevalent fractures and musculoskeletal pain. Statistical analysis was performed to correlate the results of DXA and TBS with musculoskeletal pain and fracture rate considering the kind and duration of dialysis as well as the number of kidney transplantations.

**Results:** 36 out of 82 patients (43.9%) patients suffered from musculoskeletal pain and 32 out of 82 patients (39%) had a positive history of fracture. There was a significant linkage between dialysis duration and fracture rate ($p<0.05$) as well as musculoskeletal pain ($p<0.01$). No significant correlation between the DXA- and TBS-parameters and musculoskeletal pain could be established. DXA scores did not correlate with fracture history with the exception of DXA radius measurements. However, a high fracture rate in patients on dialysis significantly correlates with a low TBS ($p<0.001$).

**Conclusion:** DXA has a limited role in fracture prediction in patients on dialysis. However, the TBS seems to be a better predictor regarding the fracture risk in this patient population.

## P686
## OMEGA-3 INTAKE IN PRESARCOPENIC AND SARCOPENIC ELDERLY

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**Objectives:** Omega-3 polyunsaturated fatty acids (PUFAs) are gaining an important role in sarcopenia research. Higher levels of omega-3 PUFAs intake have been associated with an improvement of sarcopenia defining parameters (muscle strength, mass and quality) and physical performance. Accordingly, omega-3 PUFAs supplements may be a potential therapeutic agent for sarcopenia. However, data about omega-3 PUFA intake in the (pre)sarcopenic elderly are scarce. The objective of present study is to determine the omega-3 PUFAs intake of participants at baseline without supplementation in the Exercise and Nutrition for Healthy AgeiNg (ENHANce) randomized controlled trial (RCT).

**Methods:** ENHANce is an ongoing 5-armed RCT (ClinicalTrials.gov: NCT03649698) that examines the effect of an individualized nutritional intervention (protein supplementation and/or omega-3) combined with a physical exercise program in community-dwelling (pre)sarcopenic older persons aged ≥65 y. Self-reported dietary intake is estimated through 4 day food diaries and analyzed for total omega-3 PUFAs intake. US Dietary reference daily intake (RDI) is used as cutoff for adequate intake (men: 1.6 g/d and women 1.1 g/d).

**Results:** As on 23 January 2019, 37 participants completed their baseline food diaries (mean age 74.76±6.4 y, 45% female, handgrip strength 31.82±10.93 kg, gait speed 1.06±0.25 m/s). The study population consists of 29 presarcopenic and 8 (severe) sarcopenic elderly, defined according to the European Working Group for Sarcopenia in Older Persons consensus (EWGSOP1). The overall mean omega-3 PUFAs intake was 1.65±0.75 g/d. Of the male participants only 50% reached the RDI with a mean of 1.76±0.78 g/d, whereas 71% of female participants reached the RDI with a mean of 1.51±0.70 g/d. When analyzed according to EWGSOP1 classification, 71% of presarcopenic and 63% of sarcopenic elderly reached RDI.

**Conclusions:** The majority of (pre)sarcopenic elderly in our study reached the RDI for omega-3 PUFAs. This raises the question whether the RDI is also the appropriate intake for maintaining muscle mass and function in an elderly (pre)sarcopenic population. Similar to specific recommendations for protein intake in elderly, a higher intake than RDI might be needed for this purpose.

## P687
## (PRE)SARCOPENIC OLDER PEOPLE HAVE AN INADEQUATE AND UNEVEN PROTEIN INTAKE, BUT ADEQUATE ENERGY INTAKE

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**Objectives:** The protein recommended daily allowance (RDA) for healthy adults is 0.8 g protein/kg bodyweight (BW)/d. Expert groups, such as the PROT-AGE study group, recommend a protein intake and up to 1.5 g protein/kg BW/d, for elderly with acute or chronic diseases, to overcome anabolic resistance and prevent loss of skeletal muscle mass and function with ageing. Additionally adequate energy intake, 29 kcal/kg BW/d or 2232 kcal/d for men and 1870 kcal/d for women aged above 70 y, is recommended. Up to now however, daily protein and energy intake have not been described in a (pre)sarcopenic older population.

**Methods:** A 4-d estimated dietary record was completed by community-dwelling (pre)sarcopenic individuals (≥65 y). (Pre)sarcopenia was diagnosed by the assessment of gait speed, handgrip strength and muscle mass according to the European Working Group on Sarcopenia in Older People (EWGSOP1) criteria.

**Results:** 37 (pre)sarcopenic community-dwelling adults (45% female, 74.76±6.40 y, 24.35±2.95 kg/m$^2$, gait speed 1.06 ±0.25 m/s, handgrip strength 31.82±10.93 kg) had a higher average protein intake (1.04±0.25 g/kg BW/d, 71.88±17.95 g/d) than the current RDA, but lower than the recommendations of the PROT-AGE study group. The timing of protein intake was unevenly distributed, reaching only at lunch the level for optimal muscle protein synthesis (Figure 1). The average energy intake was only slightly below the recommended intake for men (2039.65±405.42 kcal/d, 26.98±5.31 kcal/kg BW/d) and sufficient (1856.65±366.51 kcal/d, 30.21 ±5.47 kcal/kg BW/d) for women.

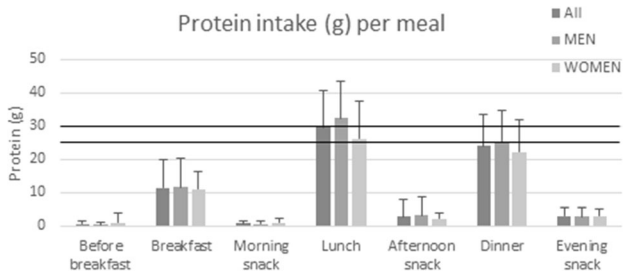


Figure 1. Daily protein intake (g) distributed per meal (mean and SD) in (pre)sarcopenic older individuals, dark grey; men, grey; women, light grey. The horizontal line at 25 g and 30 g represents the amount of protein required per meal to maximally stimulate muscle protein synthesis.

**Conclusions:** Both the amount and timing of protein intake are suboptimal in community-dwelling (pre)sarcopenic elderly. Since both higher protein intake and an even protein intake distribution are associated with higher muscle mass and function, we must rethink strategies on how to increase for protein intake and distribution in community-dwelling (pre)sarcopenic elderly. A higher protein intake may consequently result in higher energy intake.

## P688

## AN EXPLORATION OF THE STRUCTURAL VALIDITY OF THE SARCOPENIA QUALITY OF LIFE (SARQOL®) QUESTIONNAIRE WITH EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS

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**Objective:** The SarQoL questionnaire is a patient-reported outcome measure specific to sarcopenia. Several of its psychometric properties have previously been examined, but its structural validity has not yet been analyzed. The theoretical factor structure, formulated by a group of experts during the development of the questionnaire, categorizes the items in 7 domains of health-related dysfunction. This study explores the factor structure of the SarQoL questionnaire through a series of exploratory (EFA) and confirmatory factor analyses (CFA), and compares these to the theoretical model.
**Methods:** A dataset with 2227 sarcopenic and non-sarcopenic subjects from 8 countries (Brazil, Czech Republic, France, Belgium, Poland, Romania, Spain & Switzerland) with complete data for the SarQoL questionnaire was used. The dataset was randomly split into 2 samples, one of which was used for EFA (n=1119, 50.2%), and the other for CFA (n=1108, 49.8%). EFA was carried out with a matrix of polychloric correlations and the Promax rotation. The number of factors to extract was based on the Scree plot, the traditional Kaiser criterion and Velicer's MAP test. CFA was then performed using the weighted least squares mean and variance (WLSMV) adjusted estimator. Fit of the models was evaluated with the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR).
**Results:** The ratio of the 1$^{st}$ eigenvalue (27.5) to the 2$^{nd}$ eigenvalue (2.6) indicated the presence of a single factor. The traditional Kaiser criterion indicated 10 factors and Velicer's MAP test indicated 7 factors. The 1-factor model explained 49% of the total variance, the 7-factor model 54% and the 10-factor model 64%. The 1-, 7- and 10-factor models obtained through EFA were tested in CFA. All three models showed adequate fit, as did the theoretical model (CFI between 0.975 and 0.998; TLI between 0.974 and 0.998; RSMEA between 0.019 and 0.062; SRMR between 0.035 and 0.071).
**Conclusions:** Several models for the factor structure of the SarQoL questionnaire showed acceptable fit. However, an analysis with only sarcopenic subjects would be advisable before drawing conclusions.
**Disclosures:** CB, OB & J-YR are shareholders of SarQoL sprl.

## P689

## DETERMINING INDIVIDUAL TRAJECTORIES OF JOINT SPACE LOSS: A BAYESIAN APPROACH FOR ASSESSING OSTEOARTHRITIS PROGRESSION

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Osteoarthritis-related changes in joint space measurements over time are small and sensitive to measurement

error, and there is considerable variation in disease progression between individuals. This study aimed to examine Bayesian modelling as a new approach to estimating individual trajectories of knee osteoarthritis (OA) progression.

Joint space width (JSW) on radiograph were taken from two datasets: the control arm of the Strontium Ranelate Efficacy in Knee Osteoarthritis trial (SEKOIA), a 3-y multicentre, double-blind, placebo-controlled phase 3 trial, and the Osteoarthritis Initiative (OAI), an open-access longitudinal dataset from the USA of America on participants followed over 8 y. Bayesian hierarchical modelling was used to determine annual estimates of JSW for each study participant. Noninformative priors were assigned to all hyperparameters within the model, and both a random intercept and random slopes were used in the model.

Results from the Bayesian modelling indicated, on average, knee joint space width decreased by 0.14mm/y during the SEKOIA study and 0.08 mm/y in the OAI. When considering individual annual change, the posterior estimates from the Bayesian modelling ranged from -0.64 to 0.15 in SEKOIA and -0.60 to 0.37 in the OAI. Thus at one extreme an individual's average JSW reduction was as large as 0.64 mm/y in SEKOIA and 0.60 mm/y in the OAI, while at the other end another individual's average indicated an increase of 0.15 mm/y in SEKOIA and 0.37 mm/y in the OAI.

Bayesian modelling could prove valuable in monitoring of disease progression and in identification of risk factors for the progression of knee OA that have not yet been discovered. Bayesian modelling allows individual estimates of OA progression to be obtained, which can be used in further analysis to investigate phenotypes for disease progression. Furthermore, application of Bayesian methodology in other clinical areas may aid in monitoring of other conditions.

## P690

## THE EXERCISE AND NUTRITION FOR HEALTHY AGEING (ENHANCE) PROJECT: PROTOCOL OF A TRIPLE BLINDED, RANDOMIZED CONTROLLED TRIAL

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**Objective:** The ENHANce project aims to assess the combined effect of exercise and nutritional interventions to overcome anabolic resistance and prevent loss of skeletal muscle mass and function with ageing, and to determine the underlying mechanisms of action.

**Methods:** 180 community-dwelling (pre)sarcopenic individuals (≥65 y) will be randomly allocated into five groups for a 12 week intervention period, followed by a 12-week follow-up period: 1) exercise intervention + protein placebo + omega-3 placebo; 2) protein + omega-3 placebo; 3) exercise intervention + protein + omega-3 placebo; 4) exercise intervention + protein + omega-3 polyunsaturated fatty acids; 5) protein placebo + omega-3 placebo. All interventions are adapted to the physical capabilities and nutritional needs of the participants. (Pre)sarcopenia will be diagnosed by the assessment of gait speed, handgrip strength (dynamometer) and muscle mass (DXA) according European Working Group on Sarcopenia in Older People (EWGSOP1) criteria. Participants and researchers are blinded to omega-3 and protein treatment. Compliance to the exercise, protein and omega-3 interventions will be objectively measured, by respectively monitoring their movement by an activity monitor, determining nitrogen content in urine and analyzing the composition of the red blood cell membrane. The primary outcome is the change in short physical performance battery score. Secondary endpoints will be, among others, changes in muscle mass and strength, objective compliance to interventions, changes in muscle and blood biomarkers related to sarcopenia, cognition, quality of life and falls.

**Conclusion:** To our knowledge, this is the first RCT in well defined (pre)sarcopenic elderly that investigates the effects of combined and personalized anabolic interventions including omega-3 supplementation, compared to single or placebo interventions. Moreover, innovative technology is used to objectively measure compliance to the interventions., Also metabolic parameters and specific markers in muscle and blood will be examined to help to understand the mechanism of action behind the changes in physical performance. This project will pioneer in research assessing both physiological aspects and mechanistic insights of anabolic interventions, in order to develop more effective interventions for sarcopenia.

## P691

## POSTMENOPAUSAL WOMEN AT HIGH RISK OF OSTEOPOROSIS CONSUME HIGH AMOUNTS OF FRUITS AND VEGETABLES BUT TOO LITTLE DAIRY PRODUCTS: THE COLAUS/OSTEOLAUS COHORT

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**Objective:** A healthy lifestyle, especially diet, plays a major role in the prevention of chronic diseases like osteoporosis (OP). We aimed to evaluate the link between nutrients, diet patterns or compliance to dietary guidelines and bone health among postmenopausal women. Influence of nutrition on trabecular bone score (TBS) was evaluated for the first time.

**Method:** we assessed 1475 women 50-80 y from the CoLaus/OsteoLaus cohort. Exclusion criteria were OP treatment and extreme energy intake. BMD, TBS and vertebral fracture were evaluated with DXA, OP risk factors, calcium supplements, and prevalent major OP fractures via questionnaire. Dietary intake was assessed using a validated, self-administered, semi-quantitative food frequency questionnaire.
**Results:** 1057 women (63.9±7.5 y, BMI 25.8±4.4) met the inclusion criteria; 126 had OP on BMD, 67 a low TBS (<1.23) and 110 prevalent OP fractures. In multivariate analysis, women with OP consumed more vegetal proteins (21.9 ±0.5 vs. 20.2±0.2 g/d, p=0.005), more fibers (18.8±0.6 vs. 17.1±0.2 g/d, p=0.01), less animal proteins (40.1±1.3 vs. 43.9±0.5 g/d, p=0.007), and less calcium (914±36 vs. 1036 ±13 mg/d, p=0.002). According to dietary guidelines, they had a higher compliance for vegetables: OR (95%CI): 1.88 (1.03-3.43) p=0.041, and a lower compliance for dairy: 0.34 (0.14-0.82) p=0.016. Women taking calcium supplements had a higher compliance to dairy products: 1.72 (1.11-2.66), p=0.015. Dietary pattern "fruits and vegetables" was more prevalent in OP women: 1.77 (1.10-2.84), p=0.019. No association was found between TBS values and nutrients, dietary patterns or compliance to dietary guidelines.
**Conclusion:** Postmenopausal women with OP consume a high amount of vegetables, a too low amount of dairy products and animal proteins. The negative effect of vegetables on BMD may be due to the lower value of vegetable proteins and decreased calcium absorption due to fibres. TBS does not seem to be influenced by diet.

## P692
## A PROPOSAL FOR THE ADJUSTMENT OF BONE MINERAL DENSITY FOR BODY DIMENSIONS IN CHILDREN

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**Objectives:** Describing the biological development of a child is very important in bone structure assessment. The precise age estimation is of high importance in BMD evaluation in children, since the bone structure of a studied child is evaluated by using the age and gender dependent references. In addition, the biological age – the bone age in this case – estimation could help this bone structural evaluation process, since the developmental status of the skeletal system can significantly alter from the theoretical developmental status determined by chronological age in healthy, but early or late maturing children. The aims of the study were (1) to check whether volumetric BMD Z-scores estimated by considering chronological age and biological age differ significantly in children aged between 6-18 y, and (2) in the case of significant inaccuracy of Z-score estimation based on only chronological age to construct new BMD standards adjusted for bone age or body developmental status.
**Methods:** Body structural and densitometry data of 476 healthy children aged between 7-18 y were used in the analysis. pQCT measurements were performed at the distal radius using Stratec XCT-2000 equipment (Stratec Inc, Germany). The centile curves of BMD parameters were estimated by using lmsChartMaker Pro 2.3 software.
**Results:** The total and 'cortical + subcortical' BMD changed by age in the studied age interval in both genders. Our results confirmed that when the biological age of a child significantly differs from her/his chronological age, BMD evaluation should be done by considering her/his biological age. If the estimation of any biological age cannot be carried out, BMD references adjusted for height or other body dimensions should be used in the bone health status estimation in children.
**Conclusion:** Due to the increase in individual variability of rate and timing of pubertal developmental processes, the sensitivity of BMD evaluation by considering body developmental status was the lowest in the age between 12-16 y in the boys and between 10-12 y in the girls. Therefore the suggested BMD adjustments for biological ages are highly recommended to use at least in children with ages outside these age intervals.

## P693
## SARCOPENIA: PERFORMANCE OF THE SARC-F QUESTIONNAIRE ACCORDING TO THE EUROPEAN CONSENSUS CRITERIA, EWGSOP1 VS. EWGSOP2

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**Objective:** To compare the impact of the European Working Group on Sarcopenia in Older People definition published in 2010 (EWGSOP1) and its update in 2018 (EWGSOP2) on performance of a screening tool for sarcopenia, the SARC-F questionnaire.
**Methods:** Data from the SarcoPhAge (*Sarcopenia and Physical Impairment with advancing Age*) cohort were used. In 2010, sarcopenia is considered to be present when a person has low muscle mass (i.e., appendicular skeletal muscle mass (ASM)/height$^2$ ≤5.5 kg/m$^2$ for women; ≤7.26 kg/m$^2$ for men) in combination with low muscle strength (i.e., handgrip strength <20 kg for women; <30 kg for men) and/or low physical performance (i.e., Short Physical Performance Battery (SPPB) ≤8 points). In 2018, with the revision of the definition, EWGSOP2 characterizes "*sarcopenia confirmed*" as low muscle strength (handgrip strength <16 kg for women; <27 kg for men) along with low muscle mass (ASM/height$^2$ <6.0 kg/m$^2$ for women, <7.0 kg/m$^2$ for men). If a person also

presents with low physical performance (SPBB ≤8 points), they are considered to have "*sarcopenia severe*". The diagnostic accuracy of the SARC-F was judged using sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) and area under the curve (AUC).
**Results:** A total of 306 community-dwelling subjects over 65 years old (74.8±5.9 y, 59.5% of women) were included, with 16.7% of subjects diagnosed as sarcopenic when using the EWGSOP1 criteria and 10.5% with the EWGSOP2 criteria. With EWGSOP1 definition, results of SARC-F questionnaire were: Se 36.0%, Sp 87.1%, PPV 35.3%, NPV 87.4% and AUC 0.710 (95%CI: 0.636-0.785). With EWGSOP2 definition, results were: Se 46.9%, Sp 86.5%, PPV 28.9%, NPV 93.3% and AUC 0.774 (0.695-0.852) for s*arcopenia confirmed;* Se 66.7%, Sp 86.1%, PPV 23.1%, NPV 97.6%, AUC 0.872 (0.817-0.926) for s*arcopenia severe.*
**Conclusions:** From a clinical point of view, the SARC-F questionnaire seems to have a good discriminative power and a good performance in identifying subjects without sarcopenia with a high confidence (i.e., high Sp). The recommendation of EWGSOP2 to use the SARC-F questionnaire as a screening test is well founded.

## P694
## LEVEL OF DEPRESSION AND GLYCOSYLATED HEMOGLOBIN IN PATIENTS WITH KNEE OSTEOARTHRITIS AND WITH TYPE 2 DIABETES MELLITUS THROUGH DIFFERENT THERAPIES

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**Objective:** Osteoarthritis is the most common joint damage, accompanied by dysfunction. The course of osteoarthritis and concomitant diabetes can lead to depression. The purpose of study are to analyze the correlation of different types of therapy with depression and the level of glycosylated hemoglobin.
**Methods:** Author conducted research from December 2017 to December 2018. The study included 80 patients with osteoarthritis and with type 2 diabetes mellitus through different therapies. These patients were identified through rheumatology database of hospital. Patients were determined index a disease activity as WOMAC and conducted blood analysis, including monitoring of the level of glycosylated hemoglobin every 2 months. Patients completed 2 questionnaires: SF-36, Beck depression inventory.
**Results:** The mean age of surveyed patients was 65 y, and 70% were female . The average disease duration was 6 y. All patients had well controlled diabetes mellitus. 3 group patients: 1 group with chondroitin sulfate 1000 mg/d -25 persons, 2 group with glucosamine hydrochloride 1500 mg/d -25 persons and 3 group patients with combination of 1500 mg of glucosamine hydrochloride with 1200 mg of chondroitin sulfate -30 persons. They received 2 courses of treatment for 3 months and a break in treatment 4 months. In the group of patients with monotherapy glucosamine hydrochloride the level of depression was higher moreover, than patients with another groups ($p<0.05$). The level of glycosylated hemoglobin by the end of the 2nd course of treatment in the glucosamine hydroxychloride group was much higher -7.94% ($p<0.05$). Quality of life more better in group patients with combination of 1500 mg of glucosamine hydrochloride with 1200 mg of chondroitin sulfate.
**Conclusions:** The choice of therapy for patients with OA with type 2 diabetes should include medications whose improve the quality of life and do not aggravate glucose metabolism in patients with type 2 diabetes.

## P695
## MONITORING PROGRAM OF POSTMENOPAUSAL OSTEOPOROSIS LONG-TERM THERAPY

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**Objective:** To develop a complex monitoring program of postmenopausal osteoporosis (PMO) long-term therapy.
**Methods:** The monitoring program includes: DXA, SF-36, QUALEFFO-41, triple-component numeric pain rating scale (NPRS), the test for patient compliance evaluation. The viewed group: 71 women with PMO, age 50 and 65; control group: 22 women without osteoporosis, comparable to the viewed group in age, education and occupation. The viewed group regimen: alendronate 70 mg/week taken with calcium 1000 mg/d and vitamin D 800 IU/d. The control group regimen: the same dose of calcium and vitamin D. SF-36, QUALEFFO-41 and NPRS were filled on the 3rd, 6th and 12th months of the first treatment year (P3, P6 and P12 accordingly) and twice a year afterwards. The test for patient compliance evaluation and DXA were filled once a year. The results of the first year of treatment are presented in this abstract.
**Results:** After 3 months of therapy no significant differences in questionnaires data and rating scale were observed in both study groups ($p>0.05$). After 6 and 12 months of treatment, the comparison of quality of life indicators of the questionnaires demonstrated the greater sensitivity and specificity of QUALEFFO-41 compared to SF-36 ($p<0.01$). At P6 and P12, affected by alendronate treatment, a significant vertebral pain level decrease was achieved in all three NPRS components. After a year of alendronate treatment, a significant increase of lumbar spine BMD by +0.047 (+0.025; +0.093) was detected, which represented +5.85 (+3.15;+10.68)% ($p<0.01$). Increase of femoral neck BMD after 12 months of alendronate treatment is uncertain.
**Conclusion:** The 12-month alendronate treatment in case of high patient's compliance (MPR>80%) causes a significant increase of lumbar spine BMD. QUALEFFO-41 is recommended to use independently as well as in combination with triple-component NPRS as criteria for evaluation of clinically significant effect of PMO therapy. Evaluation of therapy is justified after 6 and 12 months of alendronate treatment.

## P696

## SINGLE INTRA-ARTICULAR PLATELET-RICH PLASMA VS. HOME-BASED THERAPEUTIC EXERCISE PROGRAM IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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**Objective:** To compare the effects of single intra-articular platelet-rich plasma (PRP) and home-based therapeutic exercise program in individuals with knee osteoarthritis in the treatment of knee osteoarthritis.
**Methods:** 69 patients aged 63-87 y of either sex (10 m/ 59 f), diagnosed with knee osteoarthritis, with >6 months duration were included. 39 patients received single injection (4 ml) of PRP (PRP Group), and 30 patients received a single home based exercise program (HBEP Group). All patients were prospectively followed for 6 and 52 weeks with WOMAC, KOOS, VAS and HADS tools.
**Results:** 32 patients in PRP group and 27 patients in HBEP Group finished the entire 52 weeks study period. At 6 weeks, WOMAC, KOOS, VAS and HADS scores, in PRP group were 15% better, compared to HBEP Group. In ROM, PRP group showed significant improvement in passive flexion, compared to HBEP respectively. No major complications were observed in any patients. At 52 week follow-up no statistical differences observed in two groups with WOMAC, KOOS, VAS and HADS tools.
**Conclusions:** At 6 week follow-up, a single dose of PRP injection was found to be more effective than a home-based therapeutic exercise program in terms of improving pain, disability, ROM in patients. At 52 week follow-up, a single dose of PRP injection was not found to be more effective than a home-based therapeutic exercise program of the knee, in individuals with knee osteoarthritis

## P697

## UNDERSTANDING PATIENTS' PREFERENCES FOR OSTEOPOROSIS TREATMENT: THE IMPACT OF PATIENTS' CHARACTERISTICS

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**Objectives:** This study was designed to identify different profiles of treatment preferences and to investigate how patient characteristics influence patients' preferences for antiosteoporosis medication.
**Methods:** Data from a discrete-choice experiment among 188 Dutch osteoporotic patients were used. Patients were asked to repetitively choose between two hypothetical treatments (and an opt-out) that differed in four characteristics: treatment efficacy, side effects and mode combined with frequency of administration. First, a mixed logit model was used to measure heterogeneity across the sample. Then latent class modelling (LCM) was applied to identify potential latent classes regarding patient characteristics. Finally, multinomial logistic regression (MLR) and chi$^2$ explored associations between patients' characteristics and the identified latent classes.
**Results:** All treatment characteristics were important for patients' decision regarding osteoporotic treatment. Significant heterogeneity was observed for most attributes. Three latent classes were identified, in which 6-month subcutaneous injection was preferred in two classes (86%), while oral tablets were preferred in the third class (14%). No statistically significant associations between the latent classes regarding sociodemographic or clinical characteristics (besides BMI) could be found.
**Conclusions:** This study revealed patterns in patients' preferences for osteoporosis treatment, which cannot be related to specific sociodemographic or clinical characteristics. This implicates underlying reasons for the preferences which were not observed. This implicates the necessity to address patient preferences for each individual patient when discussing starting or switching treatment to ensure that more patients stay adherent to anti-osteoporotic medications.

## P698

## MAJOR OSTEOPOROTIC FRACTURE RISK FOLLOWING BARIATRIC SURGERY: A SELF-CONTROLLED CASE SERIES INCLUDING 5492 PEOPLE FROM THE UK CPRD AND LINKED HES DATABASES

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**Objective:** Bariatric surgery is increasingly common due to the obesity epidemic but there is controversial evidence about

the risk of fracture after bariatric surgery potentially due to differences between the patients who receive surgery and those who do not. We aim to investigate the association between bariatric surgery and risk of three fracture locations, using a within person study design comparing a) the 5-y incidence postsurgery to the 5-y presurgery risk and b) splitting the 5-y postsurgery risk into two windows 0-2 and 2.01-5 y.

**Methods:** A self-controlled case series analysis was conducted. Patients undergoing bariatric surgery and experiencing fracture were identified in the clinical practice research datalink (CPRD) GOLD dataset and linked to hospital episode statistics (HES) data. Primary outcome was any fracture (any skeletal sites except skull and digits). Secondary outcomes were major (hip, vertebrae, forearm and humerus) and peripheral fractures (forearm and lower leg). Poisson models were fit to calculate incidence rate ratios (IRR) for the aforementioned time windows.

**Results:** Of 5492 patients undergoing bariatric surgery, 252 patients had 272 any fractures, 75 had 80 major osteoporotic fractures and 126 had 135 peripheral fractures. Average BMI was 43.9. Major fracture risk increased nearly 3-fold following surgery: IRR (95%CI) 2.70 (1.31, 5.57). Conversely, the incidence of any and peripheral fractures did not change in the 5 y postsurgery compared to previously: IRRs 1.17 (0.86, 1.60) and 0.92 (0.60, 1.42) respectively. Any and major fracture risk increased further in the 3rd to 5th year post-surgery: IRRs of 1.73 (1.08, 2.77), 4.98 (1.94, 12.78) respectively.

**Conclusions:** Few patients had fractures after surgery (252/5492). The incidence of major osteoporotic fracture is increased after bariatric surgery by nearly 3-fold; this further increases to 5-fold in the 2.01-5 year window. Further research is needed on post-bariatric surgery care to minimise fracture risk.

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## P699

## IMPACT OF OBESITY ON VITAMIN D STATUS AND MUSCLE MASS IN POSTMENOPAUSAL WOMEN UNDER 65 YEARS OLD FROM BUENOS AIRES

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**Objectives:** To describe the impact of obesity on serum 25 hydroxyvitamin D status, BMD and sarcopenia in Argentinian ambulatory postmenopausal women between 50-65 y of age.

**Methods:** A total of 239 women (56.7±0.3 y) attended a community activity to evaluate osteoporotic risk and muscle health. They were asked to answer a questionnaire about history of osteoporotic risk factors, chronic diseases, use of medication, and osteoporotic fractures. The clinical evaluation included BMI, hand-grip strength test (by dynamometry) and short physical performance battery test. Serum 25-hydroxyvitamin D was measured by Advia Centaur. Body composition and BMD in femoral neck (by Lunar) was performed in 121 participants. Women were classified as normal (BMI 18-24.9 kg/m$^2$), overweight (BMI 25-29.9 kg/m$^2$) and obese (BMI ≥30 kg/m$^2$ or fat percentage >33%). Sarcopenia was determined according to EWGSOP: ALM/ht$^2$ ≤5.67 kg/m$^2$ and gait speed: >0.8 m/s or grip strength <20 kg, and the FNIH criteria: $ALM_{BMI}$ <0.512 and grip strength <16 kg. Statistical analysis by SPSS20.0, significance $p<0.05$.

**Results:** According to BMI, 29.1% of participants had normal weight, 35.4% had overweight and 35.3% were obese. In comparison with the nonobese group (n=153), obese women (n=84) showed similar physical performance, no differences were found in gait speed or sit-chair test neither in the hand grip strength test. Obese women presented higher BMD in femoral neck (0.918±0.017 vs. 0.829±0.12 g/cm$^2$, $p<0.0001$, respectively) and higher T-score (-0.51±0.1 vs-1.25±0.1, $p<0.001$, respectively). However, obese people presented higher total lean ($p<0.0001$) and fat mass ($p<0.0001$) and higher ALM/ht$^2$ ($p<0.0001$). But, when ALM was adjusted to BMI, participants showed a significant lower $ALM_{BMI}$ (0.4585±0.009 vs. 0.5703±0.009, $p<0.0001$). However, no differences were found in incidence of falls or osteoporotic fractures. 80% of participants had serum 25-hydroxyvitamin D <20 ng/mL, no differences were found between nonobese and obese group (14.35±0.55 vs. 13.97±0.94 ng/ml, respectively).

**Conclusions:** In postmenopausal women under 65 y, obesity did not impact in 25-hydroxyvitamin D deficiency or physical performance. Despite higher BMD in femoral neck and higher ALM/ht$^2$, obese people showed lower muscle mass when evaluated adjusted to BMI, suggesting this way of measuring it.

## P700

## MOLECULAR CODES IN HIGH-GRADE TYPES OF OSTEOSARCOMA

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**Objective:** In this study, the existence of CSCs in high grade types of osteosarcoma (OS) (i.e., the telangiectatic osteogenic sarcoma (TOS), the small cell osteosarcoma (SCO) and the conventional osteosarcoma (OSA)), and the presence of a common expression of microRNAs (miRNAs) is showed.
**Methods:** The human SCO, TOS and OSA samples have been collected at the "Unit Ortopedia Oncologica e Ricostruttiva", AOUC Careggi, Florence, with informed consent approved by the local Ethical Committee. First, the primary cancer cell lines of TOS, SCO and OSA have been established. After that, the subpopulation of CSCs has been isolated from all of these cell lines. Consequently, several cellular assays/stainings and molecular analyses have been performed to demonstrate the CSCs phenotype. We have also tested the neoplastic capacity to infiltrate surrounding tissues by the invasion assay. At last, we have analyzed the miRNAs expression in the CSCs lines.
**Results:** Firstly, we have established a primary cell line of a SCO, a TOS and an osteoblastic OSA, from the samples collected, respectively marked as OSA3, OSA4 and OSA5. Consequently, from these we have isolated CSCs and we have established a SCO-. a TOS- and a OSA-CSCs lines, named as OSA3-, TOS1- and OSA5-CSCs. The stemness of these lines has been confirmed by observing their capacity to differentiate into osteoblasts and into adipocytes, by showing the positive presence of the mesenchymal and embryonic stem cells markers into the lines, and by evaluating their clonogenic capacity. We have also confirmed the neoplastic capacity of these lines. Finally, we have analysed and preliminary observed a common miRNAs expression code n these CSCs lines.
**Conclusions:** We have settled three new in vitro models of OS. The preliminary results obtained about the analysis of the miRNAs expression profile in these lines could be important because seems to identify a common "miRNA code" among these types of OS, that could be used to develop new molecular therapies against this aggressive primary bone tumour.

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## P701

## RISK OF HAND OSTEOARTHRITIS IN NEW USERS OF HORMONE REPLACEMENT THERAPY: A NESTED CASE-CONTROL ANALYSIS

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**Objective:** To estimate the risk of hand osteoarthritis (OA) in new users of hormone replacement therapy (HRT).
**Methods:** We conducted a nested case-control study using data from the UK-based Clinical Practice Research Datalink (1998-2017). In an inception cohort of women entering at age 45, we matched patients with hand OA during follow-up (cases) to at the time OA-free controls 1:4 on age and calendar date (index date). We applied multivariable conditional logistic regression to calculate odds ratios (OR) with 95%CI of hand OA in association with new HRT use when compared to non-use and stratified by timing of HRT exposure (current, past). We performed the same analysis in a subgroup of patients with recorded menopause (MP) and within intervals between the first MP record and the index date (≤2 y, >2 y). In the interval of >2 y after MP, we further assessed the timing of HRT initiation with regards to MP in current HRT users and of HRT cessation before the index date in past HRT users compared to nonusers.
**Results:** Among 3440 cases and 13,760 controls (mean age 50.9 years), we observed an overall adjusted OR (aOR) of hand OA of 1.32 (95%CI 1.17-1.48) in HRT users compared to non-users which attenuated to 0.98 (95%CI 0.85-1.14) in patients with recorded MP. Compared with nonusers, the aOR of hand OA in HRT users with a MP record ≤2 y before the index date was lower (0.75, 95%CI 0.55-1.03) than that of HRT users with MP recorded >2 y before the index date (1.07, 95%CI 0.90-1.26). In all analyses, compared to nonusers, current HRT use was associated with lower and past use with higher aORs of hand OA than overall HRT use. In patients with a MP record >2 y before the index date, we observed a non-significantly decreased aOR of hand OA in current users if HRT was initiated within 90 d before or after recorded MP (0.72, 95%CI 0.49-1.05), aORs increasing with later HRT initiation. Furthermore, among past users, compared to nonusers, the aOR of hand OA was nonsignificantly increased (1.42, 95%CI 0.92-2.21) if HRT was stopped ≤1 y before the index date and aORs decreased with earlier HRT cessation.

**Conclusion:** HRT use is associated with a decreased risk of hand OA if initiated around MP and with an increased risk of hand OA shortly after ceasing HRT.
**Disclosure:** DPA has received research grants, speaker, and advisory board fees from Amgen, research grants from Servier Laboratoires and UCB Pharma, and consultancy fees from UCB.

## P702
## CORRECTION OF A HYPOVITAMINOSIS D AT CHILDREN WITH A CYSTIC FIBROSIS OF THE CITY OF ST. PETERSBURG

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**Objective(s):** To study efficiency and features of correction of a hypovitaminosis of vitamin D.
**Material and Methods:** Control of observance of the mode of intake of vitamin D within 18 months was established in families of 92 children of patients with a cystic fibrosis. Until inclusion in a research none of them received D3 vitamin drugs on a regular basis in adequate doses according to the existing recommendations. In 18 months at patients serum concentration 25(OH)D was three times measured in blood. After the analysis of the obtained data of a dose of D3 vitamin were adjusted.
**Results:** As a result of a research it was established that only at 68 (74%, average age of 6 years) from 92 children (average age of 7.7 years) the compliance, administration of drug made more than 80% that indicated adequacy of therapy. 68 patients at primary inspection have level 25(OH)D in blood ≥ 30 ng\ml is noted in 25% of cases (n=17), and level 25(OH)D in the range of 20-30 ng\ml - at 35% (n=24) of children, at 40% of children (n=27) – level 25(OH)D was lower than 20 ng\ml. When determining serumal concentration of vitamin D at the end of a research at patients with good commitment to treatment level 25(OH)D in blood serum ≥ 30 ng\ml is revealed more, than at a half of patients – 57% (n=39, average age of 5.8 years), and in the range from 20 ng\ml to 30 37% had level 25(OH)D (n=25, average age of 6.3 years) children. At 6% (n=4, average age of 11 years) of children it was not succeeded to reach, despite regular administration of drug, minimum target (≥ 20 ng\ml) level 25(OH)D in blood serum.
**Conclusion(s):** Children of preschool age at observance of the mode of dosing reached target level 25(OH) in blood serum when using of the recommended age dosages. Despite a good komplayentnost of patients, at children in a prepubertata (average age of 11 years) it was not succeeded to reach minimum target (≥ 20 ng\ml) level 25(OH)D in blood serum that probably testifies to higher need for D3 vitamin for this age group and demands revision of the recommended drug dose.
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## P703
## SECONDARY OSTEOPOROSIS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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**Objective:** Primary hyperparathyroidism (PHPT) seems to significantly increase the risk of secondary osteoporosis.
**Methods:** We reviewed the medical records of 449 patients admitted to three Medical Centers (Saint-Petersburg, Russia) between Jan 2011 and May 2018. Anamnesis, anthropometric data, laboratory (PTH, serum total Ca and iCa, phosphorus, 24-h calciuria level, alkaline phosphatase, 25(OH)D) and instrumental (ultrasonography, scintigraphy, CT/MRI scan, DXA) tests were analyzed.
**Results:** Out of 449 patients, clinical forms of PHPT (osteoporosis, urolithiasis, peptic ulcer, cholelithiasis, acute erosive lesions) were identified in 310 cases. Osteoporosis was detected in 63.5% cases. We found significant difference in age between pts with and those without osteoporosis (62 y (56; 69) & 57 y (49; 64) accordingly, p<0.00001). Patients with symptomatic PHPT were divided into groups: “osteoporosis”, “urolithiasis”, “osteoporosis+urolithiasis”. Patients without these pathologies were included in “other manifestations” group. 98.5% of patients with “osteoporosis” were women compared to “urolithiasis” and “osteoporosis+urolithiasis” groups where 50% were men (p=0.006). Patients with “osteoporosis” or “osteoporosis+urolithiasis” were older than those with normal bone remodeling (p=0.0002). We found that pts with “osteoporosis + urolithiasis” had higher incidence of fragility fractures than “osteoporosis” pts (14 (21.2%) & 11 (8.5%), p=0.046). Correlation analysis revealed the association between PTH and T-score L1-L4 (r=-0.298, p=0.0024), Neck (r=-0.230, p=0.043) and Radius (r=-0.478, p=0.006), as well as between T-score Radius and Ca (r=-0.510, p=0.0077). In addition, there was an association between the age and the T-score Radius (r=-0.437, p=0.02), as well as between the BMI and the T-score L1-L4 (r=0.325, p=0.009).
**Conclusion:** Study results showed that PHPT most often manifested itself in the form of impaired bone remodeling.

PHPT pts with osteoporosis are older than those having normal bone density. The incidence of fragility fractures is significantly higher when patients had combination of osteoporosis+urolithiasis compared to those with osteoporosis only. Besides correlation analysis showed increased PTH level associated with decreased BMD.

## P704
## SERUM RESISTIN LEVELS AS PREDICTOR OF LOW BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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**Objective:** Resistin is a predictor of BMD in postmenopausal women.
**Methods:** In this correlational analytical study, postmenopausal women (n=160) between the age of 50-70 y were recruited and divided into two groups. Postmenopausal nonosteoporotic women (n=70) having T-score ≥-1.0 and postmenopausal osteoporotic women (n=90) with T-score ≤-2.5. BMD was evaluated by DXA. Serum resistin levels were assessed by ELISA. Mann-Whitney U test was used for comparisons and stepwise multiple regression analysis was used to predict BMD.
**Results:** Serum resistin levels ($p<0.001$), BMD at lumbar spine ($p<0.001$), right femoral neck ($p<0.001$), right hip ($p<0.001$), left femoral neck ($p<0.001$) and left hip ($p<0.001$) were significantly different between the two groups. Serum resistin levels, height, weight, BMI, waist circumference, hip circumference, and W/H ratio were used to predict T-scores. At lumbar spine, the independent predictors were body weight (β 0.047, $p<0.001$) and serum resistin levels (β -0.000075, $p<0.001$) that uniquely accounted for 16% and 7% of the variance of T-scores. At Right femoral neck, the independent predictors were weight (β 0.034, $p<0.001$) and serum resistin levels (β -0.000070, $p<0.001$) that contributed 11% and 8% of the variance of T-scores. At Right hip, the independent predictors were weight (β 0.034, $p<0.001$) and serum resistin levels (β -0.000054, $p<0.001$) contributing 13% and 5% of the variance of T-scores. At Left femoral neck, the independent predictors were weight (β 0.036, $p<0.001$) and serum resistin levels (β -0.000069, $p<0.001$) contributing 13% and 8% of the variance of T-scores. At left hip, the independent predictors were weight (β 0.035, $p<0.001$) and serum resistin levels (β -0.000064, $p<0.001$) contributing 14% and 8% of the variance of T-scores.
**Conclusion:** High serum resistin levels and low weight are independent contributors to low BMD and can influence BMD at lumbar spine, right femoral neck, right hip, left femoral neck, and left hip in postmenopausal women.
**Acknowledgments:** The research is funded by a grant from higher education commission, Pakistan.

## P705
## OSTEOARTHRITIS IN RAT KNEES: INDUCTION BY INTRA-ARTICULAR INJECTION OF SACCHAROMYCES CEREVISIAE

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**Objective:** To evaluate the effectiveness, of Saccharomyces cerevisiae in the induction of osteoarthritis in rat knees, by clinical and radiological evidence.
**Method:** An osteoarthritis induction model was used with Saccharomyces cerevisiae. A total of 40 adult male Wistar rats weighing 280-300 g and 90 days old were used. The injection of the arthritis-inducing agent was individually performed under general anesthesia, with isoflurane (2 to 5% in oxygen). On day 0 of the experiment, all animals were anesthetized and an arthrocentesis was performed on the right femoro-tibial-patellar joint of the 40 animals, followed by an intra-articular injection of Saccharomyces Cerevisiae dissolved in 10 ml of water in the dose of 50 μL in a single dose. On day 8, radiographic projections were made for joint evaluation after osteoarthritis induction.
**Results:** the results showed a reduction in range of motion based on motion-induced nociceptive analysis with 'knee-bend test' behavioral tests, while radiographic analysis showed that 72.5% of the rats presented lesions that confirmed osteoarthritis and 27.5% showed no alterations.
**Conclusion:** The induction of osteoarthritis with Saccharomyces cerevisiae is effective and can be confirmed radiologically. The knee bend test proved to be a subjective method for the evaluation of osteoarthritis.

## P706
## PREVALENCE OF VITAMIN D DEFICIENCY AND METABOLIC SYNDROME AMONG POSTMENOPAUSAL WOMEN IN CARPATHIAN REGION

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**Objective:** No report is available regarding the association of 25-hydroxyvitamin D status and metabolic syndrome (MS) among postmenopausal women in Carpathian region. Aim of the study was to find out the prevalence of 25(OH)D deficiency and MS as well as their association among postmenopausal women in this region.

**Methods:** This cross-sectional study was conducted among 495 randomly selected postmenopausal women in Carpathian region, Ukraine. Serum 25(OH)D, waist circumference (WC), fasting blood glucose (FBG), triglycerides (TG) and high density lipoprotein cholesterol (HDL-C), blood pressure (BP) were measured using standard procedures. MS was defined as per International Diabetes Federation criteria. Statistical tests were done using SPSS software.

**Results:** Prevalence of MS was 56.2%. 66.9% and 27.9% postmenopausal women were vitamin D insufficient and deficient, respectively. 28.1% and 69.4% women having MS were vitamin D insufficient and deficient, respectively. Among the postmenopausal women, 20.8% and 46.9% with WC ≥80cm; 17.9% and 61.8% with FBG ≥ 5.8 mmol/l; 28.9% and 56.9% with TG ≥1.7 mmol/l; 27.9% and 61.8% with HDL-C <1.25 mmol/l, 23.8% and 57.8% with BP ≥130/85 mm Hg were vitamin D insufficient and deficient, respectively. Significant statistical association between FBG and 25(OH)D status existed (p=0.04). Significant positive correlation between WC and 25(OH)D level (p=0.001) and significant negative correlation between FBG and 25(OH)D level observed (p=0.03).

**Conclusion:** High prevalence of vitamin D insufficiency and deficiency as well as MS existed among postmenopausal women in Carpathian region. 25(OH)D had significant inverse and direct relationship with FBG and WC. Low 25(OH)D may be one of the potential risk factors for developing MS in postmenopausal women.

## P707
## GASTROESOPHAGEAL REFLUX DISEASE IN BISPHOSPHONATE THERAPY IN PATIENTS WITH OSTEOPOROSIS

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**Objectives:** One of the possible side effects of bisphosphonate therapy in patients with osteoporosis is gastroesophageal reflux disease (GERD). Due to patients' noncompliance or other organic gastrointestinal disorders, GERD is one of the most frequent side effects of bisphosphonate therapy. This disease is also one of the most frequent causes of omission of therapy or alternative ways of application (intravenous injection). The aim of this study was to evaluate the frequency of GERD in patients with osteoporosis that are using bisphosphonates and to observe the frequency of inappropriate way of taking bisphosphonates.

**Methods:** This is an observational study which included 54 female patients treated with alendronate 70 mg/week for more than 6 months. All patients were evaluated for their gastrointestinal status. They were evaluated about the time reflux had begun.

**Results:** In our study it was observed that 29 patients(53.7%) had somehow gastrointestinal issues after taking the bisphosphonate drug with 12 (41.3%) of them diagnosed with gastroesophageal reflux disease, confirmed by gastrohepatologist consultation. From all evaluated patients, 6 of them (11.1%) had the need to switch to intravenous bisphosphonates due to their aggressive GERD status. After asking the patients about the way they take the drug, it was found that 34 patients (62.9%) did not take the drug as indicated by their rheumatologist.
**Conclusions:** From our study it was observed that a significant number of patients with osteoporosis had GERD while on therapy with bisphosphonates. Rheumatologists should be aware of this disorder before prescribing the bisphosphonates orally, and they should warn the patients about the way they should take these drugs, in order to decrease the frequency of this side effect.

## P708
## LOW DOSE MEDICINE INCREASES BONE MINERAL DENSITY IN WOMEN WITH POSTMENOPAUSAL OSTEOPENIA

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**Objective:** The source of most fractures arises from the larger numbers of women at the more moderate fracture risk caused by osteopenia (T-score between −1 and −2.5 SD).(1,2) The aim of this study was to evaluate the effectiveness of low dose medicine (LDM)- hormones and essential amino acids (Guna Osteobios) regarding BMD in postmenopausal women with osteopenia.
**Methods:** We enrolled 14 women in a total course of treatment 52 weeks, following the scheme: 20 drops Guna Osteobios two times daily. BMD was measured in all women before treatment by DXA (femoral neck and total hip) and after treatment on 52 week. DXA was performed in a control group of women with osteopenia without treatment.
**Results:** BMD and T-score significantly improved on 52 week in a group of LDM, unlike the control group. Mean percentage increase in BMD were as follows: at the femoral neck, 1.52% (n=14; p=0.037) and total hip, 2.14% (n=9; p=0.022). T-score improvement was as follows: at the femoral neck, 0.12 (p=0.014) and total hip, 0.12 (p=0.030).
**Conclusions:** LDM, presented by Guna Osteobios provides significantly increase of BMD and T-score at the femoral neck and total hip in women with postmenopausal osteopenia. It is an innovative and effective approach in osteoporosis prevention with total absence of side effects.
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## P709
## PREOPERATIVE FUNCTIONAL STATUS PREDICTS OUTCOMES AFTER PRIMARY TOTAL SHOULDER ARTHROPLASTY

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**Objective:** To evaluate the effect of dependent functional status on outcomes after primary total shoulder arthroplasty for patients with osteoarthritis of the glenohumeral joint.
**Methods:** The American College of Surgeons National Surgical Quality Improvement Program was used to identify patients who underwent primary total shoulder arthroplasty (anatomic or reverse) from 2011-2016. Patients whose functional status prior to surgery was dependent were compared with patients who had independent functional status prior to surgery. Demographic data, length of hospital stay, and postoperative complications within 30 d were analyzed. Multivariable logistic regression was used isolate the effect of functional status on postoperative complications and readmission within 30 d of surgery.
**Results:** We identified 12,982 patients who underwent primary total shoulder arthroplasty (anatomic or reverse). Patients with dependent functional status comprised 3.2% of the cohort. Dependent patients were older (71.4 y vs. 69.0 y, P<0.001) and were more likely to be female (70.5% vs. 55.6%, P<0.001). Dependent patients had longer hospital stays (3.1 d vs. 1.9 d, P<0.001), higher rate of comorbidities (P<0.001), and higher mean American Society of Anesthesiologists class (P<0.001). Complications including pneumonia (P<0.001), urinary tract infection (P=0.005), cerebrovascular accident (P=0.019), and intraoperative or postoperative blood transfusion (P<0.001) were higher in dependent patients. Logistic regression revealed that dependent functional status was an independent predictor for occurrence of any complication (OR 2.0, P<0.001) and for readmission (OR 2.6, P<0.001).
**Conclusions:** Patients with dependent functional status prior to undergoing primary total shoulder arthroplasty for osteoarthritis are at increased risk for short-term complications and readmission within 30 d of surgery. Understanding preoperative risk factors for poor outcomes can aid in medical optimization and risk stratification prior to surgery.

## P710
## SHORT-TERM COMPLICATIONS AND READMISSION FOLLOWING TOTAL SHOULDER ARTHROPLASTY

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**Objective:** Incidence of total shoulder arthroplasty (anatomic and reverse) is increasing as indications for its use expand.

The purpose of this study is to identify predictors of short-term complications and readmission following total shoulder arthroplasty for patients with osteoarthritis of the shoulder.
**Methods:** The American College of Surgeons National Surgical Quality Improvement Program was used to identify 12,982 patients who underwent total shoulder arthroplasty (anatomic or reverse) from 2011-2016. Demographic data, postoperative complications, and readmission within 30 d were analyzed. Multivariable logistic regression was used to determine independent risk factors for complications and for readmission occurring within 30 d of surgery.
**Results:** Mean age of the cohort was 69.1 y and 56.1% were female. Postoperative complication rate was 5.6% and readmission rate was 2.8% within 30 d of surgery. Mean American Society of Anesthesiologists (ASA) classification score was 2.6. Independent predictors for any complication included preoperative dependent functional status (OR 1.9, P<0.001), incremental increase in ASA class (OR 1.9, P<0.001 for each increase in class above 1), age >75 y (OR 1.5, P=0.001), and female gender (OR 1.4, P=0.001). Independent predictors for readmission included congestive heart failure (OR 3.3, P=0.002), dependent functional status (OR 2.7, P<0.001) and incremental increase in ASA class (OR 1.6, P<0.001 for each increase above 1).
**Conclusions:** Short-term complications and readmission following total shoulder arthroplasty are not uncommon. Patients with dependent functional status, age >75 y, congestive heart failure, and incremental increase in ASA classification above 1 are at increased risk for postoperative complications and readmission. Preoperative risk stratification and medical optimization is important in these patients.

## P711
## IMMOBILIZATION OSTEOPOROSIS AND SARCOPENIA IN PATIENTS WITH VERTEBROMEDULLARY TRAUMA

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The study was performed on a group of 76 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, 84.21% men, diagnosed with vertebromedullary trauma. Their mean age was 36.10 y, ranging from 21-73 y. According to ASIA classification 36.84% had ASIA-A, 31.57% had ASIA-B, 15.78% ASIA-C and 10.52% had ASIA –D. Osteoporosis was present in 85.71% of cases with ASIA score of A, all patients with B, 33.3% with C and 50% with D. Sarcopenia was present in 42.85% of cases with ASIA score of A, all patients with B, 66.6% cases with C and 50% with ASIA-D. The classification of spasticity using the modified Aschwort scale showed that 57.89% of the cases had spasticity. Out of these 18.18% had modified Aschwort 1, 54.54% had 2, 18.18% had modified Aschwort 3 and 9.09% had 4. The mean duration from the time of the vertebromedullary trauma to the DXA investigation was 38.9 months. 73.68% of these cases had osteoporosis and 63.15% had sarcopenia. Depending on the lesion topography, sarcopenia and osteoporosis were installed in 85.7% patients with cervical vertebromedullary trauma, in 33.3% cases with dorsal vertebromedullary trauma and in 66.6% cases with lumbar trauma. The mean time from the motor deficit onset to sarcopenia detection was 50.5 months in patients with cervical trauma, with variations between 8-104 months; 23.66 months in patients with dorsal trauma, range between 10-50 months; 22.5 months in patients with lumbar trauma, range between 9-36 months.
**Conclusions:** Osteoporosis and sarcopenia also occur in patients who perform an assisted pathological gait, not only in immobilized cases. Spasticity did not prevent the occurrence of osteoporosis and sarcopenia.

## P712
## BLOOD TRANSFUSION IN PATIENTS UNDERGOING TOTAL SHOULDER ARTHROPLASTY FOR OSTEOARTHRITIS OF THE GLENOHUMERAL JOINT

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**Objective:** To identify predictors for blood transfusion in patients undergoing total shoulder arthroplasty for glenohumeral joint osteoarthritis.
**Methods:** The American College of Surgeons National Surgical Quality Improvement Program was used to identify 12,982 patients who underwent total shoulder arthroplasty (anatomic or reverse) from 2011-2016. Patients who underwent intraoperative and postoperative blood transfusion were identified and compared to those who did not receive a blood transfusion. Multivariable logistic regression was used to determine independent risk factors for blood transfusion.
**Results:** The rate of intraoperative and postoperative blood transfusion was 3.5% over the study period. Patients who received a blood transfusion were older (73.4 y vs. 68.9 y, P<0.001) had longer operative times (137.8 min vs. 110.71 min, P<0.001), had longer hospital stays (3.9 d vs. 1.9 d, P<0.001) and were more likely to be female (74.2% vs. 55.4%, P<0.001) compared with patients who did not undergo blood transfusion. Patients who received a blood transfusion had higher mean American Society of Anesthesiologists (ASA) classification scores (2.8 vs. 2.5, P<0.001). Logistic regression identified dialysis treatment (OR 3.0, P=0.012), bleeding disorders (OR 2.4, P<0.001), smoking (OR 1.4, P=0.038), and female gender (OR 1.8 P<0.001) as independent predictors of blood transfusion. Each incremental increase in ASA class was associated with higher odds of blood

transfusion (OR 1.9, P<0.001). Patients with independent functional status before surgery were least likely to require blood transfusion (OR 0.5, P<0.001).

**Conclusions:** In patients undergoing total shoulder arthroplasty, preoperative factors such as ASA classification, smoking, and functional status can be used to identify patients at increased risk for requiring blood transfusion.

## P713

## TRABECULAR BONE SCORE IS PREDICTED BY PHALANGEAL QUANTITATIVE ULTRASOUND IN BREAST CANCER POSTMENOPAUSAL WOMEN RECEIVING AROMATASE INHIBITORS

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**Objective:** Quantitative ultrasound of bone (QUS) and trabecular bone score (TBS) are recognized tools to explore bone health beyond BMD. The aim of our research was to explore the association of TBS with QUS measurements at phalangeal site in a setting of postmenopausal women taking aromatase inhibitors (AIs).

**Methods:** BMD at lumbar spine, femoral neck and TBS were evaluated by a DXA densitometer (Hologic Discovery). Amplitude Dependent Speed of Sound (AD-SoS), Bone Transmission Time (BTT) and Ultrasound Bone Profile Index (UBPI) were detected at phalangeal site by Bone Profiler (Igea).

**Results:** In 102 postmenopausal women (60 AIs treated and 42 controls), at baseline examination, TBS was negatively associated with age (r=-0.39, p<0.001) and positively related with T-score values at lumbar spine and femoral neck. After 18 months, AD-SoS, UBPI and BTT values were significantly decreased in BC women receiving AIs (-3.7%, -6.45%, -8.5%, respectively, p<0.001 for all), but not in controls (-0.7%, -3.53%, -2.97%, respectively). Change of BMD at lumbar spine was significantly different between AIs treated women and controls (-2.94% vs. -0.69%, p=0.001) and the same result was observed as for BMD at femoral neck (-2.5% vs. -0.39%, p=0.01). Percent change of TBS was significantly greater in AIs treated women in comparison with controls (-2.2% vs. -0.4%, respectively, p=0.02). In AIs treated women, but not in controls, CTX levels significantly increased after 18 months [0.47 (0.36 to 0.62) vs. 0.66 (0.43 to 0.77), p=0.0004] and the same trend was observed as for BSAP levels [14 (13.01 to 15.57) vs. 15 (13.75 to 16.75), p=0.003]. At a multiple regression analysis, change of TBS was independently predicted by change of AD-SoS, after correcting for BMD change at lumbar spine and femoral neck and for modification of CTX and BSAP levels (β=0.37, SE=2.44, p<0.001).

**Conclusions:** TBS modification was independently predicted by phalangeal QUS measurement in AIs treated BC women. Phalangeal QUS may represent an alternative tool to evaluate bone quality also in this setting of patients.

## P714

## SARCOPENIA IN PATIENTS WITH DEFICITS OF NEUROLOGICAL ETIOLOGY

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Sarcopenia is a muscle disease characterized by low muscle strength, loss of muscle quantity and quality and low physical performance. Sarcopenia was categorized into primary and secondary. Secondary sarcopenia may occur due to disease-related immobility or disability that leads to physical inactivity. We investigated a group of 78 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, 71.8% men. They were diagnosed with vertebromedullary trauma (48.71%), stroke (17.94%) and the remaining cases had other neurological diseases like tumors, meningoencephalitis, multiple sclerosis, congenital arteriovenous malformations, hereditary myopathies, hereditary neuropathies. All patients had motor deficits and have been investigated for the detection of osteoporosis and sarcopenia with DXA. Patients' mean age was 42.2 y, ranging from 21-76 y. 76.92% of the patients had osteoporosis and 48.71% met criteria for diagnosing sarcopenia. In the entire lot, the time from the onset of motor deficit installation to the DXA investigation was on average 40.84 months, range from 6-104 months. In patients with sarcopenia this duration was 38.33 months, range from 6-104 months. Mean muscle mass scaled to height squared in all cases was 0.5527 and in cases with sarcopenia it was 0.4459. Mean number of comorbidities in the study group was 2.79 and in patients with sarcopenia it was 3.

**Conclusions:** Immobilization or physical inactivity following the installation of motor deficit of various etiologies leads to the early occurrence of sarcopenia. The number of comorbidities did not influence time of onset of sarcopenia.

## P715

## HANDGRIP STRENGTH TO DISCRIMINATE HIGH FRACTURE RISK IN TYPE 2 DIABETES MELLITUS PATIENTS

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**Objective:** To find a useful clinical tool that identifies type 2 diabetes mellitus (T2DM) subjects with poor bone health, finally preventing fragility fractures.
**Methods:** In a setting of Caucasian subjects with T2DM, anthropometric data and information about metabolic control and diabetic complications were recorded. Handgrip strength by dynamometer, FRAX derived 10-years probability of major osteoporotic fractures and hip fractures were also assessed. Bone evaluation was performed by a DXA densitometer at the lumbar spine (L1-L4) and at the femoral neck; based on specific software, the trabecular bone score (TBS) was calculated. Lateral scan of thoracic and lumbar spine was assessed to investigate morphometric vertebral fractures (Vfx).
**Results:** 29 patients (female 65%) [median age 67 (60-70)] with T2DM were considered. Morphometric vertebral fractures were detected by DXA in 17% of patients without any gender differences (males vs. females, p=0.6). The median ten years probability of fractures was 8.1% and 2.3% as for major osteoporotic or hip fracture respectively. Median femoral neck T-score value [-1.1 SD (-1.8 to -0.5)] was indicative of a slight osteopenia while lumbar spine T-score was even in the normal range [-0.8 SD (-1.5 to -0.1)]. The median TBS value was 1.28 (1.2 to 1.31) and TBS was positively associated with BMD at lumbar spine and femoral neck. Median handgrip strength value was 22.3 kg (18.9 to 31.3). At multiple regression analysis, handgrip strength predicted both lumbar (β=0.009, SE 0.0034, p=0.01) and femoral neck BMD values (β=0.006, SE 0.002, p=0.01). Age (β=-0.008, SE 0.002, p=0.007) and handgrip strength (β=0.01, SE 0.002, p=0.0001) were also independently associated with TBS score, after correcting for mean HbA1c values and time since T2DM diagnosis.
**Conclusions:** These findings suggest that handgrip strength may be a reliable tool to investigate bone fragility in T2DM.

## P716
## TRENDS IN INCIDENCE AND IMPROVEMENT IN PERIOPERATIVE MORTALITY FOLLOWING REVISION TOTAL HIP ARTHROPLASTY OVER TWO DECADES: A TESTAMENT TO MULTIDISCIPLINARY PERIOPERATIVE CARE

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**Objective:** To describe the trends in incidence and risk factors for perioperative mortality following revision total hip arthroplasty in the USA.
**Methods:** The National Hospital Discharge Survey was used to identify all patients who underwent revision total hip arthroplasty from 1990-2010. A cohort of 698,590 patients was identified over the study period. Trends in incidence and mortality over the 20-y period were analyzed and logistic regression was used to isolate independent variables associated with mortality.
**Results:** Population-adjusted incidence increased from 9.2 per 100,000 in 1990 to 15.3 per 100,000 in 2010 (P<0.001). Perioperative mortality was 0.9% over the 20-y period and decreased from 1.5% during the 1990-1999 period to 0.5% in the 2000-2010 period (P<0.001). When controlling for confounders, multivariable logistic regression showed that acute myocardial infarction (OR 36.7; 95%CI 33.4 to 40.2, P<0.001), pneumonia (OR 16.5; 95%CI 15.0 to 18.1, P<0.001) and pulmonary embolism (OR 13.3; 95%CI 11.5 to 15.3, P<0.001) were the strongest risk factors for perioperative mortality. When comparing reasons for revision, multivariable regression showed that periprosthetic fracture was associated with the highest odds of mortality (P<0.001).
**Conclusions:** The incidence of revision total hip arthroplasty has increased in the USA while perioperative mortality has decreased over the two decades of the study. Periprosthetic fracture is associated with higher odds of perioperative mortality compared with other reasons for revision. This study highlights the importance of multidisciplinary care, both preoperatively with risk stratification and medical optimization, and postoperatively with improved therapy and pain management protocols for patients undergoing revision hip arthroplasty for osteoarthritis and periprosthetic fractures. A multidisciplinary team approach has contributed to these improved outcomes.

## P717
## ASSOCIATION BETWEEN COGNITIVE IMPULSIVITY AND BONE MINERAL DENSITY: A CROSS-SECTIONAL STUDY IN POSTMENOPAUSAL WOMEN EVALUATED FOR OSTEOPOROSIS

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**Objectives:** The potential involvement of executive functions impairment on BMD is still unclear. The aim of this study was to investigate the correlations between cognitive impulsivity, BMD and fall risk.
**Methods:** Cognitive impulsivity was measured by Stroop Color and Word Test (SCWT) administration in a setting of 40 consecutively recruited postmenopausal women referring to a outpatients clinic for the evaluation of fracture risk. SCWT is a neuropsychological test able to assess the ability to inhibit cognitive interference: during the administration, women were required to quickly read three different tables of which two represented the

"congruous condition" in which participants were invited to read names of colors printed in black ink and name different color patches. In the third table, named "incongruous condition", color-words were printed in inconsistent color ink (e.g. the word "red" is printed in green ink) and participants were required to name the color of the ink instead of reading the word. Women with Mini Mental State Examination (MMSE) score <24, known neurologic or psychiatric disorders, history of significant hearing or visual impairment, or significant physical disability, history of uncontrolled diabetes and abnormal thyroid function, cancer, heart, respiratory, kidney or liver failure were excluded. BMD was measured at lumbar spine and femoral site by a DXA densitometer (Hologic Discovery). History of falls in the previous 12 months was recorded

**Results:** Cognitive impulsivity, as highlighted by making errors at the SCWT, was significantly associated with lumbar spine and femoral neck T-score (r=-0.39, p=0.01 and r=-0.43, p=0.008; respectively). MMSE score was not associated with T-score values, neither at lumbar spine (r=0.09, p=0.5) nor at femoral neck (r=0.2, p=0.21); differently MMSE score was significantly associated both with Stroop test error (r=-0.34, p=0.02) and time interferences (r=-0.39, p=0.01). Furthermore, time interference was positively associated with the self-reported history of falls (r=0.342; p=0.031).

**Conclusions:** Cognitive impulsivity was significantly associated with BMD values and higher prevalence of falls in postmenopausal women. It could be considered as a possible clinical risk factor for osteoporotic fractures.

## P718

## QUALITY OF LIFE OF PATIENTS WITH KNEE OSTEOARTHRITIS AFTER REHABILITATION

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**Objectives:** Physical therapy and rehabilitation may have a favorable therapeutic effect on the quality of life (QoL) in patients with knee osteoarthritis (OA). The aim of this study was to establish an association between QoL at the end of the rehabilitation with QoL and pain at the beginning of the rehabilitation, duration of rehabilitation and age of the patients with knee OA.

**Methods:** The study was designed as a retrospective study that included 40 consecutive knee OA patients (30 female and 10 male), average age of 66.7±7.9 y with diagnosis of knee OA according to American College of Rheumatology, that were hospitalized and treated in rehabilitation center. The average duration of the rehabilitation was 18.3±5 d. Program of kinesitherapy, occupational therapy, balneotherapy as well as procedures of the physical therapy were performed in all patients. The instrument used for assessment of the QoL of these patients is a modified version of WOMAC and VAS scale for the pain assessment. All patients completed the questionnaires at the end of rehabilitation. ANOVA test was used to analyze numerical data. WOMAC score at the end of the rehabilitation was dependent variable and predictors were WOMAC score and VAS scale at the beginning of the rehabilitation, duration of rehabilitation and age of the patients.

**Results:** Average value of the WOMAC score was 24, 6 ±11.2 at the beginning and 17.9±9.3 at the end of rehabilitation. WOMAC score of the patients with knee OA at the end of the rehabilitation shows significant association with predictors (F=22.9, p<0.001). WOMAC score and VAS scale at the beginning of the rehabilitation were significantly associated with WOMAC score at the end of the rehabilitation (t=4.9, p<0.001, t=2.5, p<0.05 respectively), but not with duration of rehabilitation and age.

**Conclusion:** Results of our research show that quality of life at the end of the rehabilitation of the knee OA patients is significantly associated with quality of life and pain at the beginning of the rehabilitation. These findings can be important for planning of early rehabilitation of these patients.

## P719

## PREVALENCE OF VITAMIN D DEFICIENCY IN RHEUMATIC PATIENTS IN LIMA, PERU

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**Objective:** To assess the status of vitamin D in women ≥50 y in three rheumatology outpatient clinics in Lima, Perú.

**Methods:** 157 patients were evaluated and 25(OH)D, intact PTH, calcium and phosphorus were measured in all the subjects. The mean age was 63.3±8.6 y, most of the patients had a diagnosis of fibromyalgia (50%) and osteoarthritis (30.57%). Women who were taking drugs with potential to alter bone mineral metabolism were excluded as well as those who cannot perform their daily activities.

**Results:** The average value of 25(OH)D was 18.7±6.7 ng/mL, no difference was found between the subgroups stratified by age (50-60, 61-70 and >70 y) in the values of calcium, phosphorus, 25(OH)D and PTH. No correlation was found between age and 25(OH)D (r=0.099, P=0.212). We found a weak direct correlation between age and PTH (r=0.183, P<0.05); and a weak inverse correlation between the values of 25(OH)D and PTH (r=-0.179, P<0.05). We found values of 25(OH)D <20, between 20-30 and ≥30 ng/mL in 58.6%, 36.9% and 4.5% of

patients respectively. The average values of 25(OH)D were lower in the obese patients, compared to the non-obese ones (16.94 vs. 19.42 ng/mL, P<0.05). The proportion of subjects with vitamin D deficiency was distributed homogeneously in the different diagnostic categories (fibromyalgia, osteoarthritis, chronic low back pain, others, etc.).

**Conclusions:** Vitamin D deficiency is highly prevalent in patients with rheumatic conditions; our study found 60% of patients with 25(OH)D ≤20 ng/mL that require pharmacologic therapy to correct the deficiency. It is advisable to identify and to correct the deficiency of vitamin D due its impact in different parameters of health.

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## P720

## TRABECULAR BONE SCORE VALUE IS ASSOCIATED WITH NEW BONE FORMATION INDEPENDENTLY OF FAT METAPLASIA ON SPINAL MRI IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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**Objective:** To evaluate the association between trabecular bone score (TBS) value and new bone formation in ankylosing spondylitis (AS) patients, and to investigate whether TBS is independently associated with new bone formation.

**Methods:** 68 patients with AS underwent spinal MRI and DXA of the lumbar spine to measure TBS and BMD at baseline. Lateral radiographs of the cervical and lumbar spine (baseline and 2 years) were assessed for new bone formation (syndesmophyte formation and/or growth combined), and spinal MRIs were assessed for the presence or absence of fat metaplasia (FM) at the 1st–4th lumbar spine segments. The factors associated with new bone formation were analyzed at the patient level and the vertebral level.

**Results:** New bone formation had developed in 17 (25%) patients at 2-y follow-up. Patients with new bone formation had a higher incidence of FM and lower TBS at baseline than patients without new bone formation (p=0.013 and p=0.041). At the patient level, baseline syndesmophytes, FM on MRI, and low TBS (<1.23) were significantly associated with new bone formation. At the vertebral level, new bone formation had developed in 25 out of 231 vertebrae (11%) after 2 y. Vertebrae with both FM on MRI and low TBS tended to have more new bone formation (p<0.001). Syndesmophytes and low TBS (<1.23) independently increased the risk of new bone formation at the level of individual vertebrae.

**Conclusion:** At both patient and individual vertebrae levels, low TBS was associated with new bone formation independently of FM on MRI.

## P721

## INCIDENCE RATES OF FRAGILITY FRACTURES IN A MEXICAN HEALTH SYSTEM

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**Objective:** Fragility fractures are recognized to be a major public health problem in many western nations. Particularly In Latin America is expected that the incidence of fracture increase associated to the demographic changes that will lead to huge increases in the elderly populations of those countries. In the other hand there are effective osteoporosis treatments and best practice frameworks for the prevention of fractures. Health system in Mexico are dealing with the high cost of fractures however the epidemiological trends of fractures have not been studied extensively in our country. Our aim was to evaluate the incidence rates of fragility fractures in middle-aged and elderly men and women in a Mexican health system.

**Methods:** Individuals over 40 y, who were attended in ISSSTEP (Puebla, Mexico) and sustained a fragility fracture, between 1 January 2005 and 31 December 2018, were included. Medical electronic diagnosis registers were used to identified fracture patients. Age-adjusted and age-specific incidence rates for men, women were calculated.

**Results:** A total of 1800 hip fractures (713 men, 1087 women, 632 vertebral fractures (157 men, 475 women), and 6197 wrist fractures (1404 men, 4793 women) were identified. The age-adjusted fracture rates per 10,000 were for hip 11 and 7, wrist 48 and 13, and vertebral 5 and 2 for women and men, respectively. Age specific fracture incidence rates were significantly higher in women than in men, and the highest incidence rates for hip fracture (27, 95%CI 22 – 30) were observed in women over 70.

**Conclusion:** Incidence rates adjusted for age of hip, wrist and vertebral fracture in men and women over 40 are lower than international reports. Future research is guaranteed to explore the causes.

## P722

## A TOOL TO IDENTIFY POSTMENOPAUSAL WOMEN WITH HIGH FRACTURE RISK IN SRI LANKA

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**Objective:** To develop and validate fracture risk prediction tool for Sri Lankan postmenopausal women (PMW) to be used in areas with no DXA facility.
**Methods:** Two groups of community-dwelling PMW were enrolled to development (n=602) and validation (n=339) samples. Risk of osteoporotic fracture, both major (MOFR) and hip (HFR) were estimated with Sri Lankan FRAX model. Radial ultrasound (US) bone scan was also done. Linear regression models were used with fracture risks as dependent and clinical risk factors as independent variables to develop formulae. MOFR ≥11 or HFR ≥3 were considered as intervention thresholds[1]. Sensitivity (sn), specificity (sp), positive and negative predictive values (PPV and NPV) were assessed to validate the new tools. $R^2$, SEE and Bland-Altman plots were used to assess difference of actual and estimated values.
**Results:** Mean (SD) body weight (BW) of the development and validation samples were 53.8 (10.1) and 51.8 (10.4) kg, respectively. Both samples were within 40-89 y age. Fracture risk assessment tool 1(FRAT-1) was built with age, body weight and US T-score while, Fracture risk assessment tool 2 (FRAT-2) was built with age and body weight. FRAT-1 included the following formulae.
MOFR.E1=-7.984+(0.264*age)+(-0.057*BW)+(-0.376*T_US)
HFR.E1=-1.541+(0.104*age)+(-0.065*BW)+(-0.196*T_US)
FRAT-2 included the following formulae.
MOFR.E2=-6.377+(0.273*age)+(-0.087*BW)
HFR.E2=-1.099+(0.115*age)+(-0.08*BW)
Prevalence of high fracture risk in the validation sample was 35.3% and it was 33.2% and 30.8% based on FRAT-1 and FRAT-2 estimations. Sensitivity and specificity of FRAT-1 were 59.7% and 81.5%. The corresponding values of FRAT-2 were 59.3% and 84.7%. PPV of FRAT-1 and FRAT-2 were 64.2% and 68% while NPVs were 78.5% and 79.2%. FRAT-2 showed higher $R^2$ and lower SEE than FRAT-1. All Bland-Altman plots showed >94% agreements between estimated and actual MOFR and HFR.
**Conclusion:** Compared to FRAT1, FRAT-2 has high predictive ability of MOFR and HFR and more convenient to use in settings with limited facility.
**Reference:** 1. Lekamwasam S. Arch Osteoporos 2013;8:148
**Acknowledgement:** Funded by the University of Wolverhampton.

## P723
## EVALUATION OF CALCIUM INTAKE OF CHILDREN IN DIFFERENT AGE GROUPS

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**Objective:** Adequate calcium intake is an important requirement for bone tissue growth and development in childhood and adolescence. Due to the change of modern dietary stereotypes, many children do not consume enough dairy products. It can lead to a calcium intake shortage and peak bone mass insufficiency.
**Methods:** We conducted a survey among children who study at 2nd (7-9 y), 6th (11-13 y) and 10th (15-17 y) grades of secondary school (totally 243 kids). It included questions devoted to consumption of dairy products (milk, yogurt, cottage cheese, cheese) with the specification of the portion size and the number of such portions per week. Normal calcium intake according to the Institute of medicine (IOM, USA) guidelines was estimated: 1000 mg/d for 4-8 year-olds, 1300 mg/d for 9-18 year-olds. We used the one factor Fisher ANOVA analysis.
**Results:** The average calcium intake was 1194 mg/d (for 7-9 year-olds – 1461 mg/d, for 11-13 year-olds – 1119 mg/d, for 15-17 year-olds – 950 mg/d ($p_{1.2}<0.05$, $p_{2.3}=0,05$, $p_{1.3}<0.001$)). 111 (45.68%) children had the normal calcium consumption, 82 (33.74%) consumed 50-99% of the daily norm, 50 (20.58%) children had <50%. In the age groups of 7-9, 11-13 and 15-17 year-olds the normal calcium intake was observed in 49.44%, 51.32%, 35.90% of children, respectively; 50-99% of the daily norm was consumed by 34.83%, 26.32%, 39.74% in these groups, <50% was taken by 15.73%, 22,37% and 24, 36%.
**Conclusions:** Thus, the lowest calcium intake was consumed by the children aged 15-17. In the age groups of 11-13 and 15-17, there was insufficient average calcium intake. In the age groups of 7-9 and 11-13, a normal amount of calcium was revealed in about 50% of children, in the group of 15-17 their share reduced to 36%. The limitation of the study may be self-completion of the questionnaire by children, so calcium intake may not be accurately assessed, especially in younger children. Thus, national programs are required to increase calcium intake by children, especially among teenagers.

## P724
## FRAILTY SYNDROME AND RELATED FACTORS IN A SENIORS' SAMPLE IN IRAN: A CROSS-SECTIONAL ANALYSIS

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**Objective:** Frailty is a condition with a decline in reserve and function that is accompanied by several adverse health outcomes. The distribution of frailty syndrome in older population in the Middle East has not been reported. The aims of this study were an estimation of the prevalence of frailty and associated factors in a community-dwelling elderly population in Iran.
**Methods:** The sampling was conducted in Bushehr city by a multistage cluster random method in 2016. Demographic, past medical history, and lifestyle data were gathered by interviewing. Anthropometric measures were collected based on a standard guideline. Overnight fasting blood samples were taken and fasting blood sugar (FBS), $HbA_1C$, using automatic standardized devices. diabetes mellitus and hypertension were defined according to standard guidelines. Survey analysis was performed for all analyses. Frailty was defined according to Fried's frailty phenotype. The criteria included self-reported unintentional weight loss ≥10 lbs in the past year, self-reported exhaustion, the slowness that was defined based on sex and height, the weakness that was considered as the lowest quintile of mean hand grip measures, and low physical activity that was defined as the lowest metabolic equivalents (METs) quintile. Prefrailty and frailty phenotypes were defined when existed one or two criteria and three or more criteria, respectively.
**Result:** Finally, data of 2392 subjects were analyzed. The mean age of them was 69.29(SD=6.34) and 51.6% of them were female. The prevalence of prefrailty and frailty were calculated as 8.06% (7.06% - 9.20%) and 42.89% (40.87% - 44.94%), respectively. Frailty was more common in female than male [9.63 (8.18-11.32) vs. 6.40 (5.11-7.97)]. The prevalence was increased by the aging of the participants (2.53% in 60-64 years group vs. 55.55% in 80+ years one). After adjustment for age, gender, BMI, smoking and alcohol consumption, there was an association between frailty and age (odds ratio=1.17; 1 .14-1.20), gender (male/female) (OR=0.46; 0.32-0.65), and BMI (0.93; 0.89-0.97).
**Conclusion:** It seems that the prevalence of frailty syndrome in a sample of the Iranian population is similar to southern Europe. Moreover, frailty is more frequent in the oldest age, tinny female than other elderly population.

## P725
## GEOMETRY OF THE PROXIMAL FEMORAL BONE IN TYPE 1 DIABETIC WOMEN

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**Objective:** In type 1 diabetic patients there are changes in bone quality and density and increase in the number of traumatic falls, which leads to an elevated risk of fractures. The fractures of the proximal femoral bone are associated with increased mortality, morbidity, disability, sharp decrease in the quality of life and increased healthcare costs. The aim of the study was to compare femoral bone density, structure, and strength assessments obtained from DXA measurements in a group of women with and without type 1 DM.
**Methods:** The study was performed on 68 women with type 1 diabetes (mean age: 31.5+8.6; duration of DM: 11+7.4 y; age of onset: 17±6.67) and 53 healthy women matched for age, weight, and height. BMD in the femoral neck, hip axis length (HAL), cross-sectional area and moment of inertia (CSMI), compressive strength index (CSI) and impact strength index (ISI), femur strength index (FSI) and glycated hemoglobin (HbA1c) were measured.
**Results:** Femoral neck BMD and HAL were significantly lower in the fracture group in comparison with control group. Mean CSMI was not significantly different between women with type 1DM and control group. However, there is a tendency of decreased CSMI in the diabetic women. CSI and ISI are significantly lower in fracture group compared with the controls. Differences in FSI did not reach statistical significance. BMD changes and hip strength parameters did not correlate with HbA1c.
**Conclusion:** We conclude that femoral variables are significant independent predictors of hip fracture.

## P726
## ASSOCIATION OF SARCOPENIA AND ITS PARAMETERS WITH METABOLICALLY HEALTHY OBESITY: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** Sarcopenia is a common problem in elderly with the adverse outcomes and characterized by progressive and generalized loss of skeletal muscle mass and muscle function. The aim of this study was to associate the sarcopenia and its parameters with metabolic phenotype in older adults with and without obesity.

**Methods:** A total of 2426 Iranian adults aged ≥60 y, participating in the stage II of Bushehr Elderly Health (BEH) program, a population-based prospective cohort study; were included. Skeletal muscle mass index (SMI) <7.0 kg/m$^2$ and <5.4 kg/m$^2$ were considered as low muscle mass among men and women, respectively low muscle strength was defined as grip strength <26 kg or <18 kg for men and women, respectively, and a usual walking speed ≤0.8 m/s was defined as low physical performance for both genders. Body composition was measured by the DXA method. The metabolically healthy phenotype was defined using the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) criteria. Overweight/obesity was defined as BMI ≥25.0 kg/m$^2$. Study participants were categorized into four groups: 1. metabolically healthy nonobese (MHNO) subjects: BMI<25.0 kg/m$^2$ and <2 metabolic syndrome traits; 2. MUNO subjects: BMI <25.0 kg/m$^2$ and ≥2 metabolic syndrome traits; 3. MHO: BMI ≥25.0 kg/m$^2$ and <2 metabolic syndrome traits; or 4. MUO: BMI ≥25.0 kg/m$^2$ and ≥2 metabolic syndrome traits. Logistic regression was used to calculate odds ratios and 95%CIs.

**Results:** Overall, the prevalence of sarcopenia in MUO, MHO, MUNO, and MHNO was 19.6%, 22.4%, 62.5% and 62.2%, respectively (P<0.001). In multivariate logistic regression analyses, regardless of metabolically healthy status, high BMI significantly decreased risk of sarcopenia independent of age, sex, physical activity, smoking and total body fat [OR = 0.11 (0.08-0.15 in MUO, OR = 0.22 (0.14-0.34 in MHO). Also, high BMI was shown to be a protective factor for low SMI and low muscle strength regardless of metabolically healthy status (MHO, MUO). However, there was excess risk in people with MUO for low physical performance (OR: 1.40; CI: 1.02-1.97).

**Conclusions:** High BMI represents a possible protective factor for sarcopenia, low SMI and low muscle strength regardless of metabolically healthy status among a group of community-dwelling Iranian elderly.

## P727

## COMPARISONS OF PREVALENCE OF AND RISK FACTORS FOR SARCOPENIA BY EWGSOP1 AND EWGSOP2 DIAGNOSTIC CRITERIA AMONG COMMUNITY DWELLING OLDER PEOPLE OF IRAN: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** In early 2018, the European Working Group on Sarcopenia in Older People (EWGSOP2) focused on low muscle strength as a key characteristic of sarcopenia, and provided clear cutoff points for variables identifying sarcopenia. Therefore, due to different criteria i.e. different measures, correction factors and cutoff points, the prevalence rates vary across literature. This study aimed to compare the prevalence and risk factors of sarcopenia in community-dwelling older people by the EGWSOP1 and EWGSOP2 diagnostic criteria in Iran.

**Method:** A total of 2426 Iranian adults aged ≥60 y, participating in the stage II of Bushehr Elderly Health (BEH) program, a population-based prospective cohort study, were recruited. We compared the prevalence of sarcopenia in our population by 2 diagnostic criteria of EWGSOP. According to EWGSOP1 definition, individuals were considered: presarcopenia (low muscle mass), sarcopenia (low muscle mass with low hand grip strength/low muscle performance) and severe sarcopenia (low muscle mass with low hand grip strength+low muscle performance). Based on EWGSOP2 definition, individuals were considered: probable (low muscle strength), sarcopenia (low hand grip strength with low muscle mass) and severe sarcopenia (The existence of 3 parameters together). Reference data from a normative Iranian population are available for detecting parameters of sarcopenia. Accordingly, the cutoff values for low skeletal muscle mass index (SMI) were 7.0 kg/m$^2$ and 5.4 kg/m$^2$ among men and women, respectively. The muscle strength were handgrip strength <26 kg for men and <18 kg for women; while the cutoff value for low physical performance was a usual walking speed <0.8 m/s for both genders. Body composition was measured by DXA.

**Results:** The prevalence of sarcopenia was 21.8-13.6% in men and 13.0-8.0% in women according to EWGSOP1 and EWGSOP2 criteria. The prevalence of severe sarcopenia was 13.9% in men and 18.5% in women, with both criteria. However, using EWGSOP1 criteria, the prevalence of presarcopenia was higher in men than women (27.3% vs. 5.3%). When it is defined by EWGSOP2 criteria, 37.9% of women have probable sarcopenia. The multiple logistic regression models of the risk factors for

sarcopenia reveal that the coefficient of age is >1 indicating that getting older increases the odds of sarcopenia in both genders, in both sarcopenia definitions. Similarly, high fat mass among men and women seems to have higher odds ratio of sarcopenia in two definitions (OR between 2.18 and 2.57 in men, 2.37 and 5.79 in women).

**Conclusions:** The prevalence of sarcopenia varied largely using different criteria. If the probable sarcopenia, sarcopenia, and severe sarcopenia are determined in Iranian population based on EWGSOP1 definition and Iranian cutoff, the result will be different from that of with EWGSOP2 definition and Iranian cutoff. Some adverse outcomes should be considered for estimating the risk of sarcopenia among old Iranian to compare the accuracy of EWGSOP1 and EWGSOP2.

## P728

## CURRENT KNOWLEDGE AND ACCEPTANCE OF SAME STAGE BILATERAL KNEE REPLACEMENT AMONG HONG KONG CHINESE PATIENTS WITH OSTEOARTHRITIS

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**Objective:** Prevalence of knee osteoarthritis is increasing globally and same stage bilateral knee replacement (SSBKR), with controversial risks and benefits, is one potential treatment option for well-selected patients. Patient knowledge and acceptance of SSBKR in developed countries has not yet been explored in previous literature. This study aimed to examine the current state of knowledge and attitudes to SSBKR to help inform future patient education.

**Methods:** This is a cross-sectional survey study. The included subjects are TKR candidates referred to a public sector joint replacement centre from January 2016 to December 2016 and they completed a standardized questionnaire. The Primary outcome was the proportion of patients who were aware of and accepted SSBKR. Secondary outcomes included factors associated with barriers to accepting SSBKR and their preferred medium of education.

**Results:** 43.8% of patients were unaware of the option of SSBKR. 57.2% of patients reported that they would opt for SSBKR if they were given the choice. Age and employment status significantly affected choice of operation. Effect of SSBKR on daily activity during recovery period was the main concern for 48.6% of the patients. Nurse clinics, patient sharing groups and educational videos were well-accepted methods for delivering patient education.

**Conclusions:** Nearly half of the TKR candidates in this study were unaware of the option of SSBKR, which could be a surgical option with good patient selection. Knowledge transfer for SSBKR could be improved through nurse clinics, patient sharing groups and educational videos.

## P729

## RESPONSE OF PTH IN VITAMIN D DEFICIENCY IN A RANDOMLY SELECTED, HEALTHY, URBAN MULTIETHNIC MALAYSIAN POPULATION

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**Objective:** Not all subjects with vitamin D deficiency (VDD) develop secondary hyperparathyroidism (SHPT). Inappropriately normal PTH levels in VDD is known as 'functional hypoparathyroidism' (FHPT)[1]. This study aimed to compare FHPT to SHPT in VDD subjects in a healthy Malaysian population.

**Methods:** A random sample of the population aged between 44-90 y from 2 districts in the state of Selangor, Malaysia, was invited by post for a free bone health checkup. Patients with diseases known to affect bone metabolism or were on treatment for osteoporosis were excluded. All subjects had their BMD measured with DXA. 25(OH)D, iPTH, calcium, phosphate, magnesium, creatinine and C-terminal telopeptide of type I collagen (CTX), procollagen type I N-terminal propeptide (PINP) were measured on Siemens and Roche analysers, respectively. VDD was defined as 25(OH)D <50 nmol/L. FHPT (≤7.63 pmol/L) and SHPT (>7.63 pmol/L) were defined arbitrarily based on the iPTH level within and above the laboratory reference range, in the presence of VDD.

**Results:** 401 subjects came for assessment. 155 (39%) had VDD. Median iPTH was significantly higher in VDD group (5.7 pmol/L) compared to non-VDD (4.9 pmol/L). Further analysis was done in VDD only. 77% (119/155) subjects had FHPT. No significant difference was noted between FHPT and SHPT for age, gender and race. However, within female ($p=0.041$) and Chinese ($p=0.045$) subjects, femoral neck (FN) BMD was higher in FHPT compared to SHPT. Phosphate ($p=0.034$) and iPTH ($<0.0001$) were higher and lower in FHPT than SHPT, respectively. iPTH was negatively correlated with phosphate ($p<0.0001$) only. After adjustment for phosphate, magnesium, adjusted calcium, creatinine and 25(OH)D, iPTH was positively correlated with CTX ($p=0.004$).

**Conclusions:** 39% of healthy Malaysians had VDD; 77% had FHPT. In Chinese and females, FHPT was associated with higher FN BMD than SHPT. Magnesium and calcium did not explain the PTH response in VDD. This study identifies a distinct group of subjects with VDD who show FHPT-related bone protection. This may be one of the reasons why 25(OH)D does not always correlate with BMD.

**Reference:** 1. Sahota O et al. Bone 2004;35:312

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## P730

## MALE OSTEOPOROSIS CAUSES IN A DEVELOPING COUNTRY

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**Objective:** To investigate causes of male osteoporosis in Brazil, a multiracial country with a developing economy, according to WESP World Economic Situation and Prospects 2017 (United Nations).

**Methods:** Men diagnosed as osteoporotic through a spontaneous demand densitometry campaign were referred to a tertiary center where identification data, medical history and laboratorial exams were collected.

**Results:** 110 consecutive men were analyzed. Mean age was 68±8 y and mean BMI 24±4 kg/m$^2$. Constitutional factors were present in 83% of the osteoporotic patients (more than one can apply): being white (73%), age ≥70 y (41%) and familiar history of osteoporosis (22%, among which 14% from their mother). However, only 2 men (1, 8% of the sample) showed only constitutional causes for their osteoporosis. Lifestyle factors were present in 76% of the sample: 67% were longtime smokers, with a mean 750 cigarettes/d/y; 40% reported drinking and 21% assumed more than one dose of alcohol per day, during more than 50 y; 32% of all men were simultaneously smokers and drinkers. Hypogonadism was diagnosed in 28% of the osteoporotic men; prolonged use of corticosteroids in 16%; malabsorption in 10%; rheumatoid arthritis in 7%; primary or secondary hyperparathyroidism in 6%.

**Conclusions:** The majority of our sample (81, 2%) showed mixed constitutional and acquired (related to lifestyle) causes for osteoporosis. Hypogonadism was prevalent in more than one fourth of these men, but it can also be related to lifestyle habits, such as drinking. Incident medications and diseases were minor osteoporosis causes in our setting. In a multiracial country with a developing economy and upper middle per capita income, constitutional factors still represented an important determinant of future osteoporosis. Screening as they age and especially lifestyle preventive measures should be emphasized to white men with a familiar history of osteoporosis in a developing country.

## P731

## WHAT IS YOUR RISK? PATIENT SELF-PERCEIVED FRACTURE RISK AND ITS COMPARISON TO FRAX ASSESSMENT

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**Objective:** Osteoporosis is underdiagnosed and undertreated. Self-perceived estimation of poor outcome by patients influences health-related behavior. BMD measurement is a mainstay of osteoporosis diagnosis, with fracture risk calculation by FRAX assisting in treatment decisions. Data on self-perceived vs. actual fracture risk is scarce. We aimed to compare self-assessed fracture risk and concern in a cohort of individuals undergoing BMD measurement to the FRAX-derived risk.

**Methods:** DXA examinees were offered a patient reported outcomes (PRO) tool regarding fracture risk, concern of fractures and willingness to receive treatment. Routine pre-test questionnaire provided information on risk factors. BMD and trabecular bone score (TBS) results were recorded. TBS-adjusted FRAX score was calculated using country-specific model.

**Results:** 69 patients (aged 63.2±11.3, 73% women) completed the PRO tool. Median TBS-adjusted major osteoporotic fracture (MOF) and hip fracture risk were 8.9 (IQR 5.2-14.45) and 1.8 (IQR 0.4-4.3), respectively. In general, a significant correlation existed between FRAX-derived and self-perceived risk for MOF ($R=0.291$, $p<0.05$). Fracture concern similarly correlated with MOF-FRAX score ($R=0.335$, $p<0.05$). Most examinees overestimated their fracture risk ($Z=-3.732$, $p<0.001$). Logistic regression showed that previous fracture or parental hip fracture increased the risk of underestimation by an odds ratio of 5 and 7.3, respectively ($p<0.05$). No correlation was shown between self-perceived risk or concern and willingness to receive treatment.

**Conclusions:** Surprisingly, while overall people were inclined to overestimate their risk, they tend to ignore well recognized fracture risk factors. Educational efforts must be exerted to bridge the gap between self-perceived and actual fracture risk, mainly in the high-risk group.

## P732

## USE OF THE METHOD OF PERSONALIZED PHYSIOTHERAPY IN THE REHABILITATION OF WOMEN WITH OSTEOPOROSIS COMBINED WITH RHEUMATOID ARTHRITIS

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**Objective:** Rheumatoid arthritis (RA) occupies a special place among various diseases that may be the cause of secondary osteoporosis (OP). For rational patient care it is proposed to use the method of personalized physiotherapy with a preliminary assessment of the phenotypic parameters that determine the effectiveness of treatment. Our aim was to find the determinants of the effectiveness of personalized physiotherapy during the medical rehabilitation of women with osteoporosis in combination with RA.
**Methods:** The study included 63 RA female patients with minimal pathological process activity (DAS28 <3,2). The presence of OP was diagnosed on the basis of DXA in the proximal femur and lumbar spine. The patients were divided into two groups: the main (n=45) and control (n=18). The rehabilitation program (the main group) included kinesiotherapy (dosed walking), hydrokinetic therapy and low-frequency magnetotherapy (0.3-100 Hz, up to 5 mT, duration of exposure 30 min, 10 procedures every other day).
**Results:** The results of the linear correlation analysis made it possible to establish the presence of a reliable correlation of the improvement in the complex clinical indicator DAS28 after the course of rehabilitation with initial values of the pain scores on the VAS scale (r=0.80, p=0.035), morning stiffness (r=0.81; p=0.041), level of ESR (r=0.67, p=0.043), C-reactive protein (r=0.63, p=0.029), antibodies to xanthine oxidase (r=0.66; p=0.036) and the BMD of the hip bone according to the T-criteria (r=0.54; p=0.04). To determine the main groups of indicators characterizing the effect of the rehabilitation program, a canonical correlation analysis was performed. The data obtained were confirmed by the results of factor analysis, which showed that the main factors that significantly affect the dynamics of the DAS28 parameter (73% of the variance of the indicator) are clinical and functional indicators (37%), parameters of inflammatory process activity (23%) and psychophysiological parameters (13%).
**Conclusion:** Thus, personalized physiotherapy of OP with RA patients represents a new approach to the prescription of physical therapeutic factors (for example, such as low-frequency physiotherapy), which is based on data on the clinical, biochemical and immunological status of patients.

## P733
## FRACTURE RISK ASSESSMENT IN PATIENTS WITH OSTEOPOROTIC FRACTURES INCLUDED IN SECONDARY FRACTURE PREVENTION PROGRAM

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**Objective:** Secondary fracture prevention services are being established in many countries. One of their main objectives is the assessment of the subsequent fractures risk. Our aim was to assess the risk of subsequent fractures in patients with osteoporotic fractures included in secondary fracture prevention program in Emergency Regional hospital n.a. N.V. Soloviev, Yaroslavl, Russian Federation.
**Methods:** Fracture risk assessment was performed in 582 patients (mean age 72.54±9.86 y). The assessment of the subsequent fractures risk included: analysis of the risk factors; calculation of 10-y probability of fracture (FRAX); DXA (Hologic Explorer, USA, 2006).
**Results:** Among surveyed patients risk factors of osteoporosis were noted in 526 (90.38%) patients, the majority had several of them (two - 225 (38.66%), three - 85 (14.60%), four or more - 19 (3.26%)). Previous low-energy fractures were found in 261 (44.85%) people, two fractures – in 75 (12.89%), three or more – in 16 (2.75%). The other risk factors were smoking (12.20%), early menopause (22.32% among included women), hip fracture in parents (6.01%). FRAX was calculated in 573 (98.45%) patients. A high risk of fractures was revealed in 116 (20.24%) patients. Assessment of BMD was performed in 292 (50.17%) patients, examination of the rest was not carried out due to the severity of their condition after surgery (more than 90% of them had hip fracture). Osteoporosis by DXA was revealed in 141 (48.29%) persons, osteopenia in 117 (40.07%), normal BMD - in 34 (11.64%).
**Conclusion:** Thus, fracture risk assessment in patients included in secondary fracture prevention program revealed a high prevalence risk factors of osteoporosis, the most common were previous fragility fractures, early menopause, smoking, hip fracture in parents. High fracture risk by FRAX was diagnosed in 20.24%. Osteoporosis in DXA was found less than in 50% of patients, and more than 10% of fractures occurred in patients with normal BMD.

## P734
## CHANGES OF ORTHOTROPIC PROPERTIES OF BONE TISSUE DURING UNLOADING HANGING

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**Objective:** Studies performed that anisotropic properties of the bone tissue can be reduced to orthotropic properties. It means that physical activity influence on the musculoskeletal

system and it can be a reason of evolution of biomechanical structures. It means that biomechanical structure of bone tissue can be described by 9 numerical parameters and 3 directions instead of 27 numerical parameters. All tests were conducted on nonlinear laboratory rats (180-200 g). As a model of gravitational unloading we used antiortostatic support model (1). All experiments were performed according to bioethical standards and were approved by local ethical committee of the Kazan Federal University. Chloral hydrate was used for anesthesia (5 mg/kg, intraperitoneal, Sigma-Aldrich).

**Method:** Extracted femoral bones were scanned on μCT in diaphyseal region. μCT data was discretized by cubes. For every cube orthotropic properties was calculated. For this purpose numerical mechanical tests were carried out. Statistical analysis was used to understand is orthotropic properties constant or depend on location in space. Different groups were investigated: control and microgravity groups with different time of unloading hanging (7, 14, 21, 30 and 40 d).

**Results:** The results of orthotropic properties of diaphysis of the bone were as follows. For control group transversal isotropy was detected: the greatest stiffness was directed in longitudinal direction and stiffness is equal in transverse direction. During unloading the stiffness directions starts to rotate. Stiffness in longitudinal direction became not constant (it decreases in distal regions). With increasing unloading time the main stiffness turns in transverse direction.

**Conclusion:** These results emphasize that the bone orthotropic properties changes during unloading. Bone tissue in unloaded bones adapt to external forces and orthotropic properties of the tissue changes significantly. These results mean that bone tissue can be described by 9 parameters.

**Reference:** 1. Baltina T et al. BioNanoScience 2018;8:864

**Acknowledgement:** The work was supported by the Russian Science Foundation within the scientific project No. 18-75-10027.

## P735

## CORRELATION OF THE IL-6 AND IL-17 VALUE WITH THE BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH CARDIOVASCULAR DISEASES

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**Objective:** The increased production of proinflammatory cytokines (IL-6 and IL-17) leads to an acceleration of bone resorption by the expression of RANKL [1]. Although there are data that IL-17 can have a protective effect on the bone through the suppression of adipogenesis and subsequent expression of leptin [2]. In addition, the level of IL-6 and IL-17 is significantly higher in postmenopausal women with cardiovascular diseases due to the subclinical inflammation in the vascular wall because of atherosclerosis. Our aim was to assess the level of IL-6 and IL-17 in women with cardiovascular diseases in relationship to the BMD.

**Methods:** The study included 172 postmenopausal women aged 50-80 y (average 62.8±8.9 y): women in main group (n=132) had various cardiovascular diseases (coronary heart disease and/or hypertension without severe heart failure), the control group (n=40) did not have any. BMD assessment was done in spine and femoral neck (Hologic QDR 4500C Elite), serum IL-17 and IL-6 were examined by enzyme immunoassay, Bender MedSystems (Austria). We used the nonparametric Mann-Whitney test.

**Results:** The concentration of IL-6 and IL-17 in the main study group was 0.57±1.89 pg/ml and 0.36±1.17 pg/ml, respectively, against the values in the control group 0.05±0.14 pg/ml and 0.03±0.09 pg/ml, $p<0.001$. Depending on the spine BMD value the tendency for inverse relationship with the concentration of IL-6 was revealed (among women with normal BMD it was 0.23±0.52 pg/ml, among the osteopenic 0.35 ±0.68 pg/ml, among the osteoporotic 1.04±3.19 pg/ml, $p>0.05$) and the decrease of IL-17 (0.64±1.75 pg/ml; 0.14 ±0.43 pg/ml and 0.09±0.42 pg/ml, respectively, $p>0.05$). There were no any correlations between femoral neck BMD and cytokines values.

**Conclusion:** We revealed the significant increase of IL-6 and IL-17 levels in postmenopausal women with cardiovascular diseases. At the same time, there was only a tendency of IL-6 concentration increase and IL-17 decrease among the women with osteopenia and osteoporosis. The identified patterns require further study.

**References:**
1. Lencel P and Magne D. Med Hypoth 2011;76:317
2. Goswami J et al. J Immunol 2009;39:2831

## P736

## MUSCLE STIMULATION CAN LEAD TO CHANGES IN MECHANICAL PROPERTIES OF BONE TISSUE

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**Objective:** Physical activity or microgravity condition can make bone tissue worse. It was shown that physical activity influence structure of bone tissue (1, 2) and it leads to changes of strength. The hypothesis that influence of gravitational load on a various parts of the musculoskeletal system can be a consequence of evolution of biomechanical structures and can be restored by applying external loads. For this purpose microgravity models was studied. Additionally microgravity models with putting on animal's feet and spinal cord stimulation were carried.

**Method:** Nonlinear laboratory rats (180-200 g) were used. Antiortostatic support model were used. All experiments

were performed according to bioethical standards and were approved by local ethical committee of the Kazan Federal University. Then femoral bones were dissected from all tested rats. Bones was scanned on μCT in diaphysis, metaphysis and epiphysis regions. Fabric tensor was used for analysis of distribution porosity. Additionally stress tests were performed. It was investigated different groups: control, microgravity models for 7 d of unloading hanging, models 7 d of unloading hanging with putting on animal's feet for 3 h every day and models 7 d of unloading hanging with cord stimulation.

**Results:** In microgravitational models Jung's module decreased slightly (25%), but limits of tension decreased significantly (60%). In case of putting on animal's feet Jung's module restores its value (deviation about 5%) and limits of tension increases up to 33% (in comparison with "hypogravitational" models). In case of cord stimulation Jung's module restores its value (deviation about 12%) and limits of tension increases up to 31% (in comparison with "hypogravitational" models).

**Conclusion:** The results emphasize that the bone structure can be decreased by influence of external forces. It mean that rehabilitation strategy should take into account muscle activity, because muscle also helps to support bone structure.

**References:**

1. Baltina T et al. BioNanoScience 2017;7:67
2. Baltina TV et al Osteoporosis Int 2018;29:S253

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## P737

## OBESITY ASSOCIATED WITH LOW LEAN MASS AND/OR LOW BONE DENSITY SHOWS HIGHER IMPACT ON GENERAL HEALTH IN MIDDLE AGED AND OLDER ADULTS

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**Objective:** Population aging and lifestyle changes are associated with disturbances in body composition that can affect the quality of life. We aimed to investigate the impact of disturbances in body composition on biochemical profile and function in middle aged and older persons.

**Methods:** This is a cross-sectional study with 218 individuals (48% male; aged 50-94 y) recruited from the Health Survey-Sao Paulo 2015. Appendicular lean mass (ALM), fat mass and BMD were measured by DXA. Obesity was defined as fat mass (kg) divided by height squared >9 kg/m$^2$ and >13 kg/m$^2$ for men and women, respectively. Low lean mass was set as ALM divided by BMI <0.789 for men and <0.512 for women. Osteopenia was defined as T-scores at lumbar spine and femoral neck <-1.0. Subjects were clustered into groups according to the presence/absence of body composition disturbances. Muscle function was assessed by handgrip strength and gait speed (4 m). Blood samples were collected to evaluate 25(OH)D, lipid and glycaemic profile.

**Results:** The groups were as follows: 33 (60% male) individuals "without disturbances", 100 (38% male) with "osteopenia and/or low lean mass", 33 (57% male) with "obesity alone", and 52 (51% male) with "obesity plus osteopenia and/or low lean mass". There was no difference in lipid profile among the groups. Those with "obesity alone" and "obesity plus osteopenia and/or low lean mass" showed higher HOMA-IR (+2, p<0.001), with no differences between both. The "osteopenia and/or low lean mass" group was significantly weaker than the group "without disturbances" and those with "obesity alone" (-6 kg, p=0.009). The group with "obesity plus osteopenia and/or low lean mass" showed lower handgrip strength than the group with "obesity alone" (-5.6kg, p=0.009) and a tendency of slower gait speed than those with "osteopenia and/or low lean mass" (-0.08, p=0.033). Results were controlled for age, 25(OH)D, and global physical activity.

**Conclusions:** Obesity associated with low lean mass and/or osteopenia showed poor general health profile, with an increased insulin resistance and poorer muscle function. The results suggest higher morbimortality risks when a cluster of body composition disturbances is present.

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## P738

## REHABILITATION TECHNOLOGY WITH THE USE OF MAGNETOTHERAPY REDUCE RELAPSE OF INFLAMMATORY PROCESSES IN THE JOINTS

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**Objective:** Various technologies of nonpharmacological effects have certain effectiveness in the medical rehabilitation of patients with inflammatory joint disease. Our aim was to evaluate the effectiveness of three-component rehabilitation complex in patients with OA and RA in frequency of inflammation relapses in the joints.

**Methods:** The study included 83 patients with OA and 63 patients with RA with the inflammatory process in the joints

(confirmed by clinical, laboratory and ultrasound data). The patients were divided into two groups, comparable by sex, age, duration and activity of disease and background therapy factor: the main group - 50 patients with OA and 45 patients with RA; control group - 33 patients with OA and 18 patients with RA. Patients from the main group were given a three-component rehabilitation program: kinesitherapy (gymnastics, dosed walking), hydrokinesitherapy (therapeutic swimming in a pool with sea water for 20-40 min, at a water temperature of 26°C, course - 18-20 daily procedures), and low-frequency magnetic therapy (from 0.3-100 Hz; up to 5 mTl; 10 manipulations of 30 min). This program was carried out for 3 weeks.

**Results:** In the first 3 months after the completion of the rehabilitation complex, recurrences of the inflammatory process among patients of the main group were observed in 5 (10%) patients with OA and in 6 (13.3%) patients with RA, and in patients from the control group - in 10 (30.3%) and 11 (61.1%) people, respectively. From 4 to 9 months in patients from the main group relapses were noted in 72% of cases with OA and in 77.8% in RA, in the control group - in 63.6% and 38.9%, respectively. Evaluation of the results obtained in more remote periods allowed us to establish the duration of remission for more than 9 months in 9 (18%) patients with OA and in 4 (8.9%) patients with RA from the main group, whereas in patients from the control group - only in 2 (6.1%) patients with OA. There were significant differences in the recurrence rate in patients with OA of the studied groups in terms of up to 3 months of observation ($p=0.042$) and in patients of RA in terms of up to 3 months ($p=0.025$) and 4-9 months of observation ($p=0.039$). Presumably, the positive effect of magnetic therapy on metabolic processes in cartilage tissue occurs due to the effect on microcirculation in the synovial membrane and periarticular tissues, which are less affected in OA than in RA.

**Conclusion:** The use of a three-component rehabilitation complex allows to achieve a significant reduction in the inflammatory process in the joints of patients with OA and RA (maintaining a positive effect for at least 3 months), with a longer remission observed in patients with OA.

## P739

## GREATER COST EFFECTIVENESS WITH ONE STAGE VS. TWO STAGE SEQUENTIAL BILATERAL TOTAL KNEE REPLACEMENT

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**Objective:** Knee osteoarthritis (KOA) is a common orthopaedic problem and yet approximately one third of knee replacement patients exhibit KOA bilaterally. Same-stage bilateral knee replacement (in 1 surgery) was shown to be equally safe compared to two stage bilateral knee replacement (in 2 surgery) in selected patients. In this study, we compare cost effectiveness among two stage bilateral primary knee replacement vs. same stage bilateral knee replacement.

**Methods:** This is a single center retrospective study of all primary unilateral and same stage bilateral knee replacement (including unicompartmental and total knee replacement) performed from January 2016 to December 2017. All procedures were performed by same surgical team with standardised operative protocol, pre- and post-operative rehabilitation program. The number of pre-operative clinic sessions, perioperative rehabilitation session, length of stay, operation theatre (OT) turnover and cost of instrument preparation between unilateral vs. bilateral knee replacement were analysed.

**Results:** 241 and 230 patients received knee replacement in 2016 and 2017 respectively (41 bilateral and 200 unilateral knee replacement in 2016; 53 bilateral and 177 unilateral knee replacement in 2017). Comparing same stage vs. two stage sequential bilateral knee replacement, if one patient undergo Same-stage bilateral TKR, we can save 3 pre-op clinic session, 8.7 pre-op physiotherapy session, 13 postop physiotherapy session, 4.7 length of stay, 60 min operation theatre preparation time and $HK2400 for instrument preparation.

**Conclusions:** Same-stage bilateral knee replacement resulted in significant cost reduction through improvement in clinic session, rehabilitation session, inpatient bed occupancy and Operation theatre efficiency.

## P740

## CORRELATION OF PAIN AND CHANGES IN THE SYNOVIAL MEMBRANE OF THE KNEE JOINT

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**Objective:** To investigate the clinical significance of ultrasound criteria of changes in the synovial membrane of the knee joint cavity and its role in the assessment of pain in gonarthrosis.

**Methods:** 30 people aged 30-50 y with osteoarthritis of the knee joint were under observation; assessment of the severity of pain in the knee when walking was at least 40 mm on a visual analogue scale (VAS). Ultrasound examination of the knee joint was carried out according to standard procedure using a linear sensor with a frequency of 05.12 MHz in an ultrasonic diagnosis system Accuvix V10 (Samsung Medison, Korea).

**Results:** The evaluation of ultrasound changes was performed in the upper inversion of the knee joint according to the following criteria: the severity of intraarticular effusion (1), synovial proliferation (2), local vascularization of the synovial membrane by power Doppler (3). All patients were divided into three groups, according to the severity of pain in the knee joint: group I (12 people) - 41–59 mm, group II (10 people) - 60–79 mm, group III (8 people) - 80-100 mm on the VAS scale. By comparing changes in the knee joint by ultrasound data in patients of different groups, the following results were obtained: group I: severity of intraarticular effusion - 10 people (minimal changes in 60%, moderate in 20%, expressed in 20%), synovial proliferation - 4 people (moderate changes in 50%, expressed in 50%), local vascularization of synovium - 6 people (minimal changes in 66.7%, moderate in 16.7%, expressed in 16.6%); Group II: severity of intraarticular effusion - 9 people (55.6%, 22.2% and 22.2%), synovial proliferation - 3 people (0%, 33.3% and 66.7%,), local vascularization of the synovial membrane - 4 people (25%, 25% and 50%, respectively); group III: severity of intraarticular effusion - 8 people (62.5%, 12.5% and 25%), synovial proliferation - 5 people (20%, 40% and 40%), local vascularization of the synovial membrane - 3 people (per 33.3%, respectively).

**Conclusion:** The use of ultrasound in the diagnosis of diseases of the knee joints allows to reliably determine the structural and functional changes in all components of the knee joint. The severity of pain in gonarthrosis is most associated with the presence of synovitis in the joint.

## P741
## EFFECT OF DIACEREIN ON METABOLIC SYNDROME IN PATIENTS WITH KNEE OSTEOARTHRITIS

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**Objective:** An open prospective observational study was conducted in the frames of multicenter "Osteoarthritis: evaluation of progression in real clinical practice" program to assess the efficacy and safety of diacerein therapy in pts with knee (KOA) and metabolic syndrome.

**Methods:** 55 outpatients (50 females and 5 males) from 4 federal RF entities with MS and KOA stages II and III *Kellgren-Lawrence,* pain intensity >40 mm VAS were included in the study. Mean age was 59.7±7.3 y (45-74), mean BMI 33 ±5.49 kg/m$^2$, disease duration – 8 (5-10) y (from 1-30). The duration of the study was 9 mo (6 mo therapy and 3 mo FUP). Diacerein was administered at 50 mg (1 capsule) a day during the first months, and 50 mg x 2 times a day during the following 5 months. Efficacy and safety was assessed based on WOMAC index dynamics, health status by VAS, quality of life by EQ-5D questionnaire, physician's global assessment and patient's self-assessment, and by daily demand in NSAIDS. Anthropometry and lab parameters of protein, carbohydrate and lipid metabolism were assessed at baseline and in the end of the study.

**Results:** Statistically significant pain mitigation (VAS assessment) while walking was documented in one month after initiation of treatment (56 (50-65) vs. 50 (41-60) mm, $p<0.0001$), with subsequent further improvement during all 6 mo of treatment. There was no aggravation of pain after discontinuation of the drug (during 3 mo FUP), indicating strong aftereffect of diacerein. Similar trends were observed with WOMAC assessments (baseline pain - 245.0±79.8, at the end of treatment - 149.6±73.3 mm; stiffness - 99.4±39.8 vs. 63.4±35.7 mm; FI - 819.1±306.8 vs. 529.2±290.6 mm, respectively, $p<0.0001$). Statistically significant EQ-5D assessed quality of life improvement was observed during the entire FUP - 0.52(0.52-0.59) vs. 0.62 (0.52-0.71), $p<0.0001$. By the end of treatment 92.5% were categorized as responders by OMERACT-OARSI criteria, 64.2% pts did not take any NSAIDs. Diacerein therapy resulted in significant decrease in BMI (35.2±5.3 vs. 34.9±5.2 kg/m$^2$, $p=0.005$), LDL (3.3 (3.0-3.9) vs. 3.04 (2.6-3.4) mmol/l, $p<0.001$), TG (1.9 (1.3-2.2) vs. 1.8 (1.1-2.0) mmol/l, $p<0.01$), glucose (5.3 (5.0-6.1) vs. 5.3 (4.7-6.0) mmol/l, $p<0.05$), uric acid (346 (286-390) vs. 312 (280-350) μmol/l, $p<0.05$) (Fig.1-4). Adverse reactions (frequent stools) were documented in 3 pts (5.5%), resulting in discontinuation of treatment and withdrawal from the study.

**Conclusion:** Obtained results allow to recommend Diacerein as the disease modifying therapy in OA pts with MS. Diacerein therapy reduces pain, stiffness, and use of NSAIDs, improves quality of life and joint function, significantly reduces body weight, improves the lipid profile and parameters of protein and carbohydrates metabolism. The drug demonstrated a favorable safety profile and sustainable aftereffect, lasting for at least 3mo post-treatment.

Figure 1

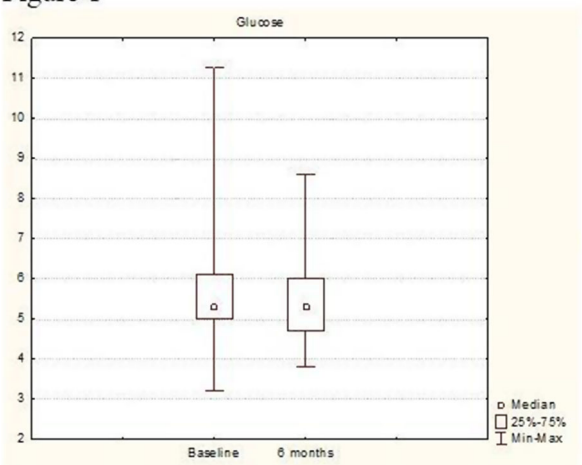


Figure 2

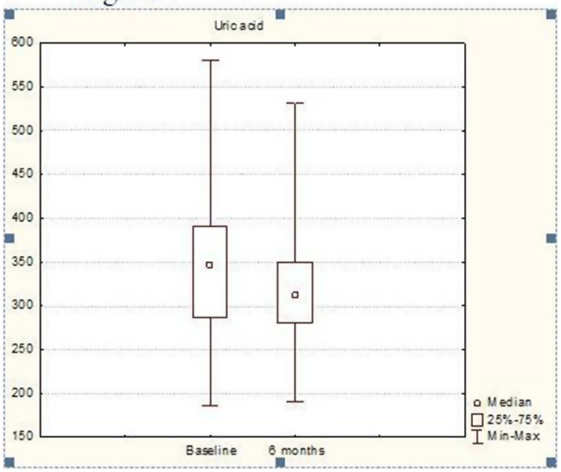



Figure 3

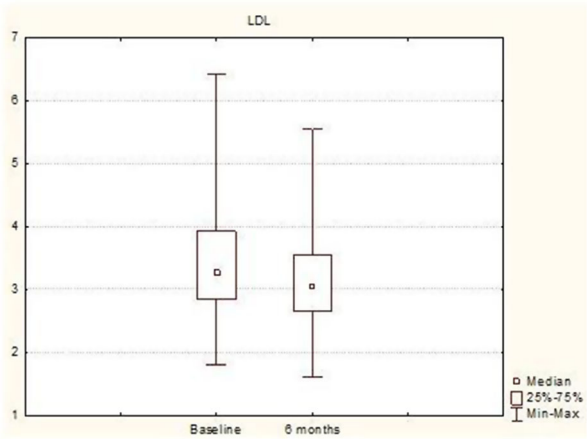
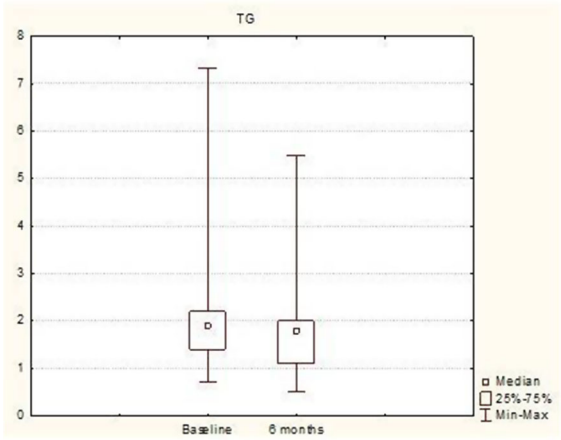



Figure 4




**P742**

**TREAT-TO-TARGET CONSENSUS MANAGEMENT APPROACH FOR PEDIATRIC OSTEOPOROSIS**

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**Objective:** Osteoporosis has been increasingly recognised in paediatric practice as a consequence of several factors. Whilst on one hand, the multifactorial underlying pathology add to the complexity of the condition and the possible treatment approaches, on the other hand the improved care provided to children with chronic illness has also led to many of them living long enough to develop osteoporosis. Our aim was to develop a target-oriented, steered therapeutic approach for children with osteoporosis with emphasis on the key pediatric-specific biological principles, and incorporating the recent advances in diagnosis, prevention and management of osteoporosis

**Methods:** Strategies for identifying and evaluating those at high risk; the use of BMD and biochemical markers in diagnosis and assessing response to management; recommendations regarding nutrition and physical activity; as well as the selection of pharmacologic therapy for the prevention and management of osteoporosis in children were reviewed by a steering Committee who formulated a set of recommendations. These were subsequently deliberated and voted on by an international Task Force. Using the nominal group technique and Delphi method, a multidisciplinary, evidence- and consensus-based treatment recommendations for pediatric osteoporosis were developed based on three consensus discussions.

**Results:** The management approach outline detailed recommendations pertaining to all aspects of osteoporosis as well as strategies for identifying those at increased risk. Ten statements regarding risk factors, diagnosis, scanning, drug therapy (including both stabilization and maintenance phases of management) and fracture prevention were generated. Percentage of positive votes ranged between 87-100%; whereas mean±SD level of agreement was 9.7±0.5. Meticulous

screening and monitoring of children at high fracture risk is mandatory to endorse early diagnosis of osteoporosis. For the children with persistent risk factors and reduced probability of spontaneous recovery, medical treatment with bisphosphonates should be considered. The main treatment outcome, which should be based on a shared decision with parents/patients, was defined as clinical stability, entailing 1. Absence of new vertebral/ nonvertebral fractures in previously normal vertebral bodies and absence of further loss of vertebral height at sites of previous fractures; 2. increases in spine BMD Z-score appropriate for height; and, 3. Improve child mobility. Treatment should be steered to achieve such level of stability. Treatment can be discontinued in patients whose underlying disease or risk factors resolve once they are clinically stable for 6-12 months.

**Conclusion:** It is important to recognise that a multidisciplinary approach is often required for the case finding, diagnosis and management of children with osteoporosis. Consensus-based, Delphi procedure recommended a steered therapy for treating pediatric osteoporosis to target, being aware that the evidence may not be strong at some points and needs to be expanded by future research. These recommendations can be considered as clinician's guide regarding the strategies to adopt to reach optimal outcomes for pediatric osteoporosis.

**Acknowledgement:** Collaborative group: K. Khawaja (Al Mafraq Hospital, UAE); R. Dagher (Notre Dam University Hospital, Lebanon); K. Alsaeid (Kuwait University, Kuwait), K. Alsufyani (Mekkah, Saudi Arabia)

## P743

## A CASE REPORT OF TUMOR-INDUCED OSTEOMALACIA AND DETECTION OF PHOSPHATURIC TUMOR WITH SOMATOSTATIN-RECEPTOR SCINTIGRAPHY

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**Objective:** Tumor-induced osteomalacia is a rare paraneoplastic syndrome in which FGF23 hyperproduction by tumor causes renal phosphate wasting, severe hypophosphatemia and osteomalacia. Localization of the tumor can be a major diagnostic challenge.

**Methods:** We present a clinical case concerning a 62-year-old woman previously diagnosed with hypophosphatemic osteomalacia, with a slight improvement of clinical and laboratory manifestations after initiation of medical treatment.

**Results:** The patient had 10-y history of pronounced lower back pain, decrease in height by 16 cm during life, multiple atraumatic fractures of the ribs and pelvic bones. 6 years earlier she underwent surgical treatment for the mass lesion of the proximal part of the left femur (histologic examination – osteoma). She was diagnosed with hypophosphatemic osteomalacia 4 ys earlier and received treatment with alfacalcidol 3 μg/d, cholecalciferol 15 000 IU/week, calcium 1000 mg/d. The examination showed hypophosphatemia 0.6 mmol/l (0.74-1.52), elevated PTH 111 pg/ml (15-65), normal levels of total and albumin-adjusted serum Ca, a slight increase in alkaline phosphatase (ALP) 158 IU/l (50-150) and CTx 0.836 ng/ml (0.01-0.69), 25(OH)D 23.4 ng/ml. Low tubular maximum reabsorption of phosphate corrected for glomerular filtration rate (TmP/GFR) 0.45 indicated loss of phosphate with urine. Considering likely ectopic hyperproduction of FGF23, we performed whole body scintigraphy with somatostatin analogue, which revealed focal intensive radiotracer uptake in left inguinal region. CT scan of the pelvic area excluded the presence of a primary focus in the area of a previously removed osteoma. After tumor-removal surgery, follow-up blood test on the 3rd day showed normalization of serum P level. Four months after surgical procedure, P level remained within the normal range, TmP/GFR showed no renal phosphate wasting. Ca level also remained within the normal range, while elevation of ALP 209 IU/l (40-150) as well as PTH 99 pg/ml (15-65) was observed, 25(OH)D 20.4 ng/ml. Marked elevation of osteocalcin 153 ng/ml (11-43) and CTx 2.34 ng/ml (0.01-0.69) suggested intense bone remodeling. Therapy with alfacalcidol, cholecalciferol and calcium was continued with increase of calcium dose up to 2000 mg/d.

**Conclusion:** The diagnosis of tumor-induced osteomalacia is a challenge and is commonly delayed for years. Attention to biochemical values (especially serum P level) and thorough use of imaging techniques are the key steps. Only surgical removal of causative tumor can provide complete cure.

## P744

## MUSCLE QUALITY DIFFERENCES IN MALE AND FEMALE CROSS-COUNTRY RUNNERS

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**Objective:** Handgrip strength (HG) has been demonstrated to predict nutrition status, osteoporosis, hospitalization, disability, and mortality. However, muscle quality (MQ), or the ratio of strength per unit muscle mass, might provide greater insight than strength alone. Following accrual of strength and attainment of peak muscle mass, consistent, age-related declines occur. The purpose of this study was to evaluate MQ among collegiate runners (RUN) and a group of age and height-matched non-athlete controls (CON).

**Methods:** Data from a larger study that investigated lifestyle and musculoskeletal health among college students were used in the analysis. Participants (female vs. male: age=20.5±1.8

vs. 20.3±0.9 y; height=162.9±6.1 vs. 178±5.6 cm; weight=55.4±5.2 vs. 66.3±4.8 kg; BMI=20.9±1.5 vs. 20.8 ±1.4 kg/m$^2$) were recruited from the cross-country team and broader student body to produce four groups: male RUN=18 and female RUN=18 and male CON=22 and female CON=24. HG of both limbs was measured by dynamometer and DXA was used to quantify lean mass of each arm. MQ, a unitless ratio, was calculated by dividing the combined right and left HG by the combined fat-free mass (FFM) of both arms.

**Results:** Female RUN and CON were significantly lower than male counterparts in HG (RUN=55.7±8.5 vs. 80.2±11.6 kg; CON=59.2±6.9 vs. 86.5±11.3 kg) and FFM (RUN=3.8±0.5 vs. 6.0±0.6 kg; CON=3.7±0.4 vs. 6.1±0.8 kg), but significantly higher in MQ (RUN=15.7±2.1 vs. 14.4±1.5; CON=15.3±2.2 vs. 13.2±1.6). Male RUN were significantly higher than male CON in HG (86.5±11.3 vs. 80.2±11.6 kg) and MQ (14.4±1.5 vs. 13.1±1.6), while female RUN were not different than female CON for HG, FFM, or MQ. Significance was set at $p<0.05$. Conclusion: Muscle adaptations to competitive running appear to be sex specific at a critically important stage of musculoskeletal development.

## P745
## RELATIONSHIP BETWEEN KISSPEPTIN AND NEUROKININ B LEVELS AND MARKERS OF WATER-ELECTROLYTE BALANCE AND CALCIUM-PHOSPHATE METABOLISM IN PATIENTS WITH NEUROENDOCRINE DISORDERS

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**Objective:** To study the effect of neurohormones kisspeptin and neurokinin B on the indices of electrolyte and calcium-phosphate metabolism in patients with neuroendocrine pathology.

**Methods:** 82 female patients were included in this pilot study divided into 2 groups: “Cushing's disease” group (n=51) and “Acromegaly” group (n=31). Median age was 33 y [27; 38] in “Cushing's disease” group and 39 y [32; 45] in “Acromegaly” group. Kisspeptin levels were measured using an ELISA test-system “Kisspeptin-54 S-1308” (Peninsula Laboratories International, Inc., USA) on a Luminometer Photometer LMA01 (Beckman Coulter, Czech Republic). Extraction of peptide from plasma was performed according to the manufacturer’s protocol. Measurement of the level of neurokinin B was carried out by the ELISA method on Cobas 6000 Module e601 analyzer (Roche, Switzerland), set “Neurokinin B S-1271” (Peninsula Laboratories International, Inc., USA).

**Results:** The median serum levels of kisspeptin in the “Cushing's disease” and “Acromegaly” groups were 10.8 [3.0; 13.5] and 7.9 [0.14; 11.7] ng/ml, neurokinin B – 0.11 [0.08; 0.13] and 0.07 [0.06; 0.1] ng/ml, sodium - 142 [140; 143] and 140 [139; 141] mmol/l, potassium – 4.4 [4.2; 4.8] and 4.6 [4.2; 5.0] mmol/l, chlorides - 106 [105; 108] and 107 [105; 109] mmol/l, total calcium – 2.39 [2.28; 2.46] and 2.38 [2.31; 2.45] mmol/l, phosphate – 1.14 [1.07; 1.26] and 1.34 [1.24; 1.53] mmol/l respectively. We observed statistically significant difference in kisspeptin, sodium and phosphate levels between groups ($p<0.05$). In the correlation analysis, no significant dependencies were obtained between neuropeptides and sodium, potassium and chloride blood levels. Negative correlation was observed between kisspeptin and neurokinin B in “Cushing's disease” group ($r=-0.55$, $p<0.05$), between kisspeptin and serum phosphate in “Acromegaly” group ($r=-0.45$, $p<0.05$).

**Conclusion:** In a pilot study assessing the impact of new neuroendocrine hormones, there is no correlation between kisspeptin, neurokinin B and sodium, potassium, chloride levels, which negates their significant role in the control of water and electrolyte parameters of blood. Relationship between the studied neuroendocrine hormones and calcium-phosphate metabolism is not clearly understood and may be the subject of further research.

## P746
## PREGNANCY-RELATED OSTEOPOROSIS AND ITS MANAGEMENT: A SERIES OF CASES

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**Objective:** Pregnancy-related osteoporosis is a rare disorder with severe complications and incompletely understood pathogenesis. There is lack of clinical practice guidelines due to low incidence of this disease and few published cases.

**Methods:** We present 8 cases of pregnancy-related osteoporosis in women aged between 28-42 y. Six of them were diagnosed between 1 month and 3 y postpartum and 2 were diagnosed in the third trimester of pregnancy. Only one woman had risk factors promoting osteoporosis before pregnancy (heparin treatment).

**Results:** Blood tests showed high normal serum Ca and P in most patients. All patients except one had PTH level within normal range (one patient had secondary hyperparathyroidism due to vitamin D deficiency). Serum osteocalcin level was available in 4 patients, 3/4 had low levels of osteocalcin. Seven patients had multiple vertebral compression fractures at X-ray with a prominent decrease in BMD (spinal Z-score from -2.2 to -4.4) and one patient suffered bilateral femoral neck fracture. Treatment approaches included therapy with calcium (1000-2000 mg/d) and vitamin D (alfacalcidol 0.5-3 μg/d or cholecalciferol 10000-15000 IU/week) in all patients; 5 patients had received specific treatment for osteoporosis: 2 patients

received bisphosphonates, 1 patient received calcitonin spray, 1 patient received denosumab and 1 patient sequentially received strontium ranelate, denosumab and teriparatide. Three women underwent vertebroplasty and one woman had bilateral hip replacement. Follow-up data was available in 6 patients with median 2 y, 5/6 had radiological improvement in lumbar spine.
**Conclusion:** Described cases confirm the severity of pregnancy-related osteoporosis and its challenging management. Women diagnosed with pregnancy-related osteoporosis should be advised to have appropriate calcium and vitamin D intake and counseled regarding the risk of potential detrimental effects on the bone health during breastfeeding and newborn care. Necessity and regimen of specific treatment are the subject for further research.

## P747

## A 12-MONTH STUDY OF ORAL CONTRACEPTIVE USE, BONE TURNOVER MARKERS, AND BONE MINERAL DENSITY IN COLLEGE-AGED FEMALES

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**Objective:** In 2015, 600 million women worldwide were using oral contraceptives (OCs), while in the USA, about 56% of females 15-19 years old have ever used OCs. The hormones included in OCs may influence bone metabolism and BMD, especially during young adult years when the skeleton is consolidating. Due to the widespread use of OCs, it is important to investigate potential effects these drugs may have on bone. Objective: The purpose of this study was to compare BMD and bone turnover markers between OC and non-OC users over 12 months.
**Methods:** Data was analyzed from a larger study investigating bone health among university students. Participants (n=62, age=19.2±0.6 years) were labeled as OC users (n=34) and non-OC (n=28) users based on reports of medication use. Using ELISA, serum samples collected at baseline, 6 months, and 12 months were quantified for CTX and PINP, markers of bone resorption and formation. BMD was measured at the three time points with DXA.
**Results:** OC and non-OC users were similar in age, height, weight, lean mass, physical activity, and calcium intake at baseline. OC users had greater CTX than non-OC users at baseline (18.6±8.2 vs. 13.8±5.3 ng/mL, $p<0.05$) and 6 months (20.4±10.3 vs. 14.2±8.5 ng/mL, $p<0.05$). Non-OC users showed higher PINP at baseline (95.7±30.4 vs. 82.3±28.3 ng/mL, $p=0.05$). While controlling for lean mass, groups did not exhibit different BMD at the hip, spine, or whole body. However, while non-OC users maintained BMD at the spine across 12 months, the OC users had a decline in BMD at the lateral (0.772±0.014 to 0.756±0.014 g/cm$^2$, $p<0.005$) and anterior-posterior spine (1.005±0.015 to 0.998±0.015 g/cm$^2$, $p<0.05$). Both groups exhibited increases in BMD of the whole body over the year.
**Conclusion:** The young women in this study were increasing BMD of the whole body, however OC users displayed elevated bone turnover, which may explain their decline in bone mass at the spine.

## P748

## A PATIENT WITH TWO RARE DISEASES – PFEIFER-WEBER-CHRISTIAN DISEASE AND CENTRAL FORM OF MULTIPLE SYMMETRIC LIPOMATOSIS: CASE REPORT

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Pfeifer-Weber-Christian disease (PWCD) is a rare inflammatory disorder of the subcutaneous fatty tissue. The diagnosis and therapy of this rare type of panniculitis is still controversial. Multiple symmetric lipomatosis (MSL) is a rare metabolic condition characterized by multiple symmetric accumulations of nonencapsulated fatty tissues throughout the body.
**Case presentation:** We report a 46 years old white women, who presented with tender rounded circumscribed mass in the right masseteric space, with mild erythema in overlaying skin, associated with fever, oral aphthous ulcers, arthralgia/arthritis, myalgia, dry eyes and mouth, Raynaud's phenomenon and generalized weakness. A skin biopsy showed focal lobular inflammation of adipose tissue with lymphocytes, fat cell necrosis and lipophagia. All other causes of panniculitis including polyarteritis nodosa, sarcoidosis, systemic lupus erythematosus, vasculitis, thrombophlebitis, alpha 1 antitrypsin deficiency are excluded and diagnosis PWCD was made. Also, patient was presented with dyslipidemia (high levels of cholesterol, LDL-ch, and triglycerides), hypertension, absence of insulin resistance and autonomic neuropathy. Her BMI was 23.3 kg/m$^2$. She had multiple, bilateral, symmetric, soft, nonencapsulated lipomatous, subcutaneous masses involving the lower trunk, arms and upper legs. These masses varied in size from 1 cm x 1 cm to 6 cm x 4 cm. In addition, diagnosis of central form MSL was made. Patient treated conservatively (dual lipid-lowering therapy) for MSL because she had no other complaints related to the excess fat tissue. Treatment with oral metilprednisolon (20-30 mg/d) for 6 months for PWCD was not effective. Patient improved following cyclosporine A (5 mg/kg/d) for 6 months with no activity reported and no appearance of any new swelling.

**Conclusion:** We describe, for the first time, an unusual case with two rare diseases PWCD and MSL. Even though the pathogenesis of PWCD is not finally resolved, the fact the patient responded to cyclosporine A support the hypothesis that PWCD is a T cell mediated autoinflammatory condition.

## P749
## TOTAL HIP REPLACEMENT IN PATIENTS WITH OSTEOARTHRITIS AND INCREASED BODY MASS INDEX: LONG-TERM RESULTS

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**Objective:** The urgency of the problem. Patients with osteoarthritis (OA) and obesity are often denied joint replacement of the knee and hip joints, due to excessive body weight. It is believed that in this group of patients there is a pronounced pain syndrome after the operation for a long time, and a sufficient function of the joint is not restored. The aim of the study was to conduct a comparative analysis of clinical and functional disorders in patients with pathology of the hip joint, having an increased BMI in the perioperative period.
**Methods:** The study included 48 patients (13 men and 35 women) aged 24-78 y (average 58.8) with a reliable diagnosis of OA and increased BMI, with indications for surgery - aseptic necrosis of the femoral head and coxarthrosis 3-4 X-ray stages. The growth of patients was 137-179 cm (average 160.5), body weight 74-128 kg (average 92.3), BMI: 29-50 kg/m$^2$ (average 35.8). Alimentary constitutional obesity: I degree in 28 patients, II degree in 10 patients, III degree in 9 patients, IV degree in 2 patients. The survey included detailed localization of the Harris index and VAS pain before and after surgery. Before surgery, the Harris index was 20-70 (average 40.9), VAS: 70-95 mm (average 82.2). Concomitant pathology: hypertension, coronary heart disease, type 2 diabetes. The correlation analysis method was used for statistics.
**Results:** All patients were classified according to the BMI. A high connection was found between growth, BMI, and the need for total hip replacement. BMI in men was 10% higher than in women. The duration of hip replacement surgery in patients with normal BMI is on average 40 min., in patients with elevated BMI, on average, this time increases by 20%, in men by 40%. Blood loss was measured intraoperatively and along drains throughout the day. It was found that obesity increases the volume of intraoperative blood loss after primary total arthroplasty in women more than in men. This may be due to the fact that in men most of the excess weight is concentrated around the waist, and in women it is around the hips, which makes the operation longer, blood loss during surgery is more than 20 ml. In the early and late postoperative period, patients with obesity did not have any complications. The need for analgesic therapy in duration (+2 d) and dose of NSAIDs (by 30%) was higher in women compared to men. Reduction of pain in VAS 10 days after surgery compared to the original was 56.3%, improvement of joint function on the Harris scale 28.1%. There was a significant (>0.01) decrease in pain intensity in VAS in 3 months after surgery by 56.9%, in 12 months by 96%. The dynamics of joint function on the Harris scale 3 months after surgery in relation to the initial was 28.3%, 1 year 8.5%. At the same time, in patients the first 3 months after surgery there was a tendency to reduce body weight and the implementation of the rehabilitation program, in the future, the change in body weight of patients was less significant, and the load on the joint increased.
**Conclusion:** Hip joints replacement is an effective method of improving the functional state, relief of pain and helps to increase the physical activity of patients suffering from excessive body weight.

## P750
## RISK FACTORS ASSOCIATED WITH FOREARM OSTEOPOROSIS IN FEMALES WITH RHEUMATOID ARTHRITIS

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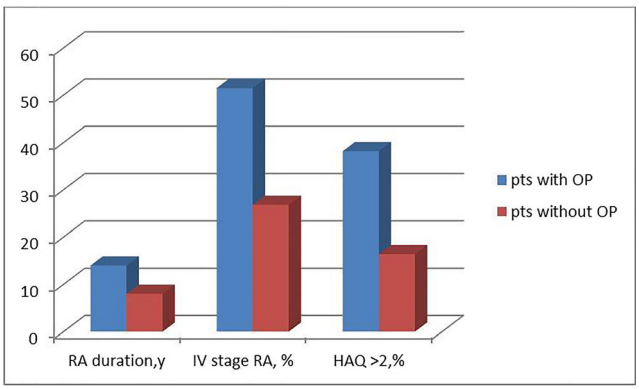
**Objective:** Bone loss and osteoporosis are known to develop predominantly in the forearm of RA patients, although risk factors are yet not clearly outlined. Our aim was to identify risk factors (RF), associated with forearm OP development in RA patients.
**Methods:** 143 female RA patients (ACR criteria) aged 20-75 y (mean age 55.3±10.1 y) were included. The following info was included in each individual pts' files: anthropometric parameters, social and demographic data, case history, clinical examination and lab findings, traditional OP RF, pts' joint status, comorbidities status, pain intensity assessments and VAS evaluation of pts' general health status. Hand and distal feet plain X-rays were taken for each patient. Van der Heijde modified Sharp method was used to score the erosions and joint space narrowing in hands and feet. Based on the forearm OP status all pts were divided into 2 groups: pts with OP–70 (49%), and pts without OP–73 (51%).
**Results:** OP pts were older as compared to pts without OP (60.5±10 vs. 51.6±10.6 y, p<0.0001), with longer RA duration (14 (8-25) vs. 8 (7-15) y., p=0,004) and more pronounced destructive changes by Sharp score (169 (86-236) vs. 92 (52-128), p<0,0001), including more cases of stage IV (Steinbrocker x-ray classification) rheumatoid arthritis (51.5% vs. 26.8%, relative risk (RR)=1.9; 95%CI 1.23-3.02, p=0.005) (Fig.1). OP pts demonstrated significantly higher incidence of severe

functional decline (mean HAQ 1.7±0.8 vs. 1.2±0.8, p=0.003): 38.2% of these patients had HAQ >2 vs. 16.4% among OP-negative (RR=2.33, 95%CI 1.25-4.32, p=0.008). There was no intergroup differences in terms of inflammatory activity and glucocorticoid (GC) dosage or duration of treatment. Analysis of traditional risk factors showed that OP pts had lower body weight (66±12.2 vs. 72.6±14.4 kg, p=0.004), the majority of them were in postmenopause (92.9% vs. 63%, RR=1.47, 95%CI 1.22-1.78, p<0.0001), experienced long immobilization periods (>2 months) earlier (23.2% vs. 9.7%, RR=2.38, 95%CI 1.05-5.44, p=0.04) and fractures (52.9% vs. 27.4%, RR=1.93, 95%CI 1.25-2.98, p=0.003). Comorbid diseases were more common in OP-positive participants (84.3% vs. 57.5%, RR=1.47, 95%CI 1.17-1.83, p=0.0009), among which certain cardiovascular diseases (arterial hypertension (70% vs. 47.9%, RR=1.46, 95%CI 1.1-1.9, p=0.01), coronary artery disease (40.6% vs. 11%, RR=3.7, 95%CI 1.8-7.6, p=0.0001)) and GI tract diseases (49.3% vs. 26.4%, RR=1.87, 95%CI 1.2-2.9, p=0.008) prevailed.

**Conclusion:** Forearm OP in patients with RA is not only associated with traditional OP risk factors (age, low body weight, long immobilization periods, fractures, comorbidity), but also with certain RA-dependent factors, such as disease duration, x-ray hand and feet lesion stage and severe HAQ functional impairment.

Figure 1.




## P751
## ONSET OF PERIPHERAL SPONDYLOARTHRITIS AFTER ADMINISTRATION OF IBANDRONATE: CASE REPORT

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Bisphosphonates are characterised by high affinity to the bone mineral and capability after internalisation to suppress the activity of the osteoclast and induce its apoptosis. The simple bisphosphonates such as etidronate interfere with phosphorylation. The nitrogen-containing bisphosphonates such as ibandronate block farnesyl pyrophosphate synthetase (FPPS) that is part of the mevalonate pathway (synthesis of cholesterol). Inhibition of FPPS leads to cumulation of isopentenyl pyrophosphate (IPP), which after bonding on the receptor of the γδT lymphocytes may induce production of the tumor necrosis factor - alpha. The transitory production of pro-inflammatory cytokines is considered as the cause of the reaction in the acute phase after administration of the first infusion of the intravenous form of bisphosphonate. The patients may suffer fever, headache, aching of the joints, muscles and nausea. Rarely, uveitis develops not only after administration of intravenous, but also oral bisphosphonates. The presence of HLA B 27 in such affected patients is unknown. HLA B 27 positive people have a higher risk of uveitis and also inflammatory rheumatic diseases that affect the spine and joints, so-called, spondyloarthritis.

**Case:** The case of a 63-year-old woman was presented, who has to date been treated for hypertension, dyslipidemia, glaucoma and uveitis of the right eye. From the indication of postmenopausal osteoporosis, ibandronate was administered to her. In the following 3 d after the first tablet, she had influenza-like syndrome. In subsequent days, symptoms developed that indicated enthesitis of the adductors of the thighs in the groins and calf muscles in the poplitea, arthritis of the left shoulder and wrist and increase in C-reactive protein. Rheumatologic examination diagnosed peripheral spondyloarthritis, HLA B 27 positive. Treatment with sulfasalazine induced remission.

**Conclusion:** This is the first described case of peripheral spondyloarthritis in an HLA B 27 positive female patient in which administration of oral ibandronate was the trigger of the disease. It is it possible to assume that apart from genetic disposition (HLA B 27), the etiopathogenesis of the disease could also be characterised by the pro-inflammatory effect of ibandronate, which is known from the in vitro and in vivo studies.

## P752
## SERUM VITAMIN D LEVEL ASSOCIATED WITH COGNITIVE AND PHYSICAL FUNCTIONING OF POSTMENOPAUSAL WOMEN

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**Objective:** Vitamin D insufficiency has been reported to be associated with increased risk of falls, low bone mineral mass, bone fractures and low quality of life in older adults [1]. Moreover, lack of vitamin D may be related to additional cardiovascular events, infections, several types of cancers and other causes of multimorbidity and premature death [2]. Our aim was to assess cognitive and physical functioning of postmenopausal women in relation with serum vitamin D level.

**Methods:** In a prospective cohort nested sample of 80 independently living postmenopausal women aged between 64-69 (median 67) serum 25OH-cholecalciferol level was assessed [1]. Mini Mental State Evaluation (MMSE) tool was used for cognitive impairment screening. Short Physical Performance Battery (SPPB) and grip strength were used to measure physical functioning.

**Results:** In this sampling menopause occurred at the age of 45-52 (median 50), 32 persons had low traumatic fractures, 9 women had traumatic fractures. Only 21 subjects had normal serum vitamin D level, 26 women had vitamin D insufficiency and 33 participants were vitamin D deficient. Low levels of serum vitamin D were associated with mild cognitive impairment (Spearman R=- 0.36: P=0.001) and decrease of grip strength (Spearman R=- 0.32: P=0.002). Low serum vitamin D group showed significantly higher occurrence of inability to perform SPPB tests ($c^2$=7.27; P=0.02).

**Conclusion:** In a small but homogenous sampling of independently living postmenopausal women low level of serum vitamin D was associated with impairment of both cognitive and physical functioning.

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## P753

## 25OH VITAMIN D LEVELS IN REFERENCE HOSPITAL LABORATORIES FROM TURKEY: A MULTICENTER NATIONWIDE STUDY

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**Objective:** Vitamin D deficiency is an epidemic. Diagnosis and treatment of vitamin D deficiency and toxicity depends on laboratory measurements of 25OH vitamin D levels. The aim of this study was to evaluate 25OHD levels which was measured in main clinical hospitals form Turkey in a year. Thus, to determine frequency of deficiency and toxicity of vitamin D in hospital admitted patients.

**Method:** Available whole results of 25OHvit D measurements for year of 2016, measurement date, gender and age parameters was included in the study form 33 hospital laboratories around Turkey, samples of age over 18 y with no exclusion criteria include in final analysis. All labs were used immunochemiluminescence method for measurement of serum 25OHvitD.Vitamin D deficiency defined as level of serum 25OHD <30 ng/dl and toxicity defined serum level of 25OHD >150 ng/dl.

**Results:** Totally 774126 serum samples evaluated and mean 25OHvitD level was 21.6±3.4 ng/dl. 78.7% of the samples were reported to be <30 ng/dl, 24.8% was <10 ng/dl that defined severe vitamin D deficiency. 25OH D levels was over 88 ng/dl range in 0.83% (n:7978) of the samples and 0.66% (n:4125) was in toxic range. 25OHvit D levels were similar between women (20.8±2.9 ng/dl) and men (21.08±2.7 ng/dl) (p=0.94) in whole group. Vitamin D levels was higher in September serum samples (24.05±4 ng/dl, n:55947) compared to march serum samples (19.07±3.3 ng/dl, n:76348) (p<0.0001).

**Conclusion:** Although this retrospective study that was not able to exclude vitamin D related diseases and vitamin D treated patients, we observed vitamin D deficiency and sufficiency most of the measured serum samples in hospital admitted patients that requires vitamin D supplementation. Interestingly toxic levels was consisting nearly 1% of adult patients; that need to pay attention inappropriate use of vitamin D and associated disorders in patients admitted to reference hospitals.

## P754

## RECOMMENDATIONS FOR THE REPORTING OF HARMS IN MANUSCRIPTS ON STUDIES ASSESSING OSTEOARTHRITIS DRUGS: A CONSENSUS STATEMENT FROM THE EUROPEAN SOCIETY FOR CLINICAL AND ECONOMIC ASPECTS OF OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES (ESCEO)

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**Objective:** There is strong evidence of under-reporting of harms in manuscripts reporting the outcomes of randomized controlled trials (RCTs) compared with the volume of raw data retrieved from these trials. Many guidelines have been developed to tackle this, but they failed to address some important issues that would allow for standardization and transparency. The ESCEO aimed at delivering accurate recommendations for better reporting of harms in clinical trials manuscripts on anti-osteoarthritis (OA) drugs, which could help better inform clinicians on harms reported from RCTs and further help researchers conducting meta-analyses.
**Methods:** Using the outcomes of several systematic reviews on the safety of anti-OA drugs, we summarized the ways in which harms have been reported in OA RCT manuscripts up until now. Next, we drafted some recommendations and initiated a modified Delphi process that involved a panel of clinicians and clinical researchers, to build an expert consensus on recommendations from the ESCEO for the reporting of harms in future manuscripts on RCTs assessing anti-OA drugs.
**Results:** These recommendations emphasize that all treatment-emergent adverse events (AEs) should be taken into account for harms reporting, with no threshold, further describing how specific AEs should be reported and providing a list of the most relevant organ systems to be considered according to each class of drug for reporting of harms within the results section of manuscripts. Irrespective of the drug, the ESCEO recommends that total, severe and serious AEs, and withdrawals due to AEs should always be reported; guidance on the reporting of specific events pertaining to each category is provided. The ESCEO also recommends the reporting of information on drug effect on biological parameters, with specific guidance.
**Conclusions:** These recommendations may contribute to improving transparency in the field of safety of anti-OA medications. Pharmaceutical companies developing drugs for OA and researchers conducting clinical trials are encouraged to comply with them, when reporting harms-related results in manuscripts. The ESCEO also encourages journals to refer to these recommendations in their Instructions to Authors for publication of manuscripts on trials of anti-OA drugs.

## P755
## HEALTHY LIFESTYLE FOR THE PREVENTION OF OSTEOPOROSIS

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**Objective:** Osteoporosis is a serious health problem, a disease characterized by high morbidity, mortality and socioeconomic costs. It is a disease characterized by a decrease in bone density. Bones become porous, crutches and, therefore, subject to fractures, which occur spontaneously or with a force less than needed to break the healthy bone. Our aim was to see the frequency of osteoporosis and the possibility of its prevention.
**Methods:** Data from the medical records and protocols for physical medicine and health of the Health Center Nis have been analyzed after the screening of the examination of patients of both sexes and apparent genus for four weeks (28 d), in October 2018, on the Sonost 3000 densitometer apparatus.
**Results:** A total of 202 patients were examined, 170 of them (84.15%) of women and 32 (15.84%) of men. The normal finding of T-score 0-1 had 104 (51.48%) patients, of which 45 women and 59 men. Osteopenia and T-score -1-2.5 had a total of 55 (27.23%), of which 38 women and 17 men. Osteoporosis T-score >-2.5 was diagnosed in 43 (21.29%) individuals and in 31 female populations and 12 male populations.
**Conclusion:** To prevent the occurrence of osteoporosis and slow down its osteoporosis, proper nutrition is needed, which provides a recommended daily intake of calcium and vitamin D and adequate physical activity according to age and healthcare possibilities of the patients. Certainly, young patients are recommended sports activity, and older elderly. It is necessary to eliminate the harmful habits (consumption of cigarettes and alcohol) and timely measurement of bone density in persons at risk. Ultrasound osteodensitometry is a fast, cost-effective method without radiation. Measurement is performed on the heel bone, and this measurement can be used as a screening method in the prevention of osteoporosis.

## P756
## IN VIVO ELEMENTAL ANALYSIS OF HUMAN CALCIFIED TISSUE

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**Objectives:** Several elements are toxic when present in excessive amounts, and such overexposure typically occurs in an occupational setting (lead), although some environmental exposures (lead and strontium) and medical treatments (strontium, lanthanum and gadolinium) are also of concern. *In vivo* elemental analysis of human calcified tissue is an approach that is not widely available in clinical practices worldwide. This presentation will introduce to the wider medical community a non-conventional, *in vivo,* radiation-based calcified

tissue analysis of lead, strontium, lanthanum and gadolinium, based on the *in vivo* X-ray fluorescence (IVXRF) diagnostic tool.

**Methods:** Instead of collecting a sample, such as a bone biopsy for *in vitro* chemical analysis, the stored quantity of a toxic element is determined *in vivo*. The approach of the *in vivo* elemental analysis is non-invasive; consequently, no sample is taken, and by extension, there is no discomfort to the patient. The relationship between chronic exposure to an element and the health effects of this exposure are best explored by examining the quantity of the element in question that is stored in the body *in vivo*. Depending on the bone site, detection and quantification of these elements can provide information on long-term exposure to an element that is distinct from other, more conventional, methods of exposure assessment. The limiting factor of these approaches, however, is that the radiation dose must be kept as low as reasonably possible, and within the range of other diagnostic procedures to allow for the monitoring of element's accumulation over time.

**Results:** The IVXRF of bone lead [1], strontium [2], lanthanum [3] and gadolinium [4] are going to be summarized. The method can identify exposure to these elements and detect concentrations at the parts per million level. Lead and strontium can be reliably measured in the controls and non-exposed population as well.

**Conclusions:** A nonconventional, *in vivo,* radiation-based calcified tissue analysis of lead, strontium, lanthanum and gadolinium, is a useful but underutilized diagnostic tool in clinical practice. Moreover, the IVXRF could be adapted to other elements with a clinical relevance or need, as long as they are accumulated in human calcified tissue.

**References:**

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## P757

## USEFULNESS OF 3D RECONSTRUCTION IN PLANNING SURGICAL TREATMENT FOR PERIPROSTHETIC PELVIC OSTEOLYSIS: IS IT THE ULTIMATE TOOL?

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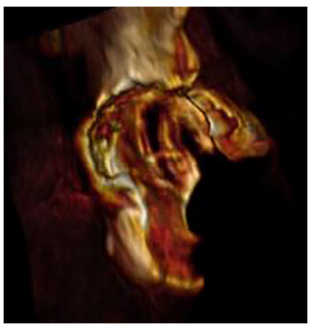
**Objectives:** To analyze the capacity of 3D reconstruction as a tool for the diagnosis and planning of prosthetic replacement surgery as a treatment for bone destruction secondary to the wear of polyethylene in long-term hip implants.

**Method:** We used a series of 30 cases of long-standing total hip replacements (THR) with suspicion of periprosthetic bone loss. They were studied with xray, MRI and 3D reconstruction based on computerized tomography (CT). Using this models, the characteristics of the osteolysis were analyzed and revision surgery was planned in the cases that were reoperated. Finally, the information was evaluated and compared, as well as its usefulness preoperative planning, with the rest of the methods.

**Results:** Of the 30 cases, the 23 that presented osteolysis on MRI (still considered as gold standard), were selected. Using volumetric reconstruction on CT, an average of 2.35 injuries in 2,48 pelvic areas were detected per case (with an average volume of 7.15 $cm^3$ per injury and 12.72 $cm^3$ per case). Considering the utility to determine the geography of the lesions, the study considered the CT as the most valuable (4.13 over 5). For the planning of surgery, the greatest utility was attributed to 3D reconstruction models (4.55). Finally, when comparing to the intraoperative findings, 3D models again obtained the highest score (4.73).

**Conclusions:** Periprosthetic osteolysis in longstanding THR is considered the problem of the future for these implants. The current technology of 3D reconstruction based on CT are what a greater help suppose for the surgeon at the time of diagnosing and studying this disease, as well as at the time of planning and executing the surgery. This technique, associated with the brand new3D printing, in which we are now working, are probably the ultimate tool we were searching for.



## P758

## HOW POSTMENOPAUSAL FEMALE AGE AND BONE MINERAL DENSITY AFFECT JAW BONES

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**Objective:** To detect impact of age and general BMD on density and quantity of the edentulous jaw bones of postmenopausal females.

**Methods:** In the present study were included 91 postmenopausal edentulous females aged 55-91 y (average age 69.7±9 y), attending for dental implant treatment. BMD measurements of lumbar spine and both hips by DXA (*Lunar DXA DPX-NT, GE Medical Systems*) were made. The worst T-score reading from both were taken into account. To analyse jaw bones cone beam computer tomography (CBCT) (Next

generation i-CAT, Kavo eXam vision) examinations were performed. CBCT images were analysed with *Dolphin Imagining* software. Volumes and average Hounsfield units (HU) of the maxilla and mandible were calculated. *Pearson* correlation was used to determine correlation between different variables.
**Results:** There was significant positive correlation between general BMD and bone density (HU) of maxilla *(r*=0.36; *p*=0.001) and volume of mandible (*r*=0.41; *p*=0.0001) and maxilla (*r*=0.21; *p*=0.04*)*. There was no correlation between general BMD and bone density of mandible. We found significant negative correlation between age and bone density of mandible (*r*=-0.33, *p*=0.002) and maxilla (*r*=-0.34, *p*=0.01), but we did not find correlation between age and volume of maxilla and mandible.
**Conclusions:** Postmenopausal female with reduced general BMD had reduced amount of edentulous mandible and amount and density of edentulous maxilla. Postmenopausal female age have effect on density of edentulous jaw bones.
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## P759
## THE IMPACT OF DIABETES MELLITUS ON SURVIVAL AFTER HIP FRACTURE: A SINGLE CENTER EXPERIENCE

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**Objective:** Diabetes mellitus (DM) is a risk factor for osteoporotic fractures, possibly associated with increased mortality rate following fracture. We aim to assess the association between DM status and all-cause mortality risk following hip fractures (HF).
**Methods:** Patients insured by Clalit Health Service over age 50 admitted to Soroka University Medical Center with HF (ICD-9 820) between January 2012 to November 2018 were included. DM was diagnosed according to one of the following: HbA1C >6.5%, ICD-9 code 250, purchase of 2 or more antidiabetic drugs or random glucose level >200 mg/dl prior to HF. Demographic data, comorbidity, drug purchase and laboratory data were retrieved from the electronic medical records.
**Results: 2840** HF patients were included; 40% were diagnosed with DM prior to HF. Mean age and female sex were similar in both groups (78.6 y and 66.4% respectively). Medical treatment for osteoporosis following HF did not differ by diabetes status. Follow-up was 855 [305-1468] days in patients without DM and 622 d in those with DM [182-1249] (median, IQR) p<0.001. At last follow-up, death occurred in 45.1% of patients with DM and in 37.7% without DM (p<0.009). Cox regression adjusted for age, sex and comorbidities (malignancies, lung diseases, congestive heart failure, chronic kidney disease, dementia, peripheral vascular disease, cardiovascular disease and liver disease) showed a 26% increase in the risk of death after HF in patients with DM compared with nondiabetic patients (HR 1.26, CI1.114-1.419; p<0.001). Cox regression in a sub analysis according to sex, showed that the effect of diabetes on mortality was significant only in females (HR 1.334, CI 1.143-1.556). Assessment of survival according to bands of mean hemoglobin A1C in the 2 years before HF showed a trend for worse outcome with higher A1C that did not reach statistical significance.
**Conclusions:** DM patients have a 26% increased post hip fracture mortality compared to nondiabetics. The increased risk was higher in females and nonsignificant in males.

## P760
## SURGICAL VS. CONSERVATIVE TREATMENT FOR VERTEBRAL COMPRESSION FRACTURES: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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**Objective:** Surgical and conservative interventions are the main treatment strategy of vertebral compression fractures (VCFs). However, there is clinical uncertainty over adequate management. Therefore, the objective of this study to compare the outcomes of surgical and conservative interventions for the treatment of VCFs.
**Methods:** Medline and Cochrane Central Register of Controlled Trials, were systematically searched, pairing relevant keywords to identify English language articles for last 5 years. The eligible randomized controlled trials (RCTs) evaluating the surgical vs. conservative treatment for patients with VCFs. The outcome measures were the pain, quality of life and incidence of new fractures event. A random-effects model was used to calculate the pooled mean difference (MD) or risk ratios (RR) with 95%CI.
**Results:** Four RCTs met the inclusion criteria, with a total of 504 participants. The mean age of patients was ranged with

70-78 y, and the majority was female. Compared with conservative treatment, surgical treatment significantly showed greater pain relief at follow-up; 6 months (MD -1.19, 95%CI (-1.80, -0.58, p=0.001)), 12 months (MD -0.82, 95%CI (-1.41, -0.22, p=0.007)) and disability on the Roland–Morris Disability Questionnaire (RMDQ) at 6 months (MD -1.64, 95%CI (-2.38, -0.91)), 12 months (MD -1.29, 95%CI (-3.26, -0.69)). Surgical treatment showed no significant improvement in quality of life on the QUALEFFO at follow-up; 6 months (MD 0.65, 95%CI (-4.57, 5.87, p=0.81)), 12 months (MD -1.97, 95%CI (-7.78, 3.85, p=0.51)), when compared with the conservative treatment. No significant difference was reported in the pooled results for the incidence of new fracture event (RR 0.82, 95%CI (0.59, 1.13, p=0.22)), compared to conservative treatment.

**Conclusion:** This study suggests that surgical treatment was more effective in reducing pain in the short term and long terms follow-up period. However, no significant difference was found in the quality of life. Furthermore, evidence from well-controlled RCTs and real-world studies with long term follow-up required to make this result robust

## P761

## HIGH FREQUENCY OF OSTEOARTHRITIS IN MEXICAN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND ITS CONSEQUENCES ON EXERCISE PERFORMANCE

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**Objectives:** To describe the frequency of osteoarthritis (OA) in postmenopausal women diagnosed with osteoporosis (OP), and the impact in exercise performance.

**Methods:** A cross-sectional study was performed. We included women older than 60 y, who fulfilled the classification criteria for OP according to the WHO, we excluded women with hysterectomy, and those with previous fractures. Patient records were reviewed, and patients meeting OA clinical criteria were located to perform X-ray to corroborate the presence of OA. The positive case were those who accomplished both criteria. Other data collected were age, BMI, BMD, treatment, location of osteoporosis, and exercise performance.

**Results:** We included 256 women diagnosed with OP, the mean age was 70.53±9.85 y, a range of 60-92 y, and the mean BMI was 27.46±5.18; the mean of the spine T-score was -3.23±0.74, femoral neck -2.72 ±0.54. 166 (65%) presented pain in at least one joint on the majority of days of the last month, of which 146 (57%) presented positive radiological findings for OA at the site of pain. The frequency by site was: hip 33 (12.9%); knee 81 (31.6%), hands 30 (11.7%), spine 87(34%), other 47(18.3). The mean of days doing exercise per week in patients with OA was 1.89±1.95. and 2.90±2.00 in those without OA (p<0.001). No association was found between OA and T-score values.

**Conclusions:** The overall prevalence of OA was 57%, greater than reported in the general Mexican population. Previously reported relationship between OP and OA was not corroborated in this study. The mean number of days of exercise was significantly minor in those with OA, witch suggest that OA interferes in physical performance, so is necessary to take it into account for the exercise prescription in OP.

## P762

## IMPACT OF TYPE 2 DIABETES ON TBS EVALUATED BONE QUALITY IN OBESE WOMEN

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**Objective:** Altered bone quality due to the metabolic changes of type 2 diabetes (DM) has been shown to have an important impact on bone strength in these patients. The objective of our study was to evaluate the impact of DM on trabecular bone score (TBS), an indirect measure of lumbar bone architecture.

**Methods:** We evaluated 277 obese postmenopausal women (mean age 63.47±8.96 y, mean BMI 35.16±4.41 kg/m$^2$) consecutively referred for DXA evaluation in a tertiary endocrinology center. Lumbar BMD was measured using GE Lunar DXA equipment and TBS was evaluated with TBS iNsight software.

**Results:** 94 patients (34%) had type 2 DM. Compared with obese nondiabetic patients, those with type 2 DM had slightly higher BMI (36.06±5.25 vs. 34.4±3.72, p<0.01) and also higher L1-L4 BMD T-score (-1.29 ±0.94 vs. -1,60±1.03 SD, p<0.01); however, the difference in BMD lost its significance after controlling for BMI and age. Osteoporosis was present in 14.45% of patients, with a higher prevalence in non-DM obese (18.2% vs.7.4%, p<0.05) but, despite this difference, fracture prevalence was similar (19.1% in non-DM, 19.8% in DM). TBS positively correlated with BMI (r=0.303, p<0.001) and L1-L4 BMD T-score (r=0.569, p<0.001). After controlling for BMI and BMD T-score, TBS was significantly lower in obese DM patients (estimated marginal mean for obese DM patients: 1.32 [1,30 – 1,33], for obese non-DM patients 1.35 [1.33 – 1.36], p=0.03)

**Conclusion:** Obese patients with DM have lower TBS values compared with nondiabetic obese and this might impact the risk of subsequent fracture.

## P763
## PREDICTORS OF DEPRESSION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Depression is the most common and most significant psychological variable in patients with RA. The aim of this study was to examine the association of demographic parameters, functional class and disease activity with depression in patients with RA.
**Methods:** The study included 121 patients with RA. The degree of depression was measured by BDI (Beck Depression Inventory). Functional disability was presented HAQ questionnaire. The index of disease activity was measured by the DAS 28 SE index.
**Results:** Our results showed an association between high disease activity, functional disability and disease duration with depression in patients with RA. The high activity of disease (DAS28 SE >5.1) $p<0.001$. severity of the HAQ functional disability (HAQ >1.000) $p<0.001$ and the duration of the disease more than 10 years, $p<0.05$ are associated with a greater degree of depression. Gender and age were not associated with significant depression in patients with RA in our research.
**Conclusion:** Depression is present in a significant percentage of patients with RA, and therefore early detection and treatment is very important. The high activity of the disease, the severity of the HAQ functional disability, and the longer duration of the disease are associated with a higher degree of depression, while the age and gender did not affect depression significantly in patients with RA in our research.

## P764
## INVESTIGATING VITAMIN D STATUS OF WOMEN IN ARMENIA

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**Objectives:** Great strides have been made in recent years in Armenia towards improving the capability to diagnose and treat osteoporosis, but any effort to treat the disease begins with prevention, and adequate vitamin D nutrition is a key preventive measure. Preliminary research has shown that regardless of age, sex and season, vitamin D levels of residents of Armenia are low, despite plentiful sunny days. The objectives of our proposed study are to characterize the level of vitamin D nutrition in women in Armenia, to investigate the prevalence of osteoporosis among postmenopausal women in the country, and to assess popular knowledge and attitudes towards osteoporosis.
**Methods:** We propose a nationwide modified cluster model cross-sectional age- and geographically-representative study. Using the well-developed healthcare infrastructure, we will randomly select 40 public community clinics, from which we will randomly select 35 registered women for a total of approximately 1400 participants. From each participant, we will obtain dried blood spot sample which will be sent to the collaborating laboratory for analysis of vitamin D. We will also obtain height, weight, grip strength, and haemoglobin measurements for each participant. All participants will complete a questionnaire about lifestyle and dietary habits. Those participants who are pos-menopausal will complete and additional questionnaire about knowledge and attitudes to towards osteoporosis, and then will be invited to undergo bone densitometry scan at a collaborating centre.
**Results:** This study will provide reliable and accurate countrywide measures of vitamin D nutrition in the population, and allow for stratification based on age, geography, and multiple demographic and lifestyle criteria. It will also provide a measurement of the prevalence of osteoporosis as determined by DXA among postmenopausal women in Armenia. Lastly, it will provide valuable insight into the popular knowledge and opinions among postmenopausal women towards osteoporosis.
**Conclusion:** The findings of this study will help characterize the risk and the burden of osteoporosis among women in Armenia, and will inform policies and interventions to effectively address the needs of the community and target the populations most at risk. This study will be conducted in 2019.

## P765
## IMPAIRMENT OF MUSCLE AND BONE MASS IN IMMOBILIZED PATIENTS WITH STROKE

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Post-stroke muscular dysfunction and bone mass removal are considered to be multifactorial phenomena. After stroke individuals lose muscle mass in both paretic and nonparetic limbs. The concept of stroke-related sarcopenia is relatively new. We report 42 cases diagnosed with stroke admitted to the Rehabilitation Clinical Hospital Baile Felix, Romania. Besides clinical examination all cases performed DXA. Patients' mean age was 55.85 y, range from 32-73 y. The mean duration from the onset of

stroke to the DXA investigation was 13 months, range from 6-35 months. 85.71% of these patients had osteoporosis, their mean age was 53.16 y and mean duration to the DXA investigation was 14 months. 42.85% of the cases met all diagnostic criteria for sarcopenia, their mean age was 60.66 y and mean duration to the DXA investigation was 6.66 months. Mean muscle mass scaled to height squared in all investigated cases was 0.5799, but in patients with sarcopenia it was 0.4886. 57.14% of the cases had left side paralysis and the rest right side paralysis. 71.42% of the patients had muscular hypotonia on the affected side. 42.85% of the patients were immobilized and the others could walk with assistive devices.

**Conclusions:** Patients diagnosed with sarcopenia had a higher mean age and the DXA investigation was performed between 6 and 10 months after stroke. It is therefore possible that sarcopenia may have already been installed, motor deficit being an additive factor for the loss of muscle and bone mass. The localization of the motor deficit on the left or right side was not relevant for the occurrence of sarcopenia. A key point in managing these cases would be an early diagnosis in the first year from the event that causes immobilisation, year in which bone loss is increased but early therapy has very good results.

## P766
## ACHILLES TENDON RUPTURE ASSOCIATED WITH THE USE OF FLUOROQUINOLONES IN PATIENTS OLDER THAN 60 YEARS

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**Objective:** To describe the epidemiological and clinical features of patients diagnosed with fluoroquinolones (FQ)-associated Achilles tendon rupture (ATR) in a Spanish tertiary hospital.

**Methods:** A retrospective observational study was performed, which included patients aged >60 y diagnosed of ATR in our center between 2000-2017, identifying patients previously treated with FQ. The demographic, clinical and outcome data were obtained from medical records.

**Results:** 44 patients with ATR were identified, 8 (14.6%) of them previously treated with FQ. In this group, the mean age at diagnosis of ATR was 77.37±9.54 y, being male 6 (75%). 50% received concomitant treatment with corticosteroids (CS) and one patient underwent kidney transplantation due to nephroangiosclerosis. Seven patients (87.5%) received cevofloxacin and one case ciprofloxacin, all of them orally. The indication for FQ treatment in 50% was acute bronchitis and in the other half exacerbations of respiratory pathology (chronic obstructive pulmonary disease/diffuse interstitial lung disease). The mean duration of FQ treatment was 6.16±2.4 d, while the mean time from the start of treatment to the diagnosis of ATR was 19.25±14.83 d. Seven patients (87.5%) had spontaneous rupture. 87.5% were total ruptures and all cases required surgical treatment, without recurrence reported. The comparison of the characteristics of patients with ATR who had or not received FQ is shown in the Table, identifying significant differences in favor of a higher percentage of patients who were smokers, received CS and had spontaneous rupture in the group treated with FQ.

**Conclusions:** The Achilles tendon is the most frequent location of tendinopathy associated with FQ. Factors associated to an increased risk of FQ-induced ATR includes age >60 y, male gender, chronic treatment with CS and organ transplantation, all these being present in our cases. Despite being a relatively frequent adverse event, it is underdiagnosed and the risk of ATR is not usually assessed when indicating FQ treatment. It is important to perform a risk/benefit assessment, specially in patients with risk factors, because ATR may be a potential cause of disability.

| | Fluoroquinolones | Non-fluoroquinolones | p-value |
|---|---|---|---|
| Age (y) | 77.37±9.54 | 70.13±8.3 | 0.48 |
| Sex (male) | 6 (75%) | 25 (69.4%) | 0.75 |
| Smoking | 5 (62.5%) | 1 (2.8%) | 0.00 |
| Treatment with CS | 4 (50%) | 2 (5.6%) | 0.01 |
| Type of rupture | | | |
| *Spontaneous* | 7 (87.5%) | 8 (25.8%) | 0.01 |
| *Traumatic* | 1 (12,5%) | 23 (74.2%) | |

## P767
## BODY COMPOSITION DIFFERENCES IN OBESE CHILDREN/ADOLESCENTS WITH AND WITHOUT METABOLIC SYNDROME

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**Objective:** Around 13% of obese children without cardiometabolic disturbances, continue to grow into adulthood as obese and maintaining a healthy cardiometabolic profile. This condition is known as "metabolically healthy obesity" (MHO). BMI correlates well with increased adiposity, and current

clinical classification of obesity relies on specific cutoff values. Nevertheless, it does not inform regarding the distribution of such mass within the different body compartments. Our objective was to compare the body composition (BC) of obese children and adolescents with metabolic syndrome MS against those with MHO.

**Methods:** This was a cross-sectional study of children and adolescents aged 5-17.9 y recruited at their first visit to any of two participating Childhood Obesity Clinics in Mexico City. We carried a medical and nutritional evaluation, anthropometry, biochemistry analysis (fasting glucose, lipid profile, and insulin) and BC assessment by DXA. We divided our sample into eight groups: children-adolescents divided by sex and with MS according to IOF criteria, and children- adolescents with MHO defined as those with BMI >p85th for age-sex and having none criteria for MS. Statistical analysis: We did conventional descriptive statistics. Then we looked for differences between groups by student T-test adjusted for multiple comparisons. We also explored indexes to better adjust for relevant variables.

**Results:** We studied 248 obese subjects. We observed a MS frequency of 115(46%). The BC data is shown in Table 1. Obese children with MS had significantly more fat than their peers with MHO. Such differences where not significant in adolescents.

Table 1. Mean differences in body composition by age group and sex according MHO vs. MS.

| Body Composition | Children | | | | Adolescents | | | |
|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Male | | Female | |
| | MHO | MS | MHO | MS | MHO | MS | MHO | MS |
| Fat mass kg | 16.39 | 21.78* | 16.89 | 22* | 31.32 | 31.67 | 31.61 | 33.59 |
| Truncal fat (g) | 7,796 | 1,1131* | 8,320 | 11,697* | 17,083 | 17,284 | 16,139 | 17,660 |
| Android fat (g) | 1,264 | 1,864* | 1,339 | 1,925* | 2,966 | 3,004 | 2,728 | 3,003 |
| Gynoid fat (g) | 2,500 | 3,115* | 2,619 | 3,325* | 5,032 | 4,860 | 5,510 | 5,606 |
| Fat mass index (kg/m$^2$) | 9.16 | 10.78* | 9.66 | 11.23* | 11.11 | 11.47 | 12.71 | 13.67 |
| Fat percentage (%) | 39.44 | 42.82* | 42.03 | 44.36* | 37.68 | 38.49 | 43.46 | 44.83 |
| Lean mass kg | 22.8 | 27.34* | 21.06 | 25.74* | 48.39 | 47.95 | 38.22 | 38.93 |
| Lean fat height index | 0.85* | 0.65 | 0.88* | 0.65 | 0.6 | 0.57 | 0.51 | 0.48 |
| Bone mineral content (g) | 1,196 | 1,396* | 1,128 | 1,331* | 2,641 | 2,459 | 2,280 | 2,143 |

*Differences that reached statistical significance (P<0.05).

**Conclusion:** In Mexican children with obesity, we found significant differences in body composition between subjects with MS and those with MHO. Such differences were not evident in obese adolescents with MS and MHO.

## P768
## COMPARISON BETWEEN A HOLISTIC PROGRAM AND AN EDUCATIONAL PROGRAM IN OA TREATMENT

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**Objective:** Osteoarthritis (OA) is the leading skeletal cause of years lived in disability. Education, diet overweight and exercise are considered core treatment. The aim of this study was to compare the results of a two-day educational program with 2-day educational program with a multiprofessional care for 6 months, and secondly to evaluate midterm results at 12 months.

**Methods:** Prospective randomized clinical trial with 120 patients with grades II and III K&L knee OA (KOA) were randomized in two groups: control (usual care and 2 days of lectures, 2 months apart, about OA with a multiprofessional group) and intervention (same program of control group plus 7 sessions of collective physical therapy, 7 sessions of physical fitness, 2 group sessions of discussion about diet with the nutritionist and 2 about engaging the program with the psychotherapist) along the first 6 months of the program. VAS, WOMAC, Lequesne, and measures such as BMI and adherence to physical activity were taken at baseline, 6 and 12 months. After 6 months, patients of the intervention group were oriented, as the control group was oriented in classes, to continue diet and exercises at local gyms or at home. Patients were re-evaluated at 12 months.

**Results:** Groups were similar at baseline (p>0.05) except for WOMAC stiffness, function and total. Control group had a higher number of dropouts at one year (15 in total, 13 in the first 6 months), whereas 7 abandoned the intervention group (6 in the first 6 months). At 6 months evaluation, all parameters were better in the intervention group (p<0.05). WOMAC improved in average 15 points in the intervention group and 9.5 in the control group. WOMAC function (at six months)

was better in the intervention group than in the control group (p=0.032). In the first 6 months of the program, the control group increased BMI and then reduced statistically from 6 months to 12 months (p=0.035), but at no time of evaluation was there a significant mean difference between the groups (p> 0.05) in respect to BMI. WOMAC pain, stiffness, function and total and Lequesne improved from baseline values to 6 and 12 months (p<0.05) in both groups. The stiffness domain and the total WOMAC were higher in the control group than in the intervention group in all the moments (p=0.003 and p=0.022, respectively). Adherence to physical activity increased progressively from baseline in each follow-up irrespective of the group (p<0.001) but mostly in the intervention group with 91.8% adherence at one year.

**Conclusions:** The holistic program improves adherence (to the program and physical activity) and function when compared to a educational program. Although there was no difference in BMI between groups only the intervention group has shown a decrease in BMI in all the moments.

## P769

## EPIDEMIOLOGICAL PROFILE OF PATIENTS WITH OSTEOPOROTIC FRACTURES COMPARED TO OA PATIENTS AND FACTORS THAT DECREASE SECONDARY PREVENTION OF OSTEOPOROTIC FRACTURES

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**Objectives:** To compare the epidemiological profile of patients with osteoporotic fractures and patients with osteoarthritis; Identify factors that diminish adherence to secondary prevention of osteoporotic fractures.

**Methods:** 108 patients with OF were compared to 86 patients with OA; Patients who did not follow the secondary prevention protocol were compared with those adhering to the program.

**Results:** Group OF was older (p<0.001), with lower BMI (p<0.001), less literate (p=0.012), more frequently whites (p=0.003), less frequently married (p<0.001), presented more falls, cognitive deficiency, previous fractures, old fracture, fall in the last year. Thw OF Group also need more help and take more medicine for osteoporosis (p<0.05), showed less pathology in the feet, muscle weakness, less vitamin D intake and lower Katz & Lawton (p<0.001). Increases chance of nonadhesion: older age (P=0.020), falls (p=0.035), cognitive deficiency (p=0.044) and presence of depression/apathy/confusion (p<0.001).

**Conclusion:** Patient age, ethnicity, marital status, previous falls, foot pathologies, muscle weakness, previous fractures, use of vitamin D, use of osteoporosis drugs and the Katz & Lawton scale define the OF group. Increases the chance of nonadherence: older age, sedatives, cognitive disorders and symptoms of depression / apathy / confusion.

## P770

## COMPARISON OF TWO ORTHOSES IN THE TREATMENT OF FEMORO-PATELLAR OSTEOARTHRITIS

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**Objective:** To compare the result of an orthosis designed to stabilize the patellofemoral joint compared to a patellar-shaped neoprene orthosis in patients with femoro-patellar osteoarthritis.

**Methods:** 57 patients with femoro-patellar osteoarthritis were allocated in two groups that received: femoro-patellar functional orthosis or a neoprene orthosis with a patellar orifice. Both groups were instructed on the clinical treatment of osteoarthritis and completed the daily consumption of medications one month before orthosis and up to three months after the placement of the orthosis. They were evaluated with the WOMAC and Lequesne questionnaire and performed five times sit-to-stand test, timed-up-and-go test and the 6-min walk test, immediately before the orthosis was placed and after one and three months.

**Results:** Both groups improved pain, stiffness and function with no difference between groups. Drug consumption declined in both groups in the first month, increasing in the third month. The consumption of naproxen was progressively higher in the control group.

**Conclusion:** Both knee orthoses improved pain, function, and altered drug use only in the first month. The functional knee orthosis provided analgesia without increased consumption of naproxen.

## P771

## THE ROLE OF POLYMORPHIC VARIANTS OF CANDIDATES OF BONE TISSUE METABOLISM (VDR BSM1 C.IVS7G> A, LCT 13910 T> C, COL1A 12046 G-> T) IN THE DEVELOPMENT OF OSTEOPOROSIS IN WOMEN OF RUSSIAN AND BURYAT NATIONALITIES

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**Objective:** To study the frequency of alleles and genotypes of polymorphisms of the vitamin D receptor gene Bsm1 c.IVS7G> A, lactase gene LCT 13910 T> C and collagen gene COL1A1 2046 G-> T in patients with osteoporosis (OP) and healthy women of Russian and Buryat nationalities.

**Methods:** 86 women with OP (48 Russian and 49 Buryat nationalities aged from 50-80 y) and 97 healthy women of the same age were examined. The material for the molecular genetic analysis of the DNA samples was extracted from peripheral venous blood. The online calculator was used for data processing (http://gen-exp.ru/calculator_or.php). The $\chi 2$ test was used to compare allele frequencies between analysed groups. The differences were considered significant at P<0. 05. The degree of risk of events was calculated by the method of assessing chances with a 95%CI.
**Results:** The comparative analysis of the frequencies of alleles and genotypes for LCT 13910 T> C, COL1A 12046 G-> T between the clinical and control groups did not reveal any significant differences. The analysis of the polymorphism of the vitamin D receptor gene VDR Bsm1 c.IVS7 G>A revealed that patients with OP had prevailing polymorphic recessive allele A (p=0.0001; OR - 2.33 (1.5-3.62). White healthy women most commonly had dominant allele G (p<0.05). The polymorphism study of the VDR gene - Bsm1 c.IVS7G> A, taking into account national peculiarities, showed that the dominant allele G was significantly more common presents among healthy women of Buryat nationality (p<0.05; OR=0.51; CI (0.26; 0.99). The relative risk calculation revealed a positive association of the A/A genotype of the VDR gene of the Bsm1 c.IVS7G> A polymorphism with the development of osteoporosis among the Buryat nationalities (RR=1.7; CI (1.1 - 2.8)), compared to Russian women. Relative probability of detecting lactase C/C and C/T genotypes with women having OP has increased by 1.5 times in comparison with healthy women (p<0.05). This pattern was typical for women of both nationalities (RR=1.5; CI (0.8 - 2.5)). The G/T and T/T genotypes of the COL1A1 2046 G>T polymorphism are associated with the development of OP in Buryat postmenopausal women (OR=1.7; CI (1.04 - 2.7)).
**Conclusion:** The gene allele A of the VDR Bsm1 c.IVS7G> A, genotypes G/G and G/T of the COL1A1 2046 G> T were associated with a higher risk of OP in women of Buryat nationality. The genotypes of lactase gene LCT 13910 T> C were associated with the development of OP in people of both nationalities.

## P772
## HOSPITAL MORTALITY AFTER HIP FRACTURE SURGERY IN RELATION TO TYPE OF SURGERY AND LENGTH OF HOSPITAL STAY: A 8-YEAR COHORT STUDY IN BRAZIL

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**Objective:** To identify the factors associated with in-hospital mortality in elderly with fragility hip fracture.
**Methods:** A cohort of 407 patients over 60 y, hip fracture by minimal trauma, admitted for 8 y (Jan 2010-18) at the Orthopedic Public Health Service at Brasília, D.C. Association the variables with the outcome (mortality) and comparison between groups (death vs. survival), through the chi-squared test and Mann-Whitney. The odds ratio of the selected variables on mortality, through the logistic regression (Stepwise method). The Nagelkerke's R2 model=0.80 adjusted for age and gender [95%CI p>0.005]. Survival through logistic regression of COX and Kaplan-Meier curves. And ROC graphs which the cutoff points defined by the highest concomitant sensitivity and specificity.
**Results:** Mean of 79 y (±9.4), predominance of women (n=265), arterial hypertension (58.7%) and moderate/high surgical risk (Detsky,1997) (78.1%). The anatomical classification in transtrochanteric: 157(38.6%), neck: 145(35.6%) and subtrochanteric: 12(2.9%) were in agreement with the profile of the surgical interventions (n=314): osteosynthesis: 170(41.7%), followed by arthroplasty in 144(35.4%). The mean to perform the surgery was 20.4 d, with the mean total length of hospital stay 26.6 d (±22.2). Overall, the prevalence of mortality during observation was 19.9% (n=81). The patients who underwent surgery, there were 44 (14.0%) deaths, being osteosynthesis [HR=1.56 95%CI:1.22-1.98], infection (n=35%)[OR=4,08), ICU length of stay (43.5% - mean/d: 6.57) [OR=1.10] and postoperative time with cutoff point defined at 6.5 d (S/E>0.70), were included in the risk model (<p 0.005).
**Conclusion:** Patients older and more comorbid, such as low BMD in women, agree with the mechanisms of fall and type of intervention. In turn, factors related to greater hospitalization after surgery also increase the risk for mortality.

## P773
## ASYMPTOMATIC ULTRASONOGRAPHIC CHANGES IN ANTERIOR CHEST WALL JOINTS AND THEIR RELATION TO THE CHEST EXPANSION IN RHEUMATOID ARTHRITIS PATIENTS

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**Objective:** Anterior chest wall (ACW) joints can be involved during the course of rheumatoid arthritis (RA), however its clinical implications appear to be underestimated by the

rheumatology community. Our aim was to detect the ultrasonographic changes of asymptomatic ACW joints in RA patients and their relation to the chest expansion and disease activity.

**Methods:** The study included 88 sternoclavicular joints (SCJ) and 44 manibrusternal joints (MSJ) in 44 subjects (22 RA and 22 control). Ultrasound (US) assessments were performed to detect synovitis, erosions, ankylosis, osteophytes, or Power Doppler (PD) signals. Chest expansion was measured. In RA group, Disease Activity Score (DAS28) and Health Assessment Questionnaire Disability Index (HAQDI) were recorded.

**Results:** US detected subclinical changes of ACW joints in (74.2%) in RA patients, and (21.2%) in control subjects. There was a highly significant difference between total US changes in RA (74.2%) and control (21.2%) ($p<0.001$). SCJ synovitis (77.3%) and erosions (72.3%) were the most frequent changes in RA patients. None of our control subjects had erosions, PD activity or ankylosing in MSJ. MSJ ankylosing was highly associated with limited chest expansion in RA group ($P<0.001$). All RA patients (100%) with ankylosed MSJ by US had limited chest expansion. Ultrasonographic changes in RA patients were found to be higher with smoking, longer disease duration and high DAS28.

**Conclusions:** Our study demonstrated high frequency of subclinical ultrasonographic changes in ACW joints in RA patients. Ankylosing of the MSJ is highly associated with limited chest expansion in RA patients. Our data suggest that US is a highly valuable and accessible tool for detecting early changes in ACW joints in RA even before being clinically manifested.

## P774

## USE OF PAIN MEDICATION AMONG PERSONS WITH OSTEOARTHRITIS IN CANADA

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**Objectives:** Analgesics are the most important medication type in osteoarthritis (OA) but population data on their use are limited. The aim of the study was to estimate the frequency of treatment with four classes of analgesics in Canada according to demographic characteristics, OA stage, and pain level.

**Methods:** We analyzed Canadian data from the National Population Health Survey, Canadian Community Health Survey, and administrative data (including all prescriptions) in the province of British Columbia. We estimated the use of conventional nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen (paracetamol), COX-2 inhibitors (coxibs), and opioids according to age, sex, OA stage (diagnosis of OA <5 y, OA ≥5 y, joint replacement (JR) <5 y and JR ≥5 y), and level of pain as measured by the Health Utilities Index.

**Results:** In 2012, NSAIDs were taken (in the last 2 days) by 17% of all persons 12 y of age or older in Canada, acetaminophen by 8%, opioids by 2%, and coxibs by 1%. Between 1994-2012, self-reported use of NSAIDs increased substantially, opioids increased slightly, whereas coxibs and acetaminophen declined. Among those with OA, the proportions taking each type of medication were, depending on OA stage, 38-43% for NSAIDs, 19-28% for acetaminophen, 4-7% for coxibs and 6-7% for opioids. Probability of taking opioids adjusted for age, sex and OA increased rapidly with pain, whereas other analgesics plateaued at moderate pain.

**Conclusion:** NSAIDs are by far the most common type of medication used by persons with OA, followed by acetaminophen. Opioids are used mostly for severe pain and their use has increased slightly over time.

**Acknowledgement:** The study was funded by the Canadian Institutes of Health Research.

## P775

## USE OF TRABECULAR BONE SCORE (TBS) AS A COMPLEMENTARY APPROACH TO BONE MINERAL DENSITY IN GAUCHER DISEASE PEDIATRIC PATIENTS

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**Objective:** Trabecular bone score (TBS), an index of lumbar spine trabecular texture, has not been explored fully in pediatric patients. Our aim was to evaluate the TBS in pediatric patients with Gaucher disease (GD).

**Methods:** We conducted an observational and descriptive study in 64 GD pediatric patients under enzyme replacement therapy (imiglucerase, mean dose 60.5±17.2 U/kg [range: 39-120]) with a follow-up of 3 y. The lumbar spine BMD was measured by DXA (Lunar Prodigy). The TBS was performed by TBS iNsight (Medimaps) and "rawTBS" were adjusted for soft tissue thickness "corrTBS" according to pediatric subjects. Data are expressed as mean±SD and differences were considered significant if $p<0.05$.

**Results:** 39 female (60.96%) and 25 male (39.1%) were included, mean age 12.6±3.8 y [range: 3.8-19.8] (85% had splenomegaly and 66.1% hepatomegaly). According to BMB, 30.8% of the patients showed bone marrow infiltration. The age at diagnosis was 59.9±43.2 months (range 4-196) and the mean values of quitosidase was 383±465 (range 0-1500). BMD was normal in 88% and 12% showed OP. A significant increase in the lumbar spine BMD was found throughout the 3 years follow-up (percentage of change: +9.5%, +13.8% and

18.0% vs. basal, respectively; Wilcoxon signed rank test $p<0.05$). No correlation was found between TBS and rowTBS but a positive correlation was found between BMD and corrTBS ($r=0.68$, $p<0.0001$). Therefore, a significant increase in the corrTBS was found throughout the 3 years follow-up (percentage of change: +3.4%, +4.1% and 7.3% vs. basal, respectively; Wilcoxon signed rank test $p<0.05$). No differences in corrTBS according to BMB score was observed. No differences in corrTBS between normal or osteoporosis BMD was found. However, 66.7% of patients with normal BMD and 83.3% of those with OP showed altered bone quality assessed by corrTBS.

**Conclusions:** The densitometry allowed us to evaluate the gain in the bone mass in pediatric GD patients under imiglucerase treatment and the corrTBS could detect patients with alteration of the bone quality.

## P776

## LOW BONE DENSITY FREQUENCY IN YOUNG EXTENSIVE BURNED PATIENTS: A CROSS-SECTIONAL STUDY

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**Objective:** To describe the frequency of low bone density (LBD) in young extensive burned subjects.

**Methods:** An observational, cross-sectional and descriptive study was performed. We included pre-menopausal women older than 19 y, and men aged between 19-50 y; with any type of burn that compromise more than 30% of the body surface area burned or an electric burn; with a spine and hip DXA; more than 6 months of evolution, with scarred lesions and without previous known diseases affecting bone mass. LBD was diagnosed with a Z-score <-2.0 in total lumbar spine and/or total femur or neck.

**Results:** A total of 42 patients fulfilled criteria, the average age was 32.83±9.53 y; 32 (76.2%) men; 23 (28.5%) with an electric burn; the mean evolution time was 7.7±1.4 months. 8 (19.04%) had LBD. None presented fragility fractures. Only the electric burn type was significantly associated with LBD ($p=0.05$).

**Conclusion:** The frequency of LBD was 19.04%, similar to that reported in other diseases well known causing bone loss. Electric burns seem to be more associated to the development of LBD. Other factors such as age, BMI, depth of burn, time of hospitalization, treatment, walking or amputations did not influence the presence of LBD. It is necessary to perform longitudinal studies and with larger sample size to assess the long-term changes and corroborate the association of the burn as a mayor risk factor developing LBD.

## P777

## ASSOCIATIONS BETWEEN PHYSICAL ACTIVITY (PA) AND CAM AND PINCER MORPHOLOGY

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**Objective:** To describe the cross-sectional and longitudinal associations between cam and pincer morphology and physical activity (PA) in a large community-based sample.

**Methods:** At baseline, cam (abnormal shape of the femoral head) and pincer (excessive coverage of the acetabulum) was assessed by anteroposterior hip radiographs of 914 subjects from the Tasmanian Older Adult Cohort (TASOAC). We assessed cam and pincer measuring $\alpha$ angle (cutoff point 60°) and Wiberg's angle (cut off point 40°) in both hips using statistical shape modelling (SSM). $\alpha$ angle was measurable in 914 participants and Wiberg's angle in 890 participants. Cam morphology was categorised into hip sides (unilateral and bilateral) and intensity (moderate cam: $\alpha$ angle > 60° & < 83° and severe cam $\alpha$ angle > 83°). At baseline PA was measured by pedometers only while at follow-up (2.5 and 5 y later) it was assessed by using both pedometer and accelerometer. Accelerometer determined PA was assessed by absolute time spent engaged in sedentary [< 1.5 Metabolic equivalents (METS)], light (1.5–2.9 METS), moderate (3–5.9 METS), and vigorous (≥ 6METS) intensity activity.

**Results:** Of 914 participants, 67% had no cam morphology, 23% had unilateral, and 10% had bilateral cam morphology. Of 890 participants, 94% had no pincer and 6% had pincer morphology. At baseline, PA measured by pedometer (per 1000 steps) was associated with pincer [Prevalence Ratio (PR): 0.99, 0.99-0.99)], unilateral cam morphology (PR: 0.96 95%CI:0.92- 0.99) and severe cam morphology (PR:0.94 95%CI:0.90-0.99) but these associations were lost after adjustment for other demographic factors. Over the period of five years, amount of steps per day was associated with all categories of cam (PR ranging from 0.96-0.99) and pincer (PR: 0.99 95%CI:0.99-0.99). Furthermore, participants who were active and took more than 10,000+ steps were less likely to have cam morphology [Unilateral (PR: 0.75, 95%CI:0.70-0.84), bilateral (PR: 0.76 95%0.63-0.91), moderate (PR:0.72 95%CI:0.61-0.84) and severe (PR:0.85 95%CI:0.76-0.93)]. Higher steps/d were also associated with pincer (PR: 0.82 95%CI:0.70, 0.97). Sedentary minutes were associated with a higher risk of having a moderate cam (on average per 100 minutes: PR:1.01 95%CI:1.00-1.02) and light, moderate and vigorous activity lowered the risk of having moderate cam by

2%, 3% and 36% METS respectively. Similarly, participants who were involved in light or vigorous activity lowered their risk of having pincer by 1% and 8% respectively.
**Conclusions:** Presence of hip shape variations, especially cam morphology, are one of the strongest predictors of hip osteoarthritis (OA). This community-based study suggests that amount and intensity of PA is associated with lower risk of cam and pincer while sedentary time is adversely associated. Overall, the risk of cam and pincer was greater in substantially lower physical activity.

## P778
## EFFECT OF HORMONE TREATMENT ON BONE HEALTH IN TRANSGENDER FEMALES: A SYSTEMATIC REVIEW

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**Background:** Not much data exists on the effect of transgender hormone treatment on bone health.
**Objective:** We conducted a systematic review of studies to examine the effect of hormone treatment on BMD in transgender females.
**Methods:** Two authors independently searched Embase and Medline for studies.
**Results:** Nineteen studies (ten cohort and nine cross sectional, N=931 subjects,age range 21-41) were eligible. Duration of hormone treatment ranged from 3 months to 15 years. Among the cross sectional studies, three studies reported lower BMD at the lumbar spine and hip at baseline compared to controls. Out of the ten studies analyzing BMD in a longitudinal fashion, three reported significant increase in lumbar spine and others documented maintenance of BMD at spine and hip (Table 1). Among the five studies analyzing BMD at 24 months, significant increase was noted by three studies at the lumbar spine and at the femoral neck by one study. Stable trends were noted by two studies at both hip and spine.
**Conclusion:** Hormone treatment in transgender females either increases or maintains BMD. Significant heterogeneity was noted in the methodology, sample size, duration of hormone treatment and BMD follow-up across studies.

Table 1. Change in BMD at 12 and 24 months in transgender women undergoing hormone treatment

| Author | Site | Baseline | | | 12 months | | | | 24 months | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean g/cm² (SD) | p | Z-score | Mean g/cm² (SD) | p | Z-score | | Mean g/cm² (SD) | p | Z-score | p** |
| Dittrich et al. | FN | 1.072 (0.131) | | | 1.091 (0.125) | 0.42 | | | 1.097 (0.111) | 0.09 | | |
| | LS | 1.201 (0.146) | | | 1.257 (0.126) | 0.07 | | | 1.263 (0.150) | <0.05* | | |
| Wiepjes et al. | FN | 0.799 (0.128) | 0.960 | | 0.813 (0.130) | 0.834 | | | | | | |
| | LS | 0.972 (0.140) | 0.362 | | 1.007 (0.139) | 0.470 | | | | | | |
| | TH | 0.938 (0.134) | 0.942 | | 0.947 (0.135) | 0.905 | | | | | | |
| Fighera et al. | FN | 1.010 (0.170) | | -0.2 (3.3) | | | | | | | | |
| | LS | 1.150 (0.160) | | -0.3 (3.3) | | | | | | | | |
| | TF | 1.010 (0.150) | | -0.4 (1.0) | | | | | | | | |
| Gava et al. | LS-1 | 1.1 (0.2) | | | 1.1 (0.2) | | | | | | | |
| | LS-2 | 1.0 (0.2) | | | 1.0 (0.1) | | | | | | | |
| | WB-1 | 1.1 (0.1) | | | 1.2 (0.1) | | | | | | | |
| | WB-2 | 1.2 (0.1) | | | 1.2 (0.1) | | | | | | | |
| Van Caenegem et al. | FN | 0.795 (0.119) | <0.001* | | 0.807 (0.129) | | | | 0.807 (0.123) | | | |
| | LS | 0.952 (0.150) | <0.001* | | 0.983 (0.156) | | | | 0.982 (0.136) | | | |
| | HIP | 0.947 (0.134) | <0.001* | | 0.952 (0.141) | | | | 0.955 (0.145) | | | |
| | WB | 1.088 (0.086) | <-0.01* | | 1.090 (0.090) | | | | 1.100 (0.090) | | | |
| | R | 0.614 (0.058) | <-0.01* | | 0.621 (0.057) | | | | 0.622 (0.062) | | | |
| Haraldsen et al. | FN | 1.04 (0.17) | 0.18 | | | | | | | | | |
| | LS | 1.13 (0.16) | 0.01* | | | | | | | | | |
| | WB | 1.18 (0.12) | 0.03* | | | | | | | | | |
| Mueller et al., 2005 | FN | 1.068 (0.142) | | 0.15 (1.02) | 1.08 (0.138) | 0.23 | 0.20 (1.05) | | 1.109 (0.116) | 0.010* | 0.45 (0.92) | |
| | LS | 1.200 (0.125) | | 0.20 (1.32) | 1.234 (0.140) | 0.034 | 0.25 (1.03) | | 1.274 (0.112) | 0.0001* | 0.42 (0.97) | 0.0003* |
| Mueller et al., 2011 | FN | 1.09 (1.03-1.17) | | | 1.12 (1.04-1.17) | 0.08 | | | 1.09 (1.04-1.17) | 0.081 | | 0.81 |
| | LS | 1.20 (1.13-1.27) | | | 1.25 (1.15-1.29) | 0.002* | | | 1.30 (1.16-1.29) | 0.006* | | 0.06 |
| Van Kesteren et al., 1998 | LS | 1.04 (0.12) | | | 1.08 (0.13) | | | | 1.04 (0.14) | | | 0.002* |
| Van Kesteren et al., 1996 | LS | 1.05 (0.16 | | | 1.09 (0.16) | <0.01* | | | | | | |

Data is expressed as mean±SD or as median (IQR)
*Statistically significant (<0.05) **Comparison between 12 and 24 months of hormone therapy, 1-GnRHa + CHT, 2-AA + CHT

## P779
## DOES BISPHOSPHONATE DELAYS BONE HEALING AFTER PROXIMAL FEMORAL NAIL ANTI-ROTATION FIXATION FOR INTERTROCHANTERIC FRACTURE IN ELDERLY PATIENT

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**Objective:** Hip fracture has been recognized as the most serious complication of osteoporosis because of its consequence including disability, poor quality of life, increased risk of mortality, and healthcare costs [1-4]. Therefore, bisphosphonates are widely used for osteoporotic patients and their efficacy are reduction of the risk of fragility fracture in clinical trial (8-10). Previous animal studies demonstrated that delayed a single dose of zoledronic acid (1 or 2 weeks after fracture) displayed significantly increasing bone strength and fracture repair (5) while a yearly intravenous zoledronic acid in clinical study (The HORIZON-RFT) significantly reduced any new clinical fracture for a secondary prevention of hip fracture (6). However, current studies lack data demonstrating whether bisphosphonate delays bone healing after hip fracture repair in clinical practice. Therefore, the purpose of our study is to define whether BPs after proximal femoral nail anti-rotation fixation for elderly intertrochanteric fracture interrupts the fracture repair.
**Method:** After Institutional Research Board Approval, 174 elderly patients with intertrochanteric fractures from low energy trauma underwent PFNA fixation. Demographic data, comorbidity, time to union, functional outcome and complications were collected. Patients were classified into 2 groups: patients taking bisphosphonate after fracture repair and those who did not receive bisphosphonate. All patients received supplemental vitamin D and calcium. The primary outcome was measured by time to clinical union and radiographic union (weeks) between groups. The secondary outcome measured the functional outcome (Harris Hip Score) and complications including mortality rate between groups.
**Results:** There was comparable functional class and comorbidities between those with bisphosphonate and those without bisphosphonate intake. The former group had significantly lower mortality rate than the latter group (6.7% vs. 23.5%, p=0.004) while there was no different in time to clinical union (6.9 weeks vs. 6.7 weeks, p=0.505), radiographic union (12.4 weeks vs. 12.1 weeks, p=0.223), and functional outcome (HHS) (p=0.410) between both groups.
**Conclusion:** Bisphosphonate is useful for osteoporotic hip fracture including significantly decreased mortality rate without inhibit bone healing after fracture fixation in clinical practice.
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## P780

## ASSOCIATIONS BETWEEN CAM MORPHOLOGY AND HIP OSTEOARTHRITIS IN A COMMUNITY-BASED SAMPLE OF OLDER ADULTS

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**Objective:** Cam-morphology plays a significant role in hip OA (osteoarthritis) but less studied in older adults. This study aimed to describe the associations of cam morphology with demographical, clinical and MRI features of OA.
**Methods:** Anteroposterior hip radiographs of 914 participants from the prospective Tasmanian Older Adult Cohort (TASOAC) were scored at baseline for $\alpha$ angle (cam morphology) in either one or both hips. Radiographic hip OA was assessed at baseline. Hip pain and hip structural changes were assessed by MRI at five years and total hip replacement (THR) data was acquired 14 years from baseline.
**Results:** Of 914 participants, 67% had no cam-morphology, 23% had unilateral, and 10% had bilateral cam-morphology. At baseline, participants with either unilateral or bilateral cam-morphology were older, more likely to be males and had higher BMI in comparison to those without cam-morphology. Bilateral cam-morphology was associated with higher prevalence of radiographic hip OA. At follow-up, bilateral cam-morphology predicted higher hip pain and threefold risk of THR. Hip effusion-synovitis at multiple sites and hip cartilage defects were more common in those with cam-morphology. High cartilage signal and hip bone marrow lesions were not associated with cam-morphology.
**Conclusion:** In this large prospective study cam-morphology was associated with increasing age, BMI and male sex. Bilateral cam-morphology was associated with hip ROA and predicted hip pain, hip effusion-synovitis, cartilage damage and THR. These findings suggest that cam-morphology plays a significant role in development of OA and can be a precursor or contribute to hip OA in later life.

## P781

## SCREENING OF FRACTURE RISK AND OSTEOPOROSIS AMONG THE ELDERLY IN THE LONG-TERM AND DAY-CARE INSTITUTIONS: A PROSPECTIVE COHORT STUDY IN TAIWAN

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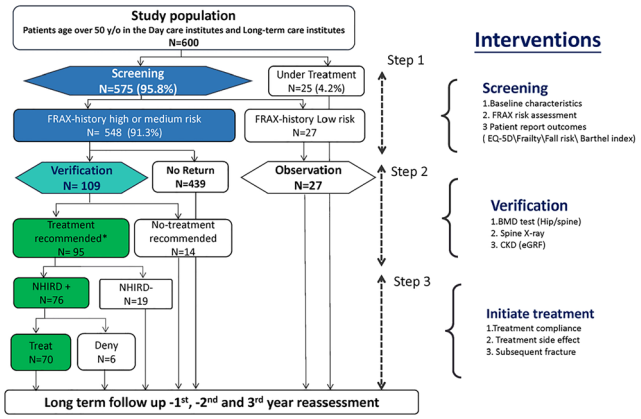
**Objectives:** Screening of fracture risk and osteoporosis treatment of the elderly in long-term and day-care institutions.
**Methods:** The elderly in long-term and day-care institutions are featured with multicomorbidities and expected to be most susceptible to osteoporotic fracture. Because of limited literature about this population, especially in Asia, we conduct a prospective longitudinal follow-up pragmatic cohort study. Patients older than 50 y old and living in long-term and day-care institutions were included as our study population. By using the fracture risk assessment tool (FRAX) and face to face questionnaire process, we assess the 10-y fracture risk of major osteoporotic and hip fracture (FRAX-history) of those elderly. In addition, those identified as moderate or high risk are recommended for further fracture risk assessment by DXA. Detail study design was represented in Figure 1.
**Results:** In 2018, there are 41 long-term care institutions and 17 day-care institutions in Yunlin County, Taiwan. Among them, 17 (41.5%) long-term care institutions and 11 day-care institutions (64.7%) were enrolled in this project. There are 600 residents underwent FRAX-history evaluation and face to face questionnaire, and only 25 patients (4.2%) have antiosteoporosis medication (AOM) treatment currently. Among these residents, 166 (27.7%) and 382 (63.7%) were identified as moderate and high risk, respectively. Among patients with FRAX-history moderate or high risk, 109 (19.9%) patients went to hospital for further fracture risk evaluation by DXA and assessed for AOMs therapy.
**Conclusions:** Approximate 90% elderly in the long-term or day-care institutions were identified as moderate or high fracture risk by FRAX. But only few residents (4.2%) already had AOM treatment. More effort is warranted to fulfill the unmet treatment gap.
**Acknowledgments:** Syun-Ping, Fu, Wen-Yan Hsu




patients with fragility fractures and the control group. After stepwise multivariate logistic correlation analysis adjusted by age, gender and BMI, lower 25OHD level is significantly associated with vertebral fragility fractures (odds ratio, 2.86, 95%CI, 2.72-3.02, p=0.036). 25OHD levels was not significantly associated with their underlying diseases, such as diabetes mellites, hypertension or stage of chronic kidney disease. The other markers, albumin, alkaline phosphatase, PTH, or osteocalcin were not significantly associated with 25OHD levels either.

**Conclusion:** Vitamin D insufficiency was shown to be a risk factor for vertebral fragility fractures in both men and women.

## P782

## VITAMIN D INSUFFICIENCY: A RISK FACTOR FOR VERTEBRAL FRAGILITY FRACTURES IN BOTH MEN AND WOMEN

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**Objectives:** Vitamin D insufficiency is defined as a risk factor for osteoporotic fractures but the association between vertebral fragility fractures and vitamin D, especially in males, remains unclear. The aim of this study was to evaluate serum levels of 25-hydroxyvitamin D (25OHD) in high fracture risk patients with or without fragility fractures and to clarify the relationship whether patients with a vertebral fracture were at greater risk of vitamin insufficiency.

**Methods:** From 2016-2018 we measured the serum 25OHD levels of 92 patients admitted with vertebral fractures, 69 patients with hip fractures, and 33 patients without fractures who recruited from fracture liaison service to evaluate the prevalence of vitamin D insufficiency. Those who received antiosteoporosis therapy within 2 y and who were related with glucocorticoid induced osteoporosis were excluded. Totally 174 patients (38 males and 136 females) were recruited in this study.

**Results:** The average ten year probability of fracture (%) of major osteoporotic and hip fracture were 21.2% and 10.3% separately. Vitamin D insufficiency was prevalent in high fracture risk patients (61%) and equally distributed between male and female patients. Univariate logistic regression analysis showed age, gender, bone mass index (BMI), femoral neck BMD, calcium, and vitamin D levels were significantly different between

## P783

## MAJOR OSTEOPOROTIC FRACTURE TO HIP FRACTURE RATIOS: A SYSTEMATIC REVIEW OF OBSERVATIONAL STUDIES

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**Objectives:** The risk of osteoporotic fracture at the lumbar spine, hip, and other sites varies by geographic location, ethnicity, socio-economic status and year [1, 2, 3, 4]. This review evaluates incidence rate ratios of major osteoporotic fracture (MOF: hip, lumbar spine, humerus, or forearm) to hip fracture, by age and gender, across countries.

**Methods:** We conducted a systematic search in Medline, PubMed, and Embase until May 2018, with no time or language restriction. We used MeSh terms and keywords relevant to osteoporosis, epidemiology, hip and MOF. We selected studies ≥1 y. After title, abstract and full text screening, we extracted data in duplicate. We derived incidence rate ratios of MOF/hip fractures and assessed the quality of studies using a modified quality score [5, 6]. Statistical analyses evaluating the difference in rate rations between countries are in progress.

**Results:** We screened 321 full articles and included 25 studies: 3 from Asia, 13 from Europe, 7 from USA and Canada, and 2 from Oceania. The MOF/hip fracture incidence rate ratios are higher in women, and as expected, decrease with age across countries. The discrepancy is largest at younger ages. For ages 50-54, it ranges between 6 (Switzerland) and 54 (South Korea) in women, and between 3.7 (Australia) and 16 (Iceland) in men. At 85+ years, rate ratios vary from 1.4 to 4 in women, and 1.3 to 3.6 in men, in Switzerland and Korea, respectively. The quality assessment revealed low scores in some studies, related to lack of definition of osteoporotic fractures (n=20 studies), ICD code fracture identification (n=15 studies), ethnicity (n=23 studies), or sample size (n=14 studies). The majority of the studies (64%) were retrospective.

**Conclusion:** The MOF/Hip fracture incidence rate ratios vary widely across countries. The FRAX tool resulted in a major shift in the approach to patients with osteoporosis [7]. FRAX assumes for most countries models that the age and gender adjusted MOF/hip ratio is the same as in Malmo, Sweden. Further research is needed to elucidate the effect of the variability in MOF/hip incidence ratios on the ultimately FRAX derived risk estimates.

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## P784

## HISTOMORPHOMETRY OF BONE TISSUE IN OSTEOSYNTHESIS OF FEMORAL DIAPHYSIS FRACTURE IN RATS WITH OSTEOPOROSIS MODEL WITH MAGNESIUM IMPLANTS WITH DIFFERENT TYPES OF COATINGS

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**Objective:** To assess the state of bone tissue during osteosynthesis of femur fracture in rats with experimental osteoporosis using magnesium implants with calcium-phosphate coating and calcium-phosphate coating with polytetrafluoroethylene.

**Methods:** 24 rats of Wistar males, divided into four groups, glucocorticoid-induced osteoporosis was reproduced, followed by modeling of the closed fracture of femur. In two groups of animals, fixation of fragments was performed by method of closed intramedullary retrograde osteosynthesis using magnesium implants coated with hydroxyapatite and hydroxyapatite with polytetrafluoroethylene. Comparison groups were formed by animals, the healing of fractures without use of implants, and animals with osteoporosis without fracture. On 14th, 30th and 60th day of experiment, a histological and morphometric assessment of bone tissue condition was performed.

**Results:** The use of implants coated hydroxyapatite and polytetrafluoroethylene in osteosynthesis in condition of osteoporosis led to earlier regeneration of bone tissue. The thickness of cortical bone and thickness of trabeculae were significantly higher in rats with coated hydroxyapatite and polytetrafluoroethylene magnesium implants comparing magnesium implants coated hydroxyapatite (152.5±4.9 mcm and 136.6±4.5 136.6±±4.5 mcm on 14th day;135.9±2.0 mcm and 138.3±2.9 mcm on 30th; 150.3±2.6 mcm and 146.8±1.9 mcm, $p<0.01$). On 14th day in group of animals, with use of magnesium implants coated with hydroxyapatite and polytetrafluoroethylene in projection of callus, equal ratio of fibroreticular tissue and osteoid was observed. On 30th day in animals of this group there was a significant increase in the density of the cancellous bone. Osteoid decreased in size and almost completely disappeared in areas far from the fracture, coarse-fibrous bone tissue began to transform into a lamellar bone. On 60th day in bone tissue of animals in groups with different types of implants, morphological picture was not significantly different.

**Conclusions:** The dynamics of bone tissue condition in fractures in rats with model of osteoporosis show to acceleration of regeneration process due to use of magnesium implants coated hydroxyapatite with polytetrafluoroethylene. The use of such devices could be as a promising way to improve results of fracture treatment in conditions of systemic osteoporosis.

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## P785

## COMPARATIVE COMORBIDITIES, FUNCTIONAL OUTCOME, AND COMPLICATIONS OF TKR BETWEEN POSTTRAUMATIC AND PRIMARY OSTEOARTHRITIS OF THE KNEE

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**Objective:** Fracture around the knee (distal femoral fracture, tibial plateau fracture) can lead to posttraumatic osteoarthritis (PTOA) of the knee.[1-4]Malunion, malalignment, intra-articular osseous defects, retained internal fixation devices, and compromised soft tissues may affect the outcome of total knee replacement (TKR).[1] On average, the posttraumatic OA patients were approximately 10 y younger than those for primary OA knee.[5-6] Additionally, tibial plateau fracture fixation in older patients and those with more severe fractures are more likely to need TKR.[7] Only a few literatures have defined surgical challenges and outcomes of total knee replacement in PTOA that was lower functional outcome than those TKR in primary OA.[8-12] However, not much data demonstrating the patient's comorbidities, functional outcome, and complication between PTOA (fracture around the knee and ligamentous injury of the knee) and primary OA of the knee. The purpose of this study was to compare comorbidity, functional outcome, and complication of TKR among posttraumatic OA caused by fracture, posttraumatic OA after knee ligamentous injury, and primary OA knee.

**Method:** After the Institutional Review Board Approval, patient's medical records were reviewed. Between January 2008 and December 2013, a total of 1225 patients underwent TKRs at our arthroplasty center. Finally, 852 patients undergoing TKRs were recruited in this study. Patients were divided into 3 categories: 716 patients with primary OA knee, 32 patients with PTOA (fracture around the knee subgroup), and 104 PTOA (knee ligamentous injury subgroup). Primary OA knee was defined as osteoarthritis of the knee which has no specific

cause while PTOA knee was defined as osteoarthritis of the knee caused by previous traumatic event. The PTOA group was further categorized into 2 subgroups; fracture PTOA subgroup and ligamentous injury PTOA subgroup. Patients were reviewed demographic data, comorbidity including ASA classification and Charlson comorbidity index (CCI), preoperative alignment, preoperative visual analogue scale (VAS), preoperative WOMAC score. Functional outcomes were assessed with the WOMAC[13-14] at 2-year follow-up.

**Results:** There were significantly different in age, gender, and obese between posttraumatic OA knee (PTOA) and primary OA knee (POA). PTOA patients were significantly younger (56.5 vs. 63.8 years; P<0.0001) at time of surgery, with a higher proportion of men (51.5% vs. 36.9%; P=0.001) compared with the primary osteoarthritis group. On the contrary, POA group undergoing TKR predominantly in female, with a significantly higher obesity rate than PTOA group. However, smoking and alcoholic drinking had no significant difference in both groups (Table 1). The POA group had higher comorbidities than PTOA group including anticoagulant usage (51% vs. 30.9%, p=0.0002), ASA class ≥3 (38.8% vs. 21.6%, p<0.0001), number of disease ≥4 (69.6% vs. 45.3%, p<0.0001), and Charlson Comorbidity Index (3.6 vs. 2.8, p<0.0001) (Table 2). According to radiographic alignment preoperatively, there was significantly different of anatomical axis between groups: PTOA group was valgus alignment (-1.6 ±9.8) while POA group was varus alignment (2.2±8.9) (p<0.0001). However, there was comparable mechanical axis preoperatively between groups. In addition, posterior slope was almost significant between groups (8.1 vs. 7.2, p=0.052) (Table 3). Postoperatively radiographic assessment defined that there was no significantly different of anatomical (-4.3 vs. -4.3, p=0.867) and mechanical axis (0.4 vs. 0.9, p=0.263) between groups, except PTOA group had more posterior slope than POA group (2.9 vs. 2.1, p=0.018) (Table 3). Preoperative visual analogue scale (VAS) was comparable among three groups. On the contrary, postoperative VAS in Fracture PTOA subgroup was significantly higher than primary OA group while there was no significant difference in pain score between ligamentous PTOA subgroup and primary OA group (Table 4). There were no differences in all three components of preoperative WOMAC score among subgroups of posttraumatic OA Knee (Fracture PTOA and Ligamentous PTOA) and primary OA knee (POA) (Table 5). PTOA subgroup had significantly lower pain component and stiffness component than primary OA group. However, there were no differences in all components of WOMAC score between ligamentous PTOA subgroup and primary OA group (Table 6). There was no difference in postoperative complications (surgical site infection, urinary tract infection, venous thrombotic event) including readmission within 90 days (Table 7).

**Conclusion:** The outcome following TKR in Fracture PTOA subgroup was poorer than the outcome with primary osteoarthritis of the knee in midterm follow-up. However, the outcome undergoing TKR was comparable between ligamentous PTOA subgroup and primary OA knee.

Table 1 Patient's demographic data between posttraumatic osteoarthritis of the knee (PTOA) and primary osteoarthritis of the knee (POA)

| Demographic data | PTOA | POA | p-value |
|---|---|---|---|
| Age* (y) | 56.5 (31.0-82.0) | 63.8 (30.0-95.0) | <0.0001 |
| Gender** -Male | 70 (51.5%) | 264 (36.9%) | 0.001 |
| -Female | 66 (48.5%) | 452 (63.1%) | |
| BMI¥ -Normal (18 to <25 kg/m$^2$) | 14 (10.4%) | 42 (5.9%) | 0.025 |
| -Overweight (25 to <30 kg/m$^2$) | 37 (27.4%) | 128 (17.9%) | |
| -Obesity (>30 kg/m$^2$) | 84 (62.7%) | 544 (76.0%) | |
| Smoking** | 8 (5.9%) | 35 (4.9%) | 0.627 |
| Alcohol drinking** | 59 (43.4%) | 255 (35.6%) | 0.085 |

*=mean, range; **=n, percentage; ¥ The values are given as the number of patients, with the percentage in parentheses; Statistic significance at p<0.05

Table 2 Patient's comorbidities between posttraumatic osteoarthritis of the knee (PTOA) and primary osteoarthritis of the knee (POA)

| Patient's comorbidities | PTOA | POA | p-value |
|---|---|---|---|
| Anticoagulant** Yes | 42 (30.9%) | 365 (51.0%) | 0.0002 |
| No | 94 (69.1%) | 351 (49.0%) | |
| ASA classification¥ 1 | 7 (5.2%) | 11 (1.6%) | <0.0001 |
| 2 | 98 (73.1%) | 424 (59.6%) | |
| ≥3 | 29 (21.6%) | 276 (38.8%) | |
| Number of disease** 1-3 | 70 (54.7%) | 214 (30.4%) | <0.0001 |
| ≥4 | 58 (45.3%) | 488 (69.6%) | |
| Charlson Comorbidity Index* | 2.8±1.4 (0.0 -7.0) | 3.6±1.5 (0.0 -10.0) | <0.0001 |

*=mean, range; **=n, percentage; ¥ The values are given as the number of patients, with the percentage in parentheses; Statistic significance at p<0.05

Table 3: Radiographic findings between posttraumatic osteoarthritis of the knee (PTOA) and primary osteoarthritis of the knee (POA)

| Radiographic alignment | PTOA | POA | p-value |
|---|---|---|---|
| Anatomical axis* | | | |
| Preoperative | -1.6±9.8 (-31.0 to 26.0) | 2.2±8.9 (-30.0 to 30.0) | <0.0001 |
| Postoperative | -4.3±3.0 (-10.0 to 7.0) | -4.3±2.4 (-11.0 to 7.0) | 0.867 |
| Mechanical axis* | | | |
| Preoperative | 3.2±10.4 (-28.0 to 34.0) | 4.0±9.4 (-27.0 to 34.0) | 0.570 |
| Postoperative | 0.4±3.7 (-8.0 to 10.0) | 0.9±3.6 (-12.0 to 18.0) | 0.263 |
| Posterior slope* | | | |
| Preoperative | 8.1±3.5 (0.0 to 19.0) | 7.2±4.1 (-3.0 to 23.0) | 0.052 |
| Postoperative | 2.9±3.2 (-6.0 to 11.0) | 2.1±2.2 (-2.0 to 12.0) | 0.018 |

*=mean, range; In AP x-ray (+=varus knee, -=valgus knee), In lateral x-ray (+=posterior slope, -=anterior slope)

Table 4 Visual analogue scale (VAS) among subgroups of post-traumatic OA knee (fracture PTOA and ligamentous PTOA) and primary OA knee (POA)

| Pain score | Mean±SD | Range | p-value |
|---|---|---|---|
| Preoperative VAS -Fracture PTOA | 8.3±1.4 | 6.0-10.0 | 0.64 |
| -Ligamentous PTOA | 8.0±1.3 | 4.0-10.0 | 0.99 |
| -POA* | 8.0±1.3 | 3.0-10.0 | |
| Postoperative VAS -Fracture PTOA | 2.1±1.8 | 0.0-6.0 | 0.019 |
| -Ligamentous PTOA | 1.7±1.8 | 0.0-8.0 | 0.063 |
| -POA* | 1.3±1.7 | 0.0-10.0 | |

*=Reference; significant at p<0.05

Table 5: Preoperative WOMAC among subgroups of posttraumatic OA knee (fracture PTOA and ligamentous PTOA) and primary OA knee (POA)

| Preoperative WOMAC | Mean±SD | Range | P-value |
|---|---|---|---|
| Pain Component -*Fracture PTOA* | 40.5±30.6 | 0.0-100.0 | 0.20 |
| -*Ligamentous PTOA* | 43.6±19.7 | 0.0-100.0 | 0.11 |
| -*POA** | 48.7±21.9 | 0.0-100.0 | |
| Stiffness Component -*Fracture PTOA* | 36.4±30.6 | 0.0-100.0 | 0.70 |
| -*Ligamentous PTOA* | 39.4±21.3 | 0.0-87.5 | 0.95 |
| -*POA** | 40.2±21.6 | 0.0-100.0 | |
| Functional Component -*Fracture PTOA* | 41.2±24.2 | 5.7-87.5 | 0.39 |
| -*Ligamentous PTOA* | 45.3±21.4 | 0.0-95.5 | 0.80 |
| -*POA** | 46.7±19.0 | 0.0-97.7 | |

Table 6: Postoperative WOMAC among subgroups of post-traumatic OA knee (fracture PTOA and ligamentous PTOA) and primary OA knee (POA)

| Postoperative WOMAC | Mean±SD | Range | P-value |
|---|---|---|---|
| Pain Component -*Fracture PTOA* | 70.0±25.0 | 25.0-100.0 | 0.007 |
| -*Ligamentous PTOA* | 80.2±23.8 | 0.0-100.0 | 0.16 |
| -*POA** | 85.7±19.6 | 10.0-100.0 | |
| Stiffness Component -*Fracture PTOA* | 50.0±25.0 | 0.0-100.0 | 0.013 |
| -*Ligamentous PTOA* | 63.2±22.8 | 0.0-100.0 | 0.98 |
| -*POA** | 63.8±18.3 | 0.0-100.0 | |
| Functional Component -*Fracture PTOA* | 60.9±21.0 | 22.7-89.8 | 0.08 |
| -*Ligamentous PTOA* | 73.6±20.6 | 18.2-97.7 | 0.83 |

Table 7: Complications including Readmission between Posttraumatic (PTOA) and Primary OA knee (POA)

| Parameters | PTOA (n=136) | POA (n=716) | P-value |
|---|---|---|---|
| Complications¥ | | | 0.262 |
| Surgical site infection** | 2 (1.5%) | 2 (0.3%) | |
| Urinary tract infection** | 0 (0%) | 1 (0.1%) | |
| VTE event | 1 (0.7%) | 1 (0.1%) | |
| No complication** | 133 (97.8%) | 712 (99.5%) | |
| Readmissions** | | | |
| Within 30 days | 2 (1.5%) | 21 (2.9%) | 0.561 |
| Between 30-90 days | 2 (1.5%) | 15 (2.1%) | 1.000 |

**=n, percentage; ¥ The values are given as the number of patients, with the percentage in parentheses; Statistic significance at p<0.05

## P786

## STANDARDIZED CEMENT AUGMENTATION IN EXTRACAPSULAR HIP FRACTURES: IS A SAFE AND REPRODUCIBLE TECHNIQUE TO INCREASE ANCHORAGE IN OSTEOPOROTIC BONE?

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**Objectives:** Evaluate safety, complications and functional result of extracapsular hip osteoporotic fractures treated with standardized cement augmentation with the PFNA-Augmentation© nail.
**Methods:** A retrospective analysis of 81 consecutive patients with extracapsular osteoporotic fracture of the proximal femur treated with PFNA-Augmentation nail was performed between 2010-2017. Demographic data, AO classification, quantity and distribution of cement, complications associated with its use (necrosis, leak to the joint, cartilage damage). radiological assessment such as fracture reduction, blade position, mechanical complications and functionality were collected.
**Results:** 81 patients (65 women and 16 men) with a mean age of 85.88 y [54-101, SD-7.71]. were reviewed. Most frequent fracture types were unstable: type 31A2.3 (30), 31A3.3 (17) and 31A2.2 (22). Mean amount of cement was 3.5 ml [3-5, SD-0.54]. No definite pattern of distribution was observed. Up to 10 different surgeons performed 3 or more interventions. There was an intraoperative complication, without clinical consequences for the patient, in which the cement migrated to the joint. Fracture reduction was good in 55 patients, acceptable in 19 cases and poor in 7 cases. Mean follow-up was 14.5 months (12-24 months).15 patients died during the follow-up for reasons unrelated to the surgical technique. Mechanical complications were observed in 4 cases (1 peri-implant fracture that needed surgical revision, and 3 "back-out"), but none associated with cement augmentation. Of the 81 patients, 71 walked previously (19 without help, 19 with simple help and 33 with walker). 57.5% of patients achieved their prefracture functional status. 17 patients could not walk again
**Conclusion:** Osteosynthesis with standardized cement augmentation technique in extracapsular osteoporotic hip fractures is a reliable, safe and reproducible technique that could reduce number of mechanical complications and improve functional results by increasing the anchorage of the implant to the frail bone.

## P787

## LACK OF CONVINCING KNOWLEDGE ABOUT OSTEOPOROSIS AMONGST TOP CLINICIANS OF MULTIPLE SPECIALTIES IS A MAJOR RISK FACTOR FOR FRAGILITY FRACTURES IN INDIA

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**Objective:** To prove that lack of convincing knowledge about Osteoporosis amongst top clinicians of multiple specialties is a major risk factor for fragility fractures in India.
**Methods:** The data is collected from the research facility where around 5000 patients were screened between 2012-2019 in the monthly camps of BMD. ECG. RBG & BP. The prescriptions from other specialists of about 500 patients having Osteoporosis diagnosis by T-score of -2.5 or even lower in these camps, were studied by the principal investigator (PI). The specialists were gynaecologists, diabetologists, orthopaedic surgeons, endocrinologists, nephrologists, physicians, etc., and AAYUSH specialists.
**Results:**

1. Very few had advised DXA Scan. Though the peripheral densitometry BMD Camps are common. But even after knowing the adverse value of T-score. only calcium and vit D were prescribed. Doctors took adverse results of ECG, random blood sugar and hypertension very seriously as against adverse T-score. Very few gave the prescription containing AOM.
2. There was minimal or no referral from specialists to physiotherapist, occupational therapist or podiatrist as a preventive strategy. All references were postoperative, to save surgical failures.
3. Very few specialists were aware of FRAX and no one is actually using it.
4. Regular Calcium consumption was significantly low for the fear of getting kidney stone or lack of evidence based encouragement & knowledge.
5. Most of the prescriptions were full of pain killers (NSAID), steroidal preparations, antirheumatic, antiarthritic drugs but rarely a prescription of AOM was seen.
6. Not a single blood work report of any of the bone marker (like s-PINP /s-CTX) was seen before initiation or for monitoring any oral or parenteral AOM.

**Conclusions:**

1. The Indian super specialists are convincingly not aware about the risk of fragility fractures in their postmenopausal patients (as they don't suggest any precautions, intervention, investigations or treatments) due to lack of their knowledge leading to fragility fractures in their postmenopausal patients coming to their hospitals with any complaints regarding their health.
2. They don't suggest DXA Scan for knowing the status of major joints prone for fracture due to fall or frailty.
3. They don't write any antiosteporosis medication (AOM). It is not a part of their routine prescription. They are also convincingly unaware that AOM are to be written for lifetime like medications for other lifestyles diseases HTN, HD, DM, etc.
4. They contribute indirectly in spreading, adding negativity regarding the side effects of AOM disproportionately. At least they can oppose the rumours by educating their patients.
5. The reality can be judged by the fact that Indian Menopause Society has been ceased to exist as a CNS member society of IOF since last many years .
6. There is no entity or no listing in the specialists' categories claiming to treat osteoporosis called as osteoporocians like orthopaedicians, physicians, dieticians, etc.
7. Pharma are doing great job for promotion of PMO - calcium, vit D, etc.
8. No Indian national medical organisations are doing promotional works for PMO.
9. Indian females don't do exercises, failure of doing it reflects the worst tally of medals In Olympics.
10. Many specialists take lead from front in discouraging patients or their relatives either in 'not permitting' to start the AOM or to stop the ongoing t/t.
11. The concept of FLS is as good as unknown and nonexistent.

## P788
## AREA OF ANTERIOR SKIN NUMBNESS AFTER TOTAL KNEE ARTHROPLASTY: A PROSPECTIVE COMPARISON STUDY BETWEEN DIABETIC AND NONDIABETIC PATIENTS

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**Objective:** Total knee arthroplasty (TKA) is one of the most successful procedures for patients with painful knee osteoarthritis. However, anterior skin numbness from injury of the infrapatellar branch of saphenous nerve (IPBSN) and/or the inferior branch of the femoral cutaneous nerve (IBFC) have been reported as a common complication after TKA, which may affect the patients' outcome (1-5). Recently, Tanavalee et al. demonstrated that there was no difference of skin numbness between minimally invasive and standard approach for TKA (6). To our knowledge, no study has compared the skin numbness including warmness between diabetic patients and non-diabetic patients undergoing TKA. Moreover, no literature can explain why some patients have large skin numbness including the upper-lateral area adjacent to the patella.
**Methods:** Phase I study: Initially, we evaluated 120 patients undergoing TKA. Five diabetic patients with skin numbness around the knee before TKA were excluded. 41 type II diabetic and 74 nondiabetic patients underwent TKA. Area of anterior skin numbness ($cm^2$) was periodically evaluated and were compared out to minimum 2-year follow-up (FU). Phase II study: 30 normal cadaveric knees were dissected. The course and distribution of the IPBSN and the IBFC were specifically identified.

**Results:** In the clinical study, there was no difference in prevalence of skin numbness (73.2% vs. 68.9%, p=0.36) and warmness (97.6% vs. 97.3%, p=1.00) between diabetic and nondiabetic patients. The average numbness ($cm^2$) was comparable between groups at 2 weeks and1 year. However, duration of numbness recovery after TKA in diabetic patients was significantly longer than the non-diabetic group (8.6 months vs. 5.3 months, p=0.001). Moreover, the characteristic of skin numbness was significantly different between groups. The former group had a higher rate of global anterior numbness compared to the latter group (48.3% vs. 22.9%, p=0.045). The clinical study demonstrated a prevalence of the superior-lateral skin numbness of 1.7%, presumed to be injury to the anterior-inferior branch of the femoral nerve. This correlated with the cadaveric study where 10% of the nerves crossed the midline incision.

**Conclusion:** The duration of numbness recovery was significantly longer in diabetic patients. This information is useful for counseling patients undergoing TKA. Additionally, a longer skin incision proximally (i.e.. more than 2 cm above the proximal pole of the patella) should be avoided to minimize superior-lateral skin numbness.

**Reference:**

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2. Johnson DF et al. Am J Orthop 2000;29:863.
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4. Sundaram RO et al. Knee 2007;14:375.
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## P789

## BODY COMPOSITION, LEVEL OF PHYSICAL ACTIVITY AND COGNITIVE DYSFUNCTION IN PATIENTS WITH NEW LOW-ENERGY FRACTURES

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**Objectives:** We assessed body composition, level of physical activity and cognitive dysfunction in patients with new low-energy fractures.

**Methods:** The study group included 33 patients (28 women) with new low-energy fracture. The average age was 75.7±12.6 y. We assessed the level of physical activity, and MMSE (Mini-Mental State Examination) score. We performed bioelectrical impedance analysis to assess body composition.

**Results:** The mean MMSE score was 20,8±8.4. 17 patients (52%) had MMSE score more or equal 24 (no dementia), 6 patients (18%) demonstrated mild dementia, 6 patients (18%) demonstrated moderate dementia, and 4 patients (12%) showed severe cognitive impairment. We assessed patients' physical activity with the original questionnaire, where 0 means bedridden level of physical activity (2 patients, 6%), 1 means ambulatory within own apartment/house (11 patients, 33%), 2 means ambulatory to and from a shop/workplace (13 patients, 39%), 3 means daily walking no <2 hours (4 patients, 12%), 4 means moderate physical activity daily (1 patient, 3%), 5 means vigorous physical activity most days of the week (1 patient, 3%). We asked about the number of spontaneous falls during the last year. The mean number was 2.1±2.8 (quartile 1 to quartile 3, 0.0-4.0). The weight mean was 80.3±5.5 kg in men and 68.2±13.9 kg in women. The mean fat mass value was 20.5±9.7 kg. Fat free mass mean value was 54.7±9.1 kg in men and 48.5 ±9.1 kg. Mean skeletal muscle mass in men was 31.0±5.2 kg, mean skeletal muscle mass in women was 27.5±3.4 kg. There was no correlation between number of falls for the last year and level of physical activity of MMSE score. We found a negative correlation between the level of physical activity and number of falls for the last year (Rs=- 0.69; p<0.05). We couldn't find any correlation between weight of different body compartments and the MMSE level, level of physical activity, and number of falls.

**Conclusion:** Patients with new low-energy fractures demonstrated high prevalence of cognitive impairment and low level of physical activity. There was a significant correlation between the level of physical activity and number of spontaneous falls.

## P790

## PREVALENCE OF SARCOPENIA IN ELDERLY PATIENTS WITH OR WITHOUT LOW-ENERGY FRACTURES SUFFERING FROM NEW STROKE OR TRANSITORY ISCHEMIC ATTACK

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**Objective:** To assess body composition, muscle strength, and prevalence of sarcopenia in patients with or without low-energy fractures in the past admitted to the hospital with new stroke of transitory ischemic attack (TIA).

**Methods:** We included in the study 60 patients with new stroke or TIA (15% of all cases), which were divided into two groups. First group with low-energy fractures in the past consisted of 26 patients (53.8% females). There were 34 patients (61.7% females) in the second group without low-energy fractures in the past. We performed bioelectrical impedance analysis. Skeletal muscle mass (SMM) was calculated by the following equation: SMM (kg)=0.566· FFM (fat free mass). Skeletal muscle mass index (SMMI) was calculated as SMM (kg)/height $(m)^2$. Muscle strength was measured using a Jamar hand dynamometer.

**Results:** According to the European Working Group on Sarcopenia in Older People consensus 11 patients (7 females) from the first group and 17 patients (13 females) from the second group demonstrated low handgrip strength (p>0.05). 4 men from the first group and 2 men from the second had SMMI lower than the cutoff values (p>0.05). In our study two men met EWGSOP

criteria for sarcopenia diagnosis, both were from the first group. Four men from the first group and two men from the second group were diagnosed with presarcopenia (p>0.05).

| | First group | | Second group | | |
|---|---|---|---|---|---|
| | Men | Women | Men | Women | |
| Age, years | 67.9±11.8 | 74.7±13.5 | 69.2±12.1 | 76.9±8.6 | p>0.05 |
| Weight, kg | 81.1±15.0 | 69.2±19.4 | 83.7±16.9 | 69.7±9.7 | p>0.05 |
| BMI | 27.3±5.2 | 25.7±6.4 | 27.1±4.3 | 27.9±4.5 | p>0.05 |
| Handgrip strength, kg | 34.8±9.1 | 17.8±6.7 | 38.7±11.1 | 16.3±5.5 | p>0.05 |
| Fat body mass, kg | 21.4±10.7 | 21.0±10.4 | 20.4±11.8 | 22.4±6.5 | p>0.05 |
| SMM, kg | 34.5±5.1 | 27.6±5.6 | 36.2±4.5 | 26.8±2.6 | p>0.05 |
| SMMI | 11,6±1.5 | 10,3±1.8 | 11,7±0.9 | 10,6±1.0 | p>0.05 |

**Conclusion:** Elderly patients with new stroke or TIA did not demonstrate high prevalence of sarcopenia or presarcopenia in our study. There was no statistical difference in the prevalence of low handgrip strength between two groups. Although there were two patients against zero with sarcopenia in the group of patients with low-energy fractures in the past, this difference did not achieve statistical significance.

## P791
## THE COMPONENTS OF ICF CLASSIFICATION IN EVALUATION OF REHABILITATION RESULTS IN PATIENTS WITH LUMBAR PAIN SYNDROME

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**Objective:** The International Classification of Functioning, Disability and Health (ICF) contains important factors for the program of rehabilitation and evaluation of the outcome of rehabilitation. The aim of this study is to compare the components of ICF Classification ("Body functions", "Body structures" and "Activities and Participation") with areas of assessment and specific elements that appear in the standardized assessments in the rehabilitation of the patients with Lumbar Pain Syndrome (Barthel index, Visual analogue scale, Oswestry Low Back Disability Questionnaire, Back Depression Inventory).
**Methods:** This research is a clinical retrospective study. The research pattern is formed by 60 patients, selected randomly, all of them hospitalised at the Clinic for Physical Medicine and Rehabilitation at the Clinical Centre University of Sarajevo in the period from 01.01.2018. until 01.12.2018. years.
**Results:** The average age was 48.91±10.98 y (28-70). Using the Paired t-test, a significant difference in values of Barthel index was established. The average value of Oswestry Questionnaire at reception was 29.16±11, while the average value at release was statistically significantly smaller 14.20 ±8.72 (t=17.424; p=0.001). Although there is statistically significance in average value of Back Depression Inventory at reception and release (t=5.085; p=0.001), patients were in the group of mild mood disorders. At reception, the average value of the Visual analogue scale was 6.96±1.74, while at release, the average value was significantly lower (3.10±1.80). By using the analytical function all patients had weakness of muscle strength, and when it came to energy levels, all were 100% motivated. The analysis of changes related to anatomical spinal column structure was found that 45% have changes related to the spinal cord, all patients have changes in the disk structure, while additional musculoskeletal changes related to the movement has 16.7%. Descriptive statistical analysis of "Activity and participation" found that walking for no more than 10 minutes had 68.3%, and the ability of business had 60% of patients. Of the total number of patients, 58.3% were dressed independently while 90% colud go to the toilet alone.
**Conclusion:** The components of ICF Classification implicitly support the program of evaluation and treatment outcomes in rehabilitation.

## P792
## PLATELET RICH PLASMA IN THE TREATMENT OF TENDINOPATHY IN SPONDYLOARTHRITIS

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**Objective:** The traditional approach to the treatment of chronic tendinopathy is the local infiltration of a glucocorticoids (GC), however this method has a high recurrence rate after 6 weeks. The infiltration of growth factors in the form of platelet rich plasma (PRP) or autologous platelet concentrate is an alternative treatment of recent statement. The rationale of the treatment with the PRP is based of Factors that counteract the pro-inflammatory immune response and of that that stimulate the cells pertaining to the musculoskeletal system. Spondyloarthritis (SpA) are a group of diseases that share clinical and genetic features, including inflammation with predilection for the axial skeleton (spine and sacroiliac joints), asymmetrical arthritis, enthesitis, uveitis, psoriasis and inflammatory bowel manifestations. The musculoskeletal manifestations of SpA are the result of inflammation, which mainly occurs at the level of the enthesis, i.e., the insertion sites of tendons, ligaments. The enthesitis occurs more frequently at sites that bear a greater mechanical stress, such as at the Achilles tendon or the insertion of the patellar tendon. The pathogenesis involves cells and mediators of the immune system, in particular helper T cells, as demonstrated by genetic and immunological studies.
**Methods:** We have recruited 20 patients with spondyloarthritis with enthesitis already locally treated with GC therapy (at least 2 infiltration of triamcinolone acetonide 40 mg). 10 patients were suffering from tendinitis of the Achille's tendon, 6 from epicondylitis and 4 from enthesitis of the patellar ligament. All patients were given two PRP

infiltrations (at baseline and after two weeks). An ultrasound check Power Doppler (PWD) has been performed in all patients (in according to Omeract criteria for PWD), before starting the infiltrative cycle, after 2 weeks and after 3 months of follow-up.

**Results:** Our data, showed a good efficacy of the PRP in the treatment of tendinopathy, evaluated both clinically and with ultrasound, in patients with SpA (Δ tot VAS PAIN -7.2 and Δ PWD tot 2.1 $p<0.05$ – Table 1). The active components of the PRP are the TGF-β and growth factors such as IGF, PDGF, etc.; it is known that TGF-β at appropriate concentrations inhibits the immune response mediated by Th17 cells, countering the priming and converting the T cell naive in TReg suppressors. The TGF-β also has the ability to inhibit other inflammatory cells, such as macrophages and other lymphocyte phenotypes, while the platelet growth factors, on the other hand, stimulate the tenocytes to produce collagen that repairs tendon lesions.

**Table 1.** Mean changes from the baseline values

| Site of Enthesitis | Baseline VAS Pain (0-10) | Baseline PWD (0-3) | 2 week VAS Pain (0-10) | 2 week PWD (0-3) | 3 month VAS Pain (0-10) | 3 month PWD (0-3) | Δ VAS Pain (0-10) | Δ PWD (0-3) |
|---|---|---|---|---|---|---|---|---|
| Achille's tendon | 7,9 SD±0,7 | 2,6 SD±0,5 | 3,6 SD±0,9 | 1,6 SD±0,5 | 1,0 SD±1,0 | 0,4 SD±0,5 | -6,9 | -2,2 |
| Epicondyle | 8,3 SD±0,6 | 2,3 SD±0,6 | 4,5 SD±0,5 | 1,0 SD±0,0 | 0,8±0,8 | 0,3 SD±0,6 | -7,5 | -2,0 |
| Patellar Ligament | 7,7 SD±0,3 | 2,0 SD±0,0 | 3,5 SD±0,7 | 0,5 SD±0,7 | 0,5 SD±0,7 | 0,0 SD±0,0 | -7,2 | -2,0 |
| Total | 8,0 SD±0,6 | 2,4 SD±0,5 | 3,9 SD±0,8 | 1,2 SD±0,6 | 0,8 SD±0,8 | 0,3 SD±0,5 | -7,2 | -2,1 |

**p-value <0,05**

**Conclusion:** PRP could be a viable alternative to the GC local treatment of these pathologies, but further studies are needed for comparison with a larger sample of patients.

## P793
## PREDICTORS OF RADIOGRAPHIC PROGRESSION IN HAND OSTEOARTHRITIS: A TEN-YEAR PROSPECTIVE COHORT STUDY

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**Objective:** To identify new prognostic factors and to confirm existing evidence on already identified prognostic factors for radiographic progression in HOA after follow-up of 10 y.

**Methods:** A total of 106 patients from 270 from the original Ghent HOA cohort consented for a 10 years-follow-up visit. Presence of tender and swollen joints was assessed. Grip strength was measured. Questionnaire for functional impairment as FIHOA and AUSCAN were completed. Pain was scored on a visual analogue scale from 0-100 mm (VAS pain). X-rays of hands were taken and scored using the anatomical phase scoring system[1]. Patients were defined as radiographic progressor when two or more joints progressed to another phase within the scoring system, except for N-phase to S-phase. Logistic regression was performed on the clinical data and outcomes as presence of tenderness (yes or no), soft tissue swelling (yes or no), VAS pain (≤33 mm vs. >33 mm), disease duration (≤5 vs. >5 y), FIHOA and AUSCAN. Odds ratios (OR) with 95%CIs were calculated.

**Results:** After a mean follow-up of 9.7 y, 73.3% of the patients showed radiographic progression. The following clinical factors were associated with radiographic progression on patient level (OR [95%CI]): presence of tenderness (4.19 [1.52-11.61]), soft tissue swelling (2.73 [1.08-6.92]) and disease duration > 5 years (4.00 [1.50-10.66]). Other variables were: VAS pain (1.02 [1.00-1.04]), total FIHOA (1.12 [1.03-1.23]), total AUSCAN (1.02 [1.01-1.04], AUSCAN pain (1.07 [1.02-1.12], AUSCAN function (1.03 [1.01-1.06]) and VAS pain > 33mm (2.87 [1.14-7.24]). The mean number of E and R joints was 1.2 and 1.4 at baseline, and 0.2 and 5.2 after 10 y ($p<0.001$). The total number of joints that progressed to the E-phase and R-phase over a period of ten years was respectively 20 (1.05%) and 399 (21%).

**Conclusion:** Clinical presence of pain and soft tissue swelling at baseline remain strong predictors of radiographic progression in HOA after ten years. Tenderness upon pressure, moderate VAS pain and moderate impaired function at baseline are identified as new predictors. After 10 y, more remodeling and less erosive joints are seen.

**References:** 1. Verbruggen G and Veys EM. Arthritis Rheum 1996;39:308.

## P794
## CLINICAL AND LABORATORY PREDICTION OF EFFICACY OF COMBINED TREATMENT IN RHEUMATOID ARTHRITIS

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**Objective:** Identification of the relationship between the level of TNFα and clinical manifestations with the effect of treatment in patients with rheumatoid arthritis (RA) receiving methotrexate (MT) with infliximab (IF).

**Methods:** 18 patients with RA were included in study. Mean disease duration was 13.2±5.3 y. RF positive RA was detected in 83.3% of patients, ACCP-positive – in 66.8%. RA radiographic stages III and IV were

detected in 66.8%. All patients were treated with MT 12.5–20 mg per week during at least 3.6 years in combination with various NSAIDS. 50% of the patients took methylprednisolone 8 mg per day. IF was prescribed at the rate of 3 mg/kg. ESR, CRP, concentration of TNFα were determined in serum before (week 0) and after IF therapy (week 30). Disease activity and therapeutic effect were assessed using DAS28-CRP(4).
**Results:** All RA patients had initial DAS28-CRP(4) > 5.6. In 55.5% of patients BMI was normal, and 44.5% of them were pre-obese. Mean ESR became decreased at 30th week (from 26.8 to 12.2 mm/h) as well as CRP (from 25.4 to 4.8 mg/l). Elevated TNF levels were revealed in 11.1% of RA sera at week 0, with mean concentration 6.96 pg/ml. All these patients were included in the group with good effect of therapy. The average value of VAS score on week 0 was 68.3 mm, after 30 weeks - 26.0 mm. The response to the therapy was evaluated: on the 30th week the group with good effect was 33.3%, with satisfactory - 50%, without effect - 16.7%. The groups with good and satisfactory response were patients with a CRP level exceeding the upper limit of the norm by more than 3 times, normal BMI (19.6-23.3 kg/m2), initially more high rates of DAS28-CRP (4) and higher concentrations of TNFα, which decreased during treatment.
**Conclusion:** Groups with a good and satisfactory response to week 30 of treatment with MT and IF included patients with normal body mass, high activity of disease, high concentrations of CRP and TNF.

## P795
## THE NONIONIZING RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) APPLIED ON A SPANISH COHORT FOR THE OSTEOPOROSIS DIAGNOSIS ON LUMBAR SPINE AND FEMORAL NECK

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**Objective:** To evaluate REMS [1] accuracy for the diagnosis of osteoporosis compared with the rd DXA in European women.
**Methods:** Within a European multicenter clinical trial, 595 subjects (aged 51-70 y) enrolled at the Department of Internal Medicine of the Hospital del Mar (Barcelona, Spain) underwent spinal and femoral examinations by both DXA and REMS technology. REMS is based on a highly selective automatic identification of target bones and regions of interest (ROIs), combined with advanced differential measurements between frequency spectra of RF signals backscattered from patient bones and reference spectral models, which had been previously derived from osteoporotic and healthy patients. All DXA acquisitions were double-checked by two different experienced operators in order to avoid possible inaccuracies [2]. At the same time, a quality control on all REMS data allowed to verify the correct transducer depth and focus selection. To evaluate REMS accuracy, its capability to discriminate osteoporotic patients from healthy individuals was assessed with Cohen Kappa and SEE (standard error of the estimate) estimation.
**Results:** We observed an high REMS sensitivity of 92.7% and 93.0% and specificity of 93.5% and 95.0% for spinal and femoral site, respectively, for the discrimination between individuals with and without osteoporosis. The diagnostic accuracy of the REMS technique was also confirmed by the SEE value equal to 0.040 and 0.039 g/cm$^2$ and the Cohen Kappa in the range 0.77-0.76 for spine and femur.
**Conclusions:** In a Spanish population REMS has been shown to be an accurate nonionizing approach for the diagnosis of osteoporosis in lumbar spine and femoral neck. The clinical use of this precise and automatic technology will also open new perspectives for early osteoporosis diagnosis and fracture risk estimation in children and in adult patients.
**References:**
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[2] Messina et al. Eur Rad, 2015

## P796
## TREATMENT OF SEVERE OSTEOPOROSIS IN RUSSIA

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**Objective:** To review and analyze peculiarity of medical therapy and treatment results in patients with severe osteoporosis in selected clinics in Russia.
**Methods:** Within the study source, data analysis was performed for the patients who were observed for at least 1 y. Total number of patients included in analysis was 1000: 955 women and 45 men aged from 35-95 y. Observation period was 2864.5 person-years.
**Results:** At the time of diagnosis of osteoporosis, more than 90% of the patients had at least one fracture in their history, and 70% of the patients had multiple vertebral fractures. During the observation period, new fractures occurred in 23.9% of patients, frequency of hip fractures was 28.8%, vertebral fractures - 24.8%. There was registered high level used of oral and parenteral bisphosphonates at baseline (55% and 30.2%, respectively). Antiosteoporosis treatment was changed or canceled in 48.3% patients with severe osteoporosis. The most often reasons were low efficacy, adverse events and the patient's inability to pay for treatment. Oral bisphosphonates were the most frequently canceled medications (71.3%). Parenteral bisphosphonates and denosumab were more frequently used at the time of last observation (42.8% and 36.6%, respectively). Over 5% of patients with severe osteoporosis received anabolic therapy (teriparatide). The best results of treatment were observed in patients who was initially prescribed intensive therapy (parenteral bisphosphonates at least 3 y, denosumab or teriparatide at least 1 y). In this group, new fractures occurred with a lower frequency than in other patients (22.1% and 29.6% for all fractures, 9.9% and 17.1% for vertebral fractures, and 0.6% and 3.5% for hip fractures, respectively).
**Conclusion:** Treatment of patients with severe osteoporosis should be started with intensive therapy (parenteral bisphosphonates, denosumab, teriparatide) in order to reduce the risk of fractures.

## P797
## PRE-ANALYTICAL VARIABILITY OF BONE TURNOVER MARKERS IN AND ELDERLY POPULATION IN IRAN: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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**Objective:** To evaluate the pre-analytical variability of four BTMs, osteocalcin (OC), C-terminal telopeptide of type I collagen (CTX), bone specific alkaline phosphatase (bALP), and tartrate-resistant acid phosphatase (TRAP) in an elderly population.
**Methods:** A random subsample of 400 individuals (186 men and 214 women) from the baseline survey of the Bushehr Elderly Health (BEH) programme, a population-based prospective cohort study being conducted in Bushehr, a southern province of Iran, was selected for this study. OC and CTX were measured using electrochemiluminescence method (Roche Diagnostics, cobas e 411) and bALP and TRAP were measured using ELISA method (immunodiagnostic systems). Robust multiple linear regression models (Hampel's M-estimator) were used adjusted for age, sex, smoking, alcohol, history fractures, drugs, bed/rest immobility, circadian, physical activity, taking corticosteroids more than three months, renal disease, liver disease, type 2 diabetes mellitus (T2DM), thyroid disorder, menopausal status, delivery, and years after menopause (<10 y as early post menopause vs. >10 y as late post menopause). To avoid sparsity, low-frequency variables were omitted from the analysis.
**Results:** The coefficients of multiple determination of the models for men and women, respectively, were as follows: OC [$R^2$=0.09 (P=0.01), $R^2$=0.21 (P<0.01)], CTX [$R^2$=0.14 (P<0.01), $R^2$=0.12 (P<0.01)], bALP [$R^2$=0.03 (P=0.64), $R^2$=0.03 (P<0.19)], and TRAP [$R^2$=0.06 (P=0.03), $R^2$=0.07 (P<0.05)]. Age had significant effect on the OC and CTX in both genders and on TRAP in men, the most important determinant of OC and CTX in both genders was T2DM that causes severe decrease in BTM levels. Late postmenopause women experienced significant decrease on their TRAP levels vs. early postmenopause women (this

variable explained 56% of variability that accounted for by the model). Physical activity changed the CTX levels in men and women in opposite directions.
**Conclusion:** Pre-analytical sources of variability should be taken into account when interpreting BTMs in clinical practice. This may be very important in elderly, in whom several coexisting factors may influence the level of BTMs.

## P798
## BONE MINERAL DENSITY CHANGES IN PATIENTS RECEIVING LIVER TRANSPLANTATION AND INFLUENCE OF TREATMENTS TARGETING BONE REMODELING

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**Objectives:** Chronichepatic diseases and liver transplantation can be responsible for bone fragility with an increase morbidity and mortality. The objectives of this study were to determine the prevalence of osteoporosis before transplantation, its evolution along the follow-up and the influence of treatments targeting bone remodeling and BMD.
**Methods:** This prospective, monocentric cohort study included liver transplant patients between 2006-2015. Patients were assessed with a systematic rheumatologic evaluation before their transplantation (V0) including clinical and biological evaluations, radiographs of the thoracolumbar spine and bone densitometry by DXA. They were then followed in outpatient visits of rheumatology 6 months (V1) and 3 y (V2) after the transplant.
**Results:** 251 patients were included at V0, 202 attended V1 and 112 V2. Our patients were 75.3% of men, mean age 54.9±8.8 y. Prevalence of osteoporosis before transplantation at least at one site according to the results of DXA was 26%. An antiosteoporotic treatment was introduced at V0 for 34.3% of the patients, 40.6% at V1 and 43.7% at V2. Alendronate was mainly prescribed (in 55 cases or 64%). In the whole of the transplanted population, BMD lowered significantly between V0 and V1 at the femoral neck (-4.82%, $p<0.0001$) and at the total hip (-3.63%, $p<0.0001$). Between V1 and V2, it increased significantly at the total hip (+4.88%, $p<0.0001$), at the femoral neck (+2.14%, $p=0.0224$) and at the spine (+6.83%, $p<0.0001$). Bisphosphonates (BP) allowed a significant increase at the spine between V0 and V1 (2.11%, $p=0.043$) and between V1 to V2 (3.1%, $p=0.05$) and at the femoral neck between V1 and V2 (0.5%, $p<0.0001$) in comparison with untreated patients. Zoledronic acid (n=18, 22%) allowed a higher gain than the oral BP between V0 and V1 at the spine.
**Conclusion:** The liver transplanted patients presented with a greater bone fragility before and after the transplant. A significant improvement was found with BP treatment, particularly with zoledronic acid.

## P799
## OSSEOTIDE, SYNTHETIC SELECTIVE OSTEOGENIC PEPTIDE FOR THE TREATMENT OF OSTEOPOROSIS: FROM DISCOVERY OF AND EFFICACY EVALUATION

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**Objective:** Osseotide, a new synthetic peptide has been identified from the protein-protein interaction between collagen and osteopontin during bone tissue biomineralization procedure. Ossteotide has been developed to selectively target and distribute to skeletal tissue thereby enhancing osteogenesis. The objective of the study is to demonstrate the selective bone formation by the peptide Ossteotide is through the stimulation of osteoblast differentiation, which is clear contrast to current therapy targeting osteoclast.
**Methods:** The osteogenic differentiation activity and cell signal pathway by Osseotide peptide were examined through stem cell culture to delineate the mode of action. In vivo tissue distribution of Osseotide was measured by imaging of the animal after IV and SC injection. Therapeutic effect of Osseotide was examined using osteoporosis mice models. Further GLP based safety evaluation was conducted for phase I clinical study.
**Results:** Osseotide increased osteogenic differentiation as reflected by the upregulation of osteogenic markers including RUNX2. In contrast, PPARγ level, which is the marker of adipogenesis was decreased by Osseotide, indicating the peptide has selective target differentiation primarily to bone formation. The selective bone targeting by Osseotide has been further evidenced by the skeletal-selective distribution after IV and SC injection. The selective bone distribution of Osseotide is anticipated to prevent side effects by nonspecific tissue distribution. In an osteoporosis animal model, Osseotide restored bone mass with significant bone formation, which is even better than the other marketed medication, PTH. In addition, significant decrease in total fat and subcutaneous fat was observed in Osseotide treated group,

which is additional advantage of this peptide over the other medication. From the GLP toxicity study result demonstrated that there has been no specific toxicity related to Osseotide even at high dose.

**Conclusion:** These results suggest that Osseotide could be an effective therapeutic agent for osteoporosis and other skeletal bone regenerative practice due to its new mode of action such as selective targeting osteogenic differentiation.

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## P800

## EFFECTS OF PHYSICAL THERAPY ON PAIN AND FUNCTIONALITY OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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**Objective:** Ankylosing spondylitis (AS) is a form of arthritis that primarily involves the spinal column. It causes inflammation of the spinal joints (vertebrae) that could lead to severe, chronic pain and reduced functionality of the diseased. Our aim was to examine the effects of physical therapy on the pain and functionality of patients with diagnosed ankylosing spondylitis.

**Methods:** Prospective study includes 64 patients. Patients were at least 18 years old and had a diagnosis of AS according to the modified New York criteria. For functional evaluation the Bath Ankylosing Spondylitis Functional Index (BASFI), The Bath as Metrology Index (BASMI), Otto test and Shober were tested. Pain was performed using VAS scales. All patients were treated with a combined physical procedure lasting 20 therapeutic days. Control functional evaluation was performed 10 d after completed physical treatment.

**Results:** A total of 64 AS patients participated in the study, including 94% men, 48±11 years old with disease duration 15.9±8.52 y. Involvement of the axial skeleton was observed at 100% patients, uveitis at 28.12% patients and peripheral arthritis at 34.37% patients. The percentage of HLA-B27 + was 90.63. Before the use of physical therapy, total score of BASMI was 5.60±1.90. Total score of BASFI was 6.40±1.40 indicating a moderate functional impairment. The Otto test (cm) was 1.95±0.60, the Shober test (cm) was 2.20±0.80. The total score of VAS was 6.8±1.70. After practicing physical therapy total score of BASMI was 4.40±1.70. Total score of BASFI was 4.80±1.90. The Otto test was 2.35±0.50. The Shober test was 3.40 ±0.60. The total score of VAS was 3.6±2.40.

**Conclusion:** The application of physical therapy has led to statistically significant reduction in pain and improvement in the functional status of patients.

## P801

## CHILDHOOD PQCT DERIVED BONE SIZE IS RELATED TO MATERNAL, BUT NOT PATERNAL, BONE SIZE: RESULTS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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**Objectives:** We have previously described greater magnitude associations between mother-child than father-child DXA bone size within the Southampton Women's Survey (SWS) cohort. This study aimed to investigate further parent-child bone relationships using pQCT within the same cohort.

**Methods:** The SWS is a cohort of 12,583 initially non-pregnant women aged 20-34 y, from which 3158 live births were followed. In a subset of participants, pQCT assessment of tibial bone mass, including total cross-sectional area (CSA) was obtained in the child (age 6-7 y) and both parents, at 4% (metaphyseal) and 38% (mid-tibial) sites. Linear regression methods were used to assess relationships. β coefficients represent the SD change in child bone outcome per 1 SD change in parental predictor. Differences between β coefficients were tested to establish whether there were significant differences between parental effects.

**Results:** Data were available for 104 parent-offspring trios. At the 4% site, a strong positive association was observed between mother-child total CSA (β (95%CI)=0.41 (0.12-0.61), p<0.0001); this remained robust to adjustment for paternal total CSA (β (95%CI)=0.42 (0.13-0.62), p<0.0001). In contrast, no relationship was observed between father-child 4% total CSA (β (95%CI)=0.01 (-0.10-0.12), p=0.80), and adjustment for maternal total CSA hardly altered this (β (95%CI)=0.02 (-0.13-0.08), p=0.69). Mother-child associations were generally much weaker at the 38% compared with 4% site.

**Conclusions:** Mother-child bone size associations at 4% tibial (metaphyseal) site were of greater magnitude than those for father and child. These findings support an intrapartum mechanism linking maternal to offspring skeletal size.

## P802

## THE STRUCTURAL CHANGES OF BONE TISSUE IN WOMEN WITH TYPE 1 DIABETES MELLITUS

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**Objective:** To assess, whether hip geometric parameters are interrelated with vertebral fractures (VFx) in type 1 diabetes mellitus (T1D) females.
**Methods:** We examined 73 type 1 diabetic females, age: 32 (25-38) y, duration of DM: 11(7-20) y, HbA1c: 8.6 (7.1-9.8)%, BMI: 23.1 (21.9-25.7) kg/m$^2$). The control group consisted of 58 health age- and BMI-matched females. BMD was measured with DXA, geometric parameters were determined using Advanced Hip Analysis program. VFx were analyzed with DXA.
**Results:** T1D females had lower BMD at femoral neck (T1D: Z-score -0.6((-1.1)-0.2) vs. controls: Z-score 0.1 ((-0.6)-0.8), p=0.007, respectively), higher frequency of fragility Fx (T1D: n=10 vs. controls: n=2, p=0.042, respectively), VFx (T1D: n=12 vs. controls: n=1, p<0.01, respectively) compared with controls. T1D females had shorter hip axis length (HAL) than in control group (T1D: 105(100-110) vs. controls: 107(103-110) mm, p=0.035, respectively).T1D females with VFx had lower CSMI (cross-sectional moment of inertia) (T1D with VFx: 7836 (6533-10377) vs. T1D without VFx 10140(8770-12522) mm$^4$, p=0.035, respectively) and CSA (cross-sectional area) (T1D with VFx: 122(104-137) vs. T1D without VFx 144(129-165) mm$^2$, p=0.006, respectively) compared with T1D females without VFx. The threshold value of CSA was determined to be 132 mm$^2$, (AUC=0.754±0.093, p=0.022; Se 75%, Sp 69%). Using the threshold value with CSA ≤132 mm$^2$ it is possible to identify individuals with a high probability of VFx (OR=2,9 95%CI 1,3-6,4). In the logit regression analysis VFx were associated with BMD spine, CSA and daily insulin dose ($\chi^2$=42,55, df=3, p<0,001). The presence of VFx, shorter HAL, lower CSMI and CSA may indicate a decreased bone quality indirectly characterizing the qualitative parameters of the bone.
**Conclusions:** Structural changes of bone tissue might potentially predispose to higher fracture risk in T1D females.

## P803

## MICROELEMENTAL COMPOSITION OF HUMERUS IN RATS AFTER IMPLANTATION OF BIOGENIC HYDROXYAPATITE INTO TIBIA AND PER OS APPLICATION OF CALCIUM DRUGS

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**Objectives:** To analyze microelemental composition of humerus in rats after implantation of biogenic hydroxyapatite in tibia and per os application of calcium drug "Biomin MK" in dosage of 90 mg per kg of body weight.
**Methods:** The study involved 210 male rats with initial body weight of 135-145 g. The 1st group comprised intact animals, the 2nd group comprised animals with 2.2 mm defect in the tibia between proximal metaphysis and diaphysis, and the 3rd group comprised the animals with the same 2.2 mm defects filled with biogenic hydroxyapatite implants OK-015. In the 4th group, the animals with empty defects received second generation calcium drug "Biomin MK" in dosage of 90 mg per kg of body weight, and in the 5th group, the animals with OK-015 fillings received "Biomin MK" in the same dosage. The animals were withdrawn from the experiment by the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th days. Upon expiration of observation terms right humeri were prepared for chemical analysis.
**Results:** A plain defect in tibia resulted in destabilization of the microelemental composition of humerus; the alterations started manifesting from the 7st day of observation and persisted throughout the whole experiment. In the 3rd group, alterations in comparison with the 2nd group recovered faster from the 60th day. Application of calcium drug "Biomin MK" to the animals with both empty and OK-filled defects substantially reduces fracture effects on microelemental composition of humerus. In the 4th group copper share increased as compared to the 3rd group values from the 30th to the 180th days by 4.64%, 9.21%, 7.74% and 5.25% respectively and manganese share by the 30th to the 90th days – by 8.78%, 5.57% and 7.05% (p<0.05 in all cases). In the 5th group, manganese share increased as compared to the 3rd group values from the 15th to 30th days by 8.55% and 6.45%.
**Conclusions:** Administration of calcium drug "Biomin MK" under conditions of tibia fracture significantly reduces adverse fracture effects on microelemental composition of humerus.

## P804

## PREVALENCE OF VERTEBRAL FRACTURES USING THE WHOLE SPINE X-RAY PHOTOGRAPHS: THE THIRD SURVEY OF THE ROAD STUDY

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**Objective:** This study aimed to determine the prevalence and site of morphometric VF classified by sex and age in Japan, using whole spine X-ray photographs, and to analyze associated factors of the presence of VF.
**Method:** Using the whole spine X-ray photographs in the population-based cohort study, entitled the Research on

Osteoarthritis/Osteoporosis Against Disability (ROAD) study 3rd survey performed in 2012-2013, we estimated sex- and age- specific prevalence of VF in Japanese people. Genant's semiquantitative method (SQ) was used to define VF; SQ ≥1 as VF, SQ=1 as mild VF, SQ ≥2 as severe VF.

**Results:** Participants were consisted of 506 men (mean age 66.3 years old, standard deviation (SD):13.0) and 1,038 women (mean age 65.3 years old, SD:12.6). The prevalence of VF at age under 40, 40s, 50s, 60s, 70s, and 80 years or older were 17.4%, 7.9%, 18.5%, 25.6%, 26.3%, and 41.5%, respectively, in men, and 2.9%, 2.4%, 7,3%, 10.3%, 27.1%, and 53.0%, respectively, in women. Low back pain and decreased walking ability were independently associated with severe VF. Decreased walking ability was associated with multiple VFs in women.

**Conclusion:** The characteristics of mild and severe VF were different, such as mild VF had male dominancy, whereas severe VF had female dominancy; not mild VF but severe VF was significantly associated with low back pain and decreased walking ability. Further, we revealed that multiple VFs were associated with decreased walking ability in women.

## P805
## A CASE REPORT OF A PATIENT WITH SEVERE MUSCULOSKELETAL MANIFESTATIONS OF FAMILIAL AMYLOID POLYNEUROPATHY AND OSTEOARTHRITIS

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**Objective:** Familial amyloid polyneuropathy (FAP) is a rare disease, inherited in an autosomal dominant pattern, caused by abnormal deposits of amyloids around peripheral nerves and other tissues. Osteoarthritis (OA) is the most common chronic joint condition which cause musculoskeletal symptoms. We report a case of a patient experiencing persistent severe musculoskeletal manifestations due to FAP in combination with OA.

**Methods:** The clinical case of a patient with osteoarthritis, diagnosed with FAP demonstrates the management of difficult to diagnose diseases due to common symptoms and the results from the on time treatment.

**Results:** A case report of a 55-year-old patient who has been followed for 3 y after diagnosed with OA of small joints of the hands, hips, knees, cervical and lumbar section of the spine due to complaints of arthralgia, myalgia and tingling of upper and lower limbs. Routine blood test (in reference range), anti-CCP (negative), RF (negative), X-rays of the affected joints and electromyography (EMG) were performed. The diagnose carpal tunnel syndrome of both hands, was accepted due to EMG changes of the median nerve. After consultation with orthopedist, the patient was operated and nerve decompression was performed bilaterally. For a short period of time the patient has small relieve of the musculoskeletal pain and the tingling of the hands. The patient had a 1-year treatment with various NSAIDS and vitamins B6, B12, with insufficient effect and worsening of the symptoms: severe pain in the joints and numbness of the upper and lower limbs, slipping off different objects from the hands, forcing the patient to leave her current job. In addition, episodes of diarrhea, shortness of breath, caught without expectoration, tachycardia appeared every other day. After a consultation with a cardiologist and neurologist she was diagnosed with cardiomyopathy and polyneuropathy. Due to the family history of a mother with similar complaints, the patient was sent for genetic test for FAB. Mutation in exon 3 of TTR gene – c.325G>C; p.Glu89Gln (p.Glu109GlN) was proven and therapy with Tafamidis has been initiated.

**Conclusions:** Successful treatment of the rare disease improves the quality of life of the patient and allows to avoid unnecessary treatments and manipulations.

## P806
## ASSOCIATION OF GENE VARIANTS OF MEVALONATE AND WNT PATHWAYS WITH RESPONSE TO BISPHOSPHONATE TREATMENT IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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**Objective:** Bisphosphonates (BPs) are still the most commonly prescribed medications in patients with postmenopausal osteoporosis (PMO). However, in some patients this therapy is not effective due to individual resistance, cause different side effects and complications. The evaluation of a poor BMD response to BPs treatment takes at least one year. The identification of genetic factors, responsible for resistance to BPs therapy, may enable drug therapy optimization and more effective treatment. The aim of this study was to analyze the influence of bone and drug metabolism gene polymorphisms on the response to BPs treatment of PMO.

**Methods:** A total of 208 postmenopausal women with BPs therapy, of them 119 responders (with an increase of BMD after treatment) and 89 nonresponders (decrease in BMD that exceeded the LSC) were recruited to the retrospective cohort study. BMD was measured by DXA (Prodigy, GE Lunar, USA). *SOST* (sclerostin, rs1234612), *PTH* (rs7125774), *FGF2* (fibroblast growth factor 2, rs6854081), *FDPS* (farnesyl diphosphate synthase, rs2297480), *GGPS1* (geranylgeranyl diphosphate synthase, rs10925503), and

*LRP5* (low density lipoprotein receptor-related protein 5, rs3736228) markers were determined using the quantitative PCR.

**Results:** We found that *SOST* T/T, *PTH* T/T, *FDPS* G/G, *GGPS1* T/T genotypes were significantly over-represented in nonresponders (P<0.05). Further multiple analysis of their association with response to BPs therapy revealed allelic combination of increased (T-T-G-C) and decreased (C-C-T-C) risk of BPs resistance (Fig. 1). None significant association was revealed for *FGF2* and *LRP5* genes.

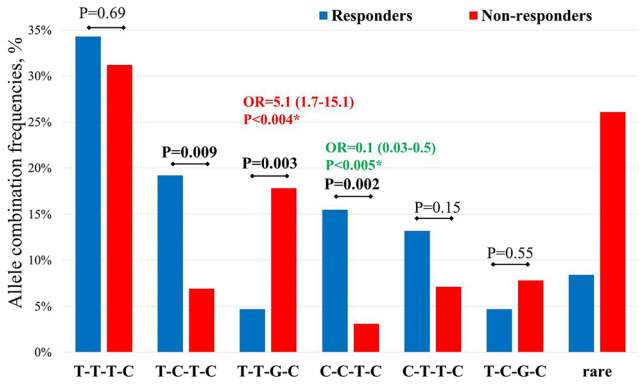


Fig 1. The frequencies distribution of estimated SOST, PTH, FDPS, and GGPS1 allelic combinations

**Conclusion:** Our findings highlight the importance of identified single gene variants and their allelic combinations for pharmacogenetics of BPs therapy of osteoporosis, complex screening of these genetic markers can be used as a new strategy for personalized antiresorptive therapy.

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## P807

## USE OF COMPOSITE INDICES OF FEMORAL NECK STRENGTH IN ORDER TO PREDICT LOW ENERGY FRACTURES IN WOMEN WITH TYPE 2 DIABETES MELLITUS

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**Objective:** Bone fragility depends on its mineral density (BMD), material composition and structural design. The aim of this study was to compare composite indices of femoral neck strength in a group in women with type 2 diabetes mellitus (T2D) with and without low energy fractures (Fx).

**Methods:** We examined 94 type 2 diabetic females, age: 57.5(53.8-60.9) y, duration of DM: 56.2(51.4-59.2) y, duration of menopause 7(3-11) y, HbA1c: 8.6(6.8-10.4)%, BMI: 32.8(28.4-36) kg/m$^2$). BMD at femoral neck (FN) and at lumbar spine (LS) was measured with DXA. VFx were analyzed with DXA. Geometric parameters were determined using Advanced Hip Analysis program. CSI- compression strength index, ISI-impact strength index were calculated using the formula of Karlamangla.

**Results:** To assess the relationship between the presence of Fx (including vertebral fractures) and structural changes in the geometric parameters of the hip, the examined patients with type 2 diabetes were divided into 2 subgroups: patients with Fx (n=23) and without Fx (n=71). Both analyzed subgroups were comparable in age (60 (55–66) vs. 60 (55–63) y; p=0.460), duration of menopause (9 (4–17) vs. 8 (4–12) y; p=0.418), height (159 (153–166) vs. 160 (154–163) cm; p=0.715) and weight (90 (69–95) vs. 81 (71– 93) kg; p=0.602). BMD (T-score) at LS (–1.3 (–2.8–0.1) vs. 0.8 (–1.7–0.2); p=0.105) and at FN (–1.1 (–1.8– –0.1) vs. –0.4 (–1.2–0.4); p=0.047) were comparable in both subgroups. The FN diameter (35 (33–36) vs. 33 (32–35) mm, p=0.040) was significantly higher, and the CSI (3.5 (3.1–4.1) vs. 3.9 (3.4–4.4) g/kg*m, p=0.043) and ISI (0.22 (0.2–0.27) vs. 0.26 (0.24–0.29) g/kg*m, p=0.020) were lower in women with T2D with Fx compared with the subgroup without Fx.

**Conclusions:** Composite indices of FN strength can be used in order to predict the probability of low energy fractures in T2D women.

## P808

## INFLUENCE OF CORTICOSTEROID THERAPY ON BONE METABOLISM AND MINERALIZATION IN CHILDREN WITH INFLAMMATORY BOWEL DISEASE

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**Objectives:** Disturbances of bone metabolism in inflammatory bowel disease (IBD) can include osteoporosis, increased risk of low-energy fractures and linear growth failure and have multifactorial nature: systemic inflammation, malabsorption, vitamin D deficiency, corticosteroid (CS) therapy. CS is a first line treatment for severe and moderate IBD, but it can deteriorate bone mineralization and metabolism. The aim of our study was to evaluate influence of CS therapy on bone metabolism and BMD.

**Methods:** 113 children with IBD (64M and 49F) aged 2-17 y (median age 14.0) were included in the resent study. Lumbar spine BMD (DXA), serum osteocalcin (OC), C-terminal telopeptides (CTT), 25-OHD3 and cumulative corticosteroid dosage were measured. We used Mann-Whitney U test, Wilcoxon test, chi-square test, ROC-analysis.

**Results:** The median cumulative dose of CS in our study was 48.8 mg/kg. The dose of CS associated with increased risk of low BMD was 100 mg/kg (OR: 2.3-20.4, p=0.0003). Main characteristics of bone metabolism in children who received dose of CS <100 mg/kg did not differ from bone metabolism parameters of children with no use of CS. Data about bone metabolism are in the Table 1.

**Conclusions:** According to our data cumulative dose of CS <100 mg/kg seems to be safe for bone health in children.

Table 1. Influence of CS dose on bone metabolism and bone density in children with IBD

| Parameter | CS<100mg/kg, (n=73) | CS >100mg/kg, (n=26) | No use of CS, (n=29) | Control group, (n=40) | $p_0$ | $p_1$ | $p_2$ |
|---|---|---|---|---|---|---|---|
| BMD, Z-score, SD | -1.1 (-1.9; -0.4) | -2.2 (-3.1; -1.4) | -1.1 (-1.8; -0.4) | 0.3 (-0.0; 1.5) | 0.00001 | 0.003 | 0.0007 |
| 25(OH)D3,ng/мл | 17.7 (14.0; 24.0) | 14.3 (10.0; 17.6) | 19.0 (14.8; 23.7) | - | - | 0.14 | 0.06 |
| CTT, upper normal level | 1.0 (0.7; 1.3) | 0.7 (0.6; 1.1) | 1.0 (0.9; 1.6) | 0.6 (0.5; 0.9) | 0.0001 | 0.06 | 0.003 |
| $Ca^{2+}$, mmol/l | 1.12 (1.05; 1.2) | 1.09 (1.06; 1.15) | 1.21 (1.2;1.34) | 1.06 (1.0; 1.1) | 0.01 | 0.11 | 0.66 |

$p_0$ -all 4 groups, $p_1$-3 groups, $p_2$- CS<100mg/kg vs. CS>100mg/kg

## P809

## EFFECTS OF THERMOTHERAPY TREATMENT ON PATIENTS WITH HAND OSTEOARTHRITIS: A RANDOMIZED CLINICAL TRIAL

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**Objective:** Osteoarthritis of the hand (OA) is a common condition that affects hand strength and function and causes disability in activities of daily living. Applying heat is known to be a good therapeutic choice for many chronic conditions and local heat applications can be used safely in hand OA. The aim of this study was to evaluate both the short-term and the long-term effectiveness of thermotherapy in patients with primary hand osteoarthritis.

**Methods:** We conducted a prospective randomized, single blind controlled trial. 61 outpatients with primary bilateral hand OA (12 males), aged 57.47±1.23, were included in the study and randomized to one of two groups. One group (n = 31) was treated with 12 daily local paraffin packs (50°C, 20 min) and galvanic thermal baths (37°C, 30 min) added to usual treatment. The control group (n = 30) continued regular outpatient care routine (exercise, NSAIDs and/or analgesics). Each patient was examined at baseline, after 12 d, and after 3, 6 and 12 months. Primary outcome measures were global spontaneous hand pain on a visual analogue scale and the functional index for hand osteoarthritis (FIHOA) score; secondary outcomes were health assessment questionnaire (HAQ), duration of morning stiffness and medical outcomes study 36-item short form (SF-36).

**Results:** The results of the study demonstrated that the efficacy of thermotherapy was significant in all the assessed parameters, both at the end of therapy and after 3 months; the values of FIHOA and HAQ continued to be significantly better after 6 months in comparison with baseline. There were no significant modifications of the parameters throughout the follow-up in the control group. Differences between the two groups were significant for all parameters at the 12th day and at 3 months follow-up; regarding FIHOA and HAQ, the difference between the two groups persisted and was significant at 6month follow-up. Tolerability of thermotherapy proved to be very good.

**Conclusion:** Our results confirm that the beneficial effects of thermotherapy in patients with hand OA last over time.

## P810

## POSTPARTUM OSTEOPOROSIS ASSOCIATED WITH VERTEBRAL FRACTURES

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Osteoporosis in postpartum period is a very rare, but severe condition. Its etiology and pathogenesis are not well studied, but it is assumed that it could be due to genetic, hormonal or associated with calcium-phosphorus metabolism disorders.

**Case report:** We present a case of postpartum osteoporosis associated with multiple vertebral fractures. Two months after the delivery of twins a 35-year-old primipara patient experienced severe low back pain following minor physical activity. The subsequently performed MRI scan showed L1 compression fracture and multiple fractures on the upper vertebral end plates from Th8 to L5. The patient has undergone a couple of stimulations for in-vitro fertilization and during the last year she took intermittently 4 mg methylprednisolone for approximately 4 months. A DXA scan was performed on GE Lunar DPX, which revealed Z-score of – 4.2, height of 159 cm, and weight– 45 kg. The patient does not have family history of osteoporosis or any diseases that

alter BMD. No pathological finding was observed from the lab results – 25(OH) vitamin D – 33 ng/ml, low rate of calciuria. The initialised treatment was calcium carbonate 600 mg, cholecalciferol 1500 IU and teriparatide 20 μg subcutaneous injection daily. Afterwards, L1 vertebroplasty was done. The ongoing therapy resulted in very good clinical outcome. 6 months after the beginning of the treatment patient's Z-score was – 2.4. The patient reported that she felt her spine more stable. Current lab results in reference range.

**Conclusion:** Postpartum osteoporosis is a rare condition, that has substantial health consequences. Currently no guideline regarding the treatment is established. At this juncture the therapy includes calcium and vitamin D supplementation and attempts with variable bisphosphonates regimens. Besides our data, many case reports in the literature support the concept of teriparatide-induced stimulation of trabecular bone growth as a promising opportunity to favourably influence this kind of patients.

## P811

## GENETIC POLYMORPHISM OF RANK/RANKL/OPG MAY AFFECT INDIVIDUAL RESPONSE TO DENOSUMAB TREATMENT IN POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Denosumab is a human recombinant monoclonal antibody to RANKL for osteoporosis treatment. RANKL is the main protein of bone resorption, which binds to RANK on osteoclasts, activating their differentiation. The RANKL mechanism is largely regulated by genetic factors, and the polymorphism of genes, involved in this pathway, may substantially influence individual resistance to denosumab. The aim of this study was to analyze the influence of *RANK/RANKL/OPG* pathway gene polymorphisms on the response to denosumab treatment of postmenopausal osteoporosis.

**Methods:** A total of 83 postmenopausal women (age median 66.0 y) with at least 12 months of denosumab therapy, of them 67 responders (with an increase of BMD after treatment) and 16 nonresponders (decrease in BMD that exceeded the LSC) were recruited to the study. BMD was measured by DXA (Prodigy, GE Lunar, USA). The *OPG* (osteoprotegerin, rs3134069, rs3102734), *RANKL* (rs9594738, rs9594759) and *WNT4* (rs7521902) markers were determined using the PCR analysis.

**Results:** We revealed that *OPG* rs3134069 and rs3102734, *RANKL* rs9594738 are statistically significantly associated with the resistance to denosumab treatment (OR=4.6, 95%CI 1.2-16.9 and OR=12.3, 95%CI 1.3-111.9, respectively, P<0.02). We also revealed a strong direct linkage disequilibrium ($P<2.0\times10^{-16}$), suggesting that risk alleles of *OPG* and *RANKL* markers are preferably inherited jointly. The multiple analysis of haplotypes distribution frequencies, constructed from *OPG* rs3134069, rs3102734, *RANKL* rs9594738, rs9594759, *WNT4* rs7521902 markers, revealed a haplotype C-A-T-T-C, constructed from unfavorable alleles, which dramatically increases in patients the risk of resistance to denosumab treatment (OR=16.6, 95%CI 1.4-185.9, P=0.029).

**Conclusion:** Our finding revealed four informative genetic markers of resistance to denosumab therapy and suggest their implementation as a strategy for personalized antiresorptive therapy of bone metabolism disorders. We suggest repetition of this work in other studies.

This work was funded by a grant from the Research Council of Lithuania and from the Belarusian Republican Foundation for Fundamental Research.

## P812

## A MULTICENTER CLINICAL TRIAL TO EVALUATE THE PERFORMANCE OF THE RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) FOR THE NONIONIZING DIAGNOSIS OF OSTEOPOROSIS AT FEMORAL NECK AND LUMBAR VERTEBRAE

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**Objective:** To evaluate the accuracy of REMS [1] in the diagnosis of osteoporosis with respect to DXA on spine and femur in 7 different clinical contexts.

**Methods:** Within an observational multicenter study, both REMS scans and DXA examinations were performed on 1672 subjects (aged 50-75 y) on lumbar vertebrae and 1759 (of the same age) on proximal femur, according to their medical prescription. An accurate

quality control on all the DXA and REMS measurements was performed by two independent experienced operators in order to verify their compliance with the corresponding guidelines and recommendations. All the inaccurate cases were excluded or reanalyzed where possible. Then, DXA outcome was assumed as the ground truth to assess REMS accuracy considering the following parameters: the capability to discriminate osteoporotic from nonosteoporotic subjects together with the estimation of Cohen's kappa ($k$), the mean BMD difference and the SEE (standard error of the estimate) parameter.

**Results:** REMS showed both sensitivity (92.7% and 92.1%) and specificity (93.4% and 92.4%) above 90% for spinal and femoral site, respectively. The high REMS diagnostic accuracy was also confirmed by the SEE value equal to 5.2% for spine and to 5.8% for femur and by the very low average difference (bias±2 SD) between BMD measured by the two techniques (-0.004±0.087 g/cm$^2$ for spine and -0.006±0.075 g/cm$^2$ for femur). The strong diagnostic concordance between REMS and DXA was confirmed by Cohen's Kappa value ($k$=equal to 0.841 for spine and $k$=0.807 for femur; $p$<0.001 for both).

**Conclusions:** The outcome of this multicenter clinical trial confirmed that REMS is an accurate nonionizing approach to detect osteoporosis disease in lumbar spine and femoral neck and could be apply for bone fracture prevention.

**Reference:**

[1] Di Paola et al, Osteoporos Int, 2018

## P813

## ASSESSMENT OF BONE MINERAL DENSITY IN PATIENTS WITH ALKAPTONURIA ON X-RAY DENSITOMETRY (DXA)

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**Objective:** To assess the BMD of the skeleton using the Hologic Discovery A DXA among adult patients with alkaptonuria (A).

**Methods:** A - a rare autosomal recessive disease (1 case per 250,000), in which severe damage of the spine/large joints and significant decrease in BMD occurs. Given the single publications on this topic, this study was conducted. We included 25 adult patients - 14 men (M) and 11 woman (W) with a reliable diagnosis of A, aged 33-76 y (61.04±8.9).

**Results:** The BMD of the proximal femur was evaluated in 18 patients (in 7 cases assessment was not possible due to the bilateral total hip arthroplasty). Normal BMD values (N) were detected in 2 patients (2 W) - 11.1%, osteopenia (Op) in 9 (6 M, 3 W) - 50% and osteoporosis (OP) in 7 (4 M, 3 W) - 38.9%. BMD of the forearm (Total program, n=21): N were detected in 1 patient (1 W) - 4.8%, Op in 5 (3 M, 2 W) - 23.8%, OP in 15 (9 M, 6 W) - 71.4% BMD of the forearm (Program 1/3, n=21): 1 patient showed N (1 W) - 4.8%, 11 Op (7 M, 4 W) - 52.4%, and 9 OP (5 M, 4 W) - 42.9%. In the lumbar spine (n=25) N were established in 17 patients (12 M, 5 W) - 68%, Op in 6 (2 M, 4 W) - 24%, OP in 2 (2 W) - 8%. BMD was also evaluated separately for M and W. In M, all indicators of BMD (except for the femur) were statistically significantly higher than in W - p<0.05 (Table):

| | Spine (g/cm$^2$) | Neck (g/cm$^2$) | Dist. For. (g /cm$^2$) | Forearm (g / cm2) |
|---|---|---|---|---|
| Men | 1.166 [1.053; 1.287] N=14 | 0.665 [0.526; 0.713] N=10 | 0.696 [0.640; 0.717] N=12 | 0,524 [0,472; 0,550] N=12 |
| Women | 0.878 [0.810; 1.024] N=11 | 0.646 [0.574; 0.793] N=8 | 0.549 [0.435; 0.584] N=9 | 0,418 [0,368; 0,459] N=9 |

**Conclusion:** In adults with A, reduces the mineral bone density with the development of osteopenia and osteoporosis equally in women and men, which often requires antiosteoporotic therapy. In the lumbar spine, these changes due to the development of calcification of intervertebral discs and ligamentous apparatus are rarely detected, in contrast to the proximal femur and forearm.

## P814

## OSTEOPOROSIS AMONG PATIENTS WITH SPINAL CORD INJURY

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**Objective:** There is still not enough awareness among clinicians of the existence of osteoporosis in patients with spinal cord injury (SCI). This secondary osteoporosis is induced by the spinal lesion itself. Our aim was to establish the existence of consequent osteoporosis among patients with SCI.

**Methods:** This observational study included 73 patients with SCI, treated as in or outpatients, at the Clinic for physical medicine and rehabilitation of Clinical Centre University of Sarajevo. Used diagnostic tool for osteoporosis was finding of

DXA densitometry of proximal femur, performed on Hologic QDR 4000. Statistical processing was done according to SPSS 16.0 program.

**Results:** The studied group was made up of 75% male and of 25% female patients. The average age was 42.7 y, and average period from the onset of SCI was 13 y. Injury at cervical level had 9.6% of patients, at the thoracic level 65.8% and at the lumbar 24.6% of patients. According to T-score, in 80% of patients osteoporosis was found, and according to Z-score in 73% of patients. The average value of T-score was -3.3. SD, and of Z-score – 2.9 SD.

**Conclusion:** This study found high prevalence of osteoporosis among patients with SCI (80%). Clinicians should start with therapy for osteoporosis in early phase of SCI, in order to prevent its development as well as development of complications connected to disturbed bone metabolism. Any further complication will worsen already compromised quality of life in this group of patients.

## P815

## DO BODY MASS INDEX AND KNEE OSTEOARTHRITIS STATUS AFFECT MENISCAL EXTRUSION AND SIZE?

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**Objective:** To test the hypotheses that in women, BMI is significantly associated with meniscus extrusion (and size) in knees with osteoarthritis (OA) while BMI is not significantly associated with meniscus extrusion and size in knees without OA.

**Methods:** Of 4796 participants from Osteoarthritis Initiative (OAI), 38 normal and 38 strongly obese (BMI: 35-40 kg/m$^2$) women were selected. Each group consisted of 19 women with (frequent pain and radiographic OA (KLG≥2)) and 19 women without OA. Between the normal and obese groups, participants were matched 1:1 by age, sex and height. Medial and lateral menisci were manually segmented on MRIs with blinding to BMI and OA status. Quantitative measures of meniscus position and size were calculated using custom software, which included 1) maximum extrusion distance, 2) area of the meniscus not covering (i.e. extruding) the tibial plateau, 3) tibial coverage (by the meniscus) (position), 4) width and 5) height (size). Statistical analysis was done using T-tests for pairwise comparisons between BMI and OA groups.

**Results:** In women with OA, obese participants had a significantly lower tibial plateau coverage (normal, mean (SD): 33 (11) mm$^2$; obese: 21 (13) mm$^2$, $p<0.01$) and smaller width (normal: 6.8 (1.3) mm; obese: 5.6 (1.6) mm, $p<0.01$) and height (normal: 2.1 (0.2) mm; obese: 2.0 (0.3) mm, $p<0.05$) of medial meniscus (MM) compared to normal participants, while other position measures were not significantly different. In women without OA, MM position and size did not differ significantly between the normal and obese groups. None of the lateral meniscus parameters differed significantly between the BMI groups, neither in those with, nor in those without knee OA.

**Conclusions:** This confirms the hypotheses that BMI is significantly related to MM position and size in OA knees, but not in non-OA knees. Therefore, we speculate that in a healthy joint, there is sufficient "structural and functional reserve of the meniscus" to compensate greater loading by the greater BMI, without the meniscus decompensating mechanically and structurally. However, once the joint is affected by OA, this reserve is also affected, and the higher load would contribute to a negative impact on meniscus health and function.

## P816

## FRACTURE RISK ASSESSMENT TOOL (FRAX) VALIDATION AMONG THE ELDERLY IN LONG-TERM AND DAY-CARE INSTITUTIONS

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**Objectives:** To assess the validity of the FRAX score at institutions (without BMD) in the prediction of the FRAX with BMD, diagnosis of established (severe) osteoporosis, and the fulfillment of guideline-recommended AOMs therapy among the elderly in long-term and day-care institutions.

**Methods:** Among the cohort study of Yunlin Long-term Care FRAX project. Residents identified as FRAX (without-BMD) moderate or high risk in the institutions were recommended to receive DXA test and X-ray to ascertain the fracture risk and evaluate the needs for antiosteoporosis medication (AOMs) therapy. Patients with concomitant BMD≤-2.5SD and hip/vertebral fracture were defined as "established (severe) osteoporosis". Patients with BMD≤-2.5 SD or hip/vertebral fracture are indicated for guideline-recommended AOMs therapy. Finally, patients with established (severe) osteoporosis or osteopenia with more than 2 osteoporotic fractures were qualified to initiate AOMs under National Health Insurance (NHI) in Taiwan.

**Results:** Among 548 residents defined as moderate or high FRAX risk by using FRAX (without BMD) score, 109 (19.9%) residents accepted further fracture risk evaluation. Among them, 94 (87.2%) patients were diagnosed as osteoporosis, and 55 (50%) patients actually had established

(severe) osteoporosis. Eventually, 76 (69.7%) patients fulfilled the reimbursement criteria of NHI in Taiwan for AOMs therapy. Detail information was provided in Table 1.

**Conclusions:** Among residents in the long-term and day-care institutions with moderate or high FRAX, approximately 90% of patients were ascertained osteoporosis and 70% of patients could receive AOMs therapy under the NHI system. The FRAX (without BMD) score was a valid predictor for the assessment of osteoporosis diagnosis and treatment in these population in Taiwan.

**Acknowledgments:** Syun-Ping, Fu, Wen-Yan Hsu

Table 1. Results of the elderly with FRAX-history score and return for further assessment for osteoporosis therapy

| | Overall | Long-term care institution | | | | Day Care Facility | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Female | | Male | | Female | | Male | |
| FRAX-history | - | High | Moderate | High | Moderate | High | Moderate | High | Moderate |
| Case number | 109 | 31 | 4 | 18 | 4 | 17 | 9 | 10 | 16 |
| FRAX-BMD-High | 101 | 30 | 4 | 14 | 7 | 17 | 7 | 8 | 14 |
| BMD T-score≤-2.5 | 108 | 26 | 1 | 8 | 1 | 9 | 3 | 3 | 2 |
| Osteoporotic fracture | 93 | 31 | 3 | 17 | 4 | 15 | 6 | 6 | 11 |
| Osteopenia | 10 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 3 |
| Osteoporosis | 95 | 31 | 3 | 17 | 4 | 15 | 7 | 7 | 11 |
| Established (severe) Osteoporosis | 55 | 28 | 1 | 9 | 1 | 10 | 2 | 2 | 2 |
| Osteoporosis & severe osteoporosis | 95 | 31 | 3 | 17 | 4 | 15 | 7 | 8 | 10 |
| Treatment recommended | 94 | 31 (100%) | 3 (75%) | 17 (94%) | 4 (100%) | 15 (88%) | 7 (78%) | 8 (80%) | 10 (63%) |
| NHIRD+ | **76** | **29 (94%)** | 3 (75%) | 13 (72%) | 3 (75%) | **14 (82%)** | 5 (56%) | 6 (60%) | 3 (19%) |

Osteoporosis : Either hip or spine BMD T-score ≤ -2.5 or osteoporotic fracture (Hip, vertebral, proximal humeral , and distal radius)
Established (Severe) osteoporosis: BMD T-score ≤ -2.5 concomitant with osteoporotic fracture (hip or spine)
Treatment recommended: Patients with : BMD T-score ≤ -2.5 or osteoporotic fracture (hip or spine)
NHIRD+: Patients with BMD T-score ≤ -2.5 + one hip or vertebral fracture or -2.5< BMD T-score ≤-1 + two hip or vertebral fracture

## P817

## OSTEOARTHRITIS IN YOUNG PEOPLE BY USING ULTRASOUND

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**Objective:** Osteoarthritis is the most common musculoskeletal affection characterized initially by pain and then followed by impairment. Osteoarthritis was considered to be an elderly disease, but new mechanism of action has been discovered and new cases of osteoarthritis affecting young people were described. The study planned to outline a pattern of early osteoarthritis in young people and such to start a preemptive rehabilitation program.

**Method:** This is a prospective, noninterventional and transversal study. For 6 months, 97 subjects were enrolled in the study and they were scanned by ultrasound at the level of the knee and ankle joint. The following lesions were scan: "step-up" lesions, "step-down" lesions, bursitis, the alteration of echogenity of hyaline cartilage, the width of hyaline cartilage and Baker's Cyst. A linear transducer with frequency between 10-15 MHz was used to see the modifications in two sections: transversal and longitudinal. The data were analyzed using ReCal1.0 and GraphPadPrism7.0.

**Results:** The mean age of the patients included in the study was 55.24±67.1 years old with a average time of clinical symptoms of 24.18±2.03 y. "Step-up" lesions (osteophytes) of the ankle were associated with similar lesions at the level of the knee (same limb) and early modification of echogenity of the tibial hyaline cartilage (p: 0.010, p: 0.033). Medial compartment degenerative changes were correlated with contralateral knee involvement (p:0.001). Suprapatellar bursitis was associated with lateral compartment presence of step-up lesions (p: 0.026). "Step-up" knee lesions were correlated with early changes of hyaline cartilage of the tibio-talar joint. The presence of Baker's cyst in one published study was linked to a worse outcome of OA. Thankfully we did not find a correlation with other OA changes in our study (p>0.05).

**Conclusions:** Osteoarthritis can affect young people. It is advisable to monitor by ultrasound the knee and the ankle if one of those are presenting echography alteration. The physical rehabilitation program should focus on both joints.

## P818

## CHANGE OF NATIONAL HEALTH INSURANCE REIMBURSEMENT CRITERIA AND SUBSEQUENT OSTEOPOROTIC FRACTURE OF PATIENTS WITH VERTEBRAL FRACTURE

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**Objectives:** To evaluate the impact of the reimbursement contraction of antiosteoporosis medications (AOMs) use since 2011 on the clinical outcome among patients encountered vertebral fracture.

**Methods:** By using the National Health Insurance Research Database, patient with outpatient visit or hospitalization for vertebral fractures from 2009-2011 were defined as our study population. Patients younger than 50 years old, with any diagnosis associated with any fracture or prescribed with AOMs within one year prior to cohort entry date were excluded. The proportion of patients receiving AOMs within 1 y post index fracture was evaluated. The incidence of subsequent osteoporotic fracture related visits within 2 y post index fracture was estimated. Subsequent osteoporotic fractures included any visit with any diagnosis for hip, humeral, and wrist fracture; in addition, hospitalization with a primary diagnosis code for spine fracture concomitant with spine imaging examinations, and occur more than 8 weeks post the index spine fracture. We adopt the interrupted time series study design to explore the association. The evaluation interval was defined in a monthly manner from 2009 to 2011. The segmented regression model was used to evaluate the impacts of the intervention on the prescription rate of AOMs and incidence of subsequent osteoporotic fracture.

**Results:** The AOMs prescription rate was 34.5% for patients encounter spine fracture on January 2009. After the introduction of the reimbursement change, the prescription rate drop to 25.4% on 2011 (Level change: -4.98%, 95%CI-7.16 - -2.79, p=0.0001). While the contraction policy of AOMs use was not associated with an increase of the incident of encountering subsequent fracture (Level change: 1.16%, 95%CI-0.14-2.46, p=0.07).

**Conclusions:** Under the nationwide reimbursement system, the changes of policy significantly influence the prescription pattern of AOMs. While some buffer system may compensate for the impact on clinical outcomes.

## P819

## FREQUENCY AND CLINICAL CHARACTERISTICS OF OSTEOSARCOPENIA IN PATIENTS WITH ISCHEMIC HEART DISEASE

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**Objective:** Osteosarcopenia (OSP) is a newly defined condition that consists of both sarcopenia and osteoporosis (OP). However, the studies investigating the patients with OSP are limited. The aim of this study is to find out the frequency and clinical characteristics of OSP in patients with ischemic heart disease.

**Methods:** 45 patients were included in the study (36 males/9 females, mean age 63.16±6.71 y). According to European Working Group on Sarcopenia in Older People (EWGSOP2) definition, a person who had low muscle mass and low muscle strength as well as low physical performance was identified as having sarcopenia. Muscle mass was assessed using computed tomography of psoas area ($cm^2$) and calculating L3 muscle index (LMI) (<52.4 $cm^2/m^2$ in men; <38.5 $cm^2/m^2$ in women). Low muscle strength was defined as grip strength <27 kg and <16 kg for men and woman, respectively. Muscle functioning was estimated on the basis of with SPPB test (gait speed, chair-stand time and standing balance). Low physical performance was defined as <8 SPPB total score for both gender. BMD was measured by DXA in the lumbar spine and hip.

**Results:** The frequency of the sarcopenia and OSP was 28.8% (13/45) and 15.5% (7/45), respectively. Sarcopenia was more common in patients with low BMD than patients with normal BMD (23.5% vs. 50%, respectively, p=0.009). The patients with OSP had worse results of grip strength, SPPB total score, including gait speed test and chair-stand test, higher total cholesterol, lower left ventricular ejection fraction compared to nonsarcopenic patients and patients who had one OP or sarcopenia (all parameters had p<0.05). LMI correlated with L1-L4 BMD (r=0.373, p<0.05), handgrip strength (r=0.785, p=0), left ventricular ejection fraction (r=0.522, p=0.002).

**Conclusion:** This study has shown that nearly a half of the patients with sarcopenia may also have OSP (7/13). Moreover, every second patient with osteoporosis/osteopenia may be sarcopenic.

## P820

## MAGNETIC RESONANCE IMAGING MARKERS IMPROVE THE PREDICTION MODEL FOR TOTAL KNEE REPLACEMENT OVER 13 YEARS IN OLDER ADULTS

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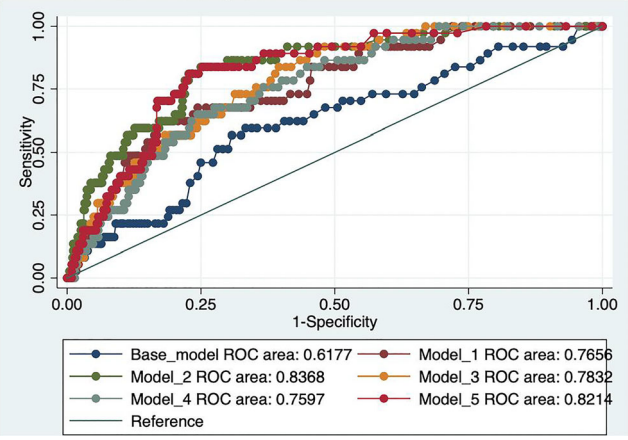
**Objectives:** To describe whether knee MRI abnormalities are associated with total knee replacement (TKR) over 13 y and to estimate the additive effect of MRI measures for risk prediction of TKR.

**Methods:** 1082 participants (62.8 y, 50% female) were randomly recruited from Tasmania and followed over 13.3 y. A 1.5T MRI scan of the right knee was acquired at baseline (n=930). Cartilage defects (grade 0-4), BMLs (grade 0-3), effusion-synovitis (grade 0-3), meniscal tears (grade 0-3) and meniscal extrusion (grade 0-2) were scored at baseline using T1-weighted and T2-weighted MRI. The incidence of primary TKR was determined by data linkage to the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR).

**Results:** After adjustment for age, sex, BMI, and radiographic OA, baseline cartilage defects (grade 2, RR=6.71; grade 3, RR=11.17; grade 4, RR=13.2; p<0.01) were significantly associated with TKR over 13 years independent of other MRI pathologies. BMLs (grade 1, RR=2.74; grade 2, RR=2.64; grade 3, RR=4.01, p<0.05 except grade 2), grade 3 effusion-synovitis (RR=2.74, p<0.05) and suprapatellar effusion-synovitis area were associated with TKR. Those who had TKR all had a meniscal tear at baseline, with 96% of them having a grade 3 tear. Compared to the baseline model with age, sex and BMI (area under the ROC curve [AUC=0.62]), Model 1 with the addition of ROA and WOMAC pain performed better (AUC=0.77). Addition of cartilage defects to Model 1 resulted in a significant increase of AUC to 0.84. The combination of all MRI pathologies to Model 1 resulted in a significant increase in AUC to 0.82.

| | |
|---|---|
| Base model | – Age, sex, BMI |
| Model 1 | – Base model + WOMAC + knee ROA |
| Model 2 | – Model 1 + Cartilage defects |
| Model 3 | – Model 1 + BMLs |
| Model 4 | – Model 1 + Effusion Synovitis |
| Model 5 | – Model 1 + Cartilage defects + BMLs + Effusion Synovitis |

**Combined model for comparison.**




**Conclusion:** Baseline knee MRI structural pathology markers can predict TKR over the long-term in the general population. Cartilage defects significantly improve the model performance for prediction of TKR over 13 y, and hence could be utilized in prediction/decision making of TKR.

## P821
## A CASE REPORT OF A PATIENT WITH SIX VERTEBRAL FRACTURES AFTER 5 YEARS TREATMENT WITH DENOSUMAB

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**Objective:** Many therapeutic options for osteoporosis have appeared in the last 10 y, but still none of them is able to restore BMD and architecture in most patients with advanced disease. We present a case of a patient who has been treated for osteoporosis with denosumab for 5 y and two months after the last injection, got 6 vertebral fractures.
**Methods:** The clinical case presents the management of osteoporosis in a patient who has been followed up for 5 y, without additional risk factors. Although, supplementation with vitamin D and her DXA T-score on spine and femur, TBS demonstrates improvement of BMD, the patient experienced multiple vertebral fractures.
**Results:** A 50-year-old female patient, non-smoker with BMI 23.4 and menopause since the last 5 y, was diagnosed with osteoporosis. In routine DXA T-score on spine was -5.3, femur -3.4. Lab tests confirm: P, Ca, β-CrossLaps in serum – within reference range; PTH: 45 pg/mL (11 - 67); 25-OH vit. D3/2: 30 ng/ml (<12 - deficiency); alkaline phosphatase: 67 U/L (<120 U/L); TSH: 1.13 mIU/l (0.3- 4.2). The patient was treated 4 y with denosumab with good result – increase in BMD (DXA spine – 3.4; femur – 3.0) and vitamin D levels in serum (42 ng/ml). Concomitant diseases: hypothyroidism after treatment with radioactive iodine due to hyperthyroidism. Two months after the 10th s.c application of denosumab 60 mg the patient experience light trauma and severe musculoskeletal pain in thoracic vertebrae. X-ray and MRI revealed fractures on Th8, Th9, Th10, Th11. Vertebroplasty was performed at levels Th9 and Th10 with good therapeutic effect for a month. Due to increasing pain new X-ray and MRI was performed which registered fractures on Th6, Th7. Vertebroplasty at levels Th6 and Th8 was performed. At the present moment no deviation of PTH, Ca, P, β-CrossLaps, TSH are found in the serum. The supplementation with vit. D continues and treatment with teriparatide was initiated.
**Conclusions:** Treatment with denosumab during the first 4 y of therapy resulted in increased BMD and improvement in clinical complaints, but with longer use and severe cases of osteoporosis showed insufficient effect on the prevention of vertebral fractures, which confirms new literature data.

## P822
## HISTOLOGICAL STRUCTURE OF THE PROXIMAL EPIPHYSEAL CARTILAGE OF THE TIBIA AFTER IMPLANTATION OF SELENIUM ENHANCED HYDROXYAPATITE INTO IT

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**Objectives:** The study is aimed at investigation of structure of the proximal epiphyseal cartilage (EC) of the tibia after implantation of selenium enhanced hydroxyapatite into it.
**Methods:** The study involved 252 rats with body weight of 135-145 g. The 1st group comprised intact animals, the 2nd group comprised animals with 2.2 mm defect in the tibia, and the groups 3 through 6 comprised the animals with the same 2.2 mm defects filled with pure hydroxyapatite implants and hydroxyapatite implants enhanced with 0.15%, 0.3%, and 0.5% share of selenium. Upon expiration of observation terms (the 7th, the 15th, the 30th, the 60th, the 90th, and the 180th day), HE stained frontal sections of proximal epiphyses were put to morphometry of EC zones.
**Results:** A plain defect in the bone is manifested with narrowing of EC and widening of osteogenic zone in the period from the 7th to 90th day of observation. Implantation of pure hydroxyapatite resulted in widening of both EC and osteogenic zone as compared to the 2nd group in the period from the 7th up to the 90th day. Width of the osteogenic zone in the bones filled with 0.15% Se implants grew as compared to the 3rd group by 5.51% by the 60th day. With selenium concentration increase up to 0.3% changes in EC turned into two-phase process: by the 7th and the 15th days of observation EC was narrower than that of group 3 by 2.69% and 2.98%

respectively and in the period from the 60th to the 180th day EC narrowed by 4.48%, 4.89%, and 3.90%. In the group 6 above-mentioned changes constituted 3.99% and 3.97%, and 5.76%, 5.41%, and 6.90%. In the group 5, by the 30th day, osteogenesis zone width and osteoblasts quantity values were higher than those of the group 3 by 5.08% and 5.01% and in the group 6 – by 5.25% and 3.62%.

**Conclusions:** Implantation of selenium enhanced hydroxyapatite restores structure of the proximal epiphyseal cartilage of the tibia related to formation of bone cuff around fracture point. The highest efficacy is yielded from the implants with 0.5% share of selenium.

## P823

## LOCALISED PAIN SEVERITY AND GENERALISED PAIN ARE ASSOCIATED WITH PREVALENT AND INCIDENT FRACTURES IN OLDER ADULTS: A 10.7-YEAR COHORT STUDY

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**Objectives:** To describe the associations of localised pain severity and generalised pain with incident fractures, and to explore whether their associations are independent of falls risk, BMD and potential confounders.

**Methods:** Data from a longitudinal population-based study of older adults (mean age 63 y, 51% female) were utilised. Follow-up was performed at 2.6, 5.1 and 10.7 y later, respectively. Pain severity in the knee was measured by the WOMAC pain questionnaire. Presence/absence of pain at the neck, back, hands, shoulders, hips, knees and feet was assessed by questionnaire at baseline. Fractures were self-reported at each time point. BMD was measured by DXA. Falls risk was calculated based on the short form Physiological Profile Assessment.

**Results:** A total of 455 fractures at baseline and 154 new fractures were reported during follow-up. In multivariable analyses, both pain severity and number of painful sites were associated with prevalent fractures at any site. Pain severity was associated prevalent vertebral fractures, while number of painful sites was associated with prevalent fractures at nonvertebral and hip. Furthermore, pain severity was associated with increased risk of incident fractures at any site [relative risk (RR) 1.04, 95%CI 1.02-1.06], major (including the femur, radius, ulnar, vertebral, rib and humerus) (RR 1.10, 95%CI 1.05-1.15) and vertebral (RR 1.04, 95%CI 1.01-1.08). Similarly, number of painful sites was also associated with increased risk of incident fractures at any site [RR 1.69, 95%CI 1.13-2.53], major (RR 2.17, 95%CI 1.12-4.22) and vertebral (RR 6.44, 95%CI 1.64-25.33). There was a dose-response relationship between number of painful sites and risk of incident fractures. These associations remained significant after further adjustment for falls risk and BMD.

**Conclusions:** Both pain severity and generalised pain are associated with increased risk of prevalent and incident fractures, which is independent of falls risk, BMD and potential confounders, suggesting that pain may be an independent marker of fracture risk. Pain management may have potential to prevent fractures in older adults.

## P824

## SARCOPENIA IN PATIENTS WITH ISCHEMIC HEART DISEASE: THE FIRST RESULTS OF THE STUDY

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**Objective:** Low muscle mass is one of the most frequent conditions in patients with ischemic heart disease (IHD) and depends on many factors such as age, reduced physical activity etc. Osteoporosis was evaluated in most of IHD studies, but studies examining sarcopenia are limited. The aim of this study is to investigate the relationship between sarcopenia and clinical parameters in patients with IHD.

**Methods:** The study included 45 patients with IHD (36 males/9 females, mean age 63.16±6.71 years) verified by coronary angiography. The following data were obtained and analyzed: sociodemographic data, clinical parameters (SPPB tests, handgrip strength, BMD of the lumbar spine, total hip and femoral neck, muscle mass was assessed using computed tomography of psoas area ($cm^2$), L3 muscle index (LMI) ($cm^2/m^2$)). A diagnosis of sarcopenia has been made according to European Working Group on Sarcopenia in Older People (EWGSOP2) definition.

**Results:** 13 (28.8%) patients had sarcopenia. Sarcopenia was more common in patients with low BMD compared to patients with normal BMD (23.5 vs. 50%, respectively, p=0.009). The following significant association were revealed. Total psoas area (TPA) (cm2) has positive correlation with BMD in all localizations (r=0.480, p=0.006 for L1-L4; r=0.547, p=0.001 for femur; r=0.597, p<0.001 for neck of the femur), handgrip strength (r=0.715, p=0 for right hand; r=0.868, p=0 for left hand) and weight (r=0.597, p<0.001). There was negative correlation between TPA and IHD duration (r=-0.417, p=0.002), age (r=-0.536, p=0.001). LMI ($cm^2/m^2$) positively correlated with L1-L4 BMD (r=0.373, p<0.05), left ventricular ejection fraction (r=0.522, p=0.002). There was no association between TPA/LMI and laboratory tests (total cholesterol and lipids fractions, glucose).

**Conclusion:** In this study sarcopenia was a frequent condition among patients with IHD. It was associated with IHD duration, low BMD, old age, heart function. Further studies are needed to clear the main risk factors for sarcopenia in IHD patients to evaluate the prognosis for this group of patients.

## P825
## DIRECT ORAL ANTICOAGULANTS DECREASE BONE FORMATION IN MC3T3-E1 CELLS

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**Objective:** The use of anticoagulation is common in many medical conditions, at times for a relatively short period and at times for an extended period in cases of venous thromboembolism (VTE), atrial fibrillation and mechanical heart valves. Treatment with heparin derivatives and vitamin K antagonists is rapidly being replaced with direct oral anticoagulants (DOACs), which have gained popularity due to their safety profile and easier surveillance. Therefore, an increasing number of young patients are and will be treated in the future with these medications for the long term. Long-term heparin treatment is a known risk factor for the development of osteoporosis. The effect of DOACs on bone health has yet to be established. Herein we address this paucity of information via *in vitro* studies examining the effect of DOACS on osteoblast proliferation, differentiation and function in an osteoblastic cell line model.
**Methods:** MC3T3-E1 cells were maintained in DMEM/10%FBC/1%Pensterp/1%L-Glut/ 0.5%HEPES. The cells were induced to osteogenesis with 10mM βGP/50μl/ml ascorbic acid. The effect of DOACs (apixaban, rivaroxaban and dabigatran at final concentrations of 0.013 μg/ml) on cell survival was determined by XTT assay (cat. 20-300-1000, BI) 7 d post treatment initiation. Differentiation was determined by alkaline phosphatase activity assay (AB83369, Abcam) 14 d post treatment initiation and osteoblast function was determined by mineralized nodule formation with alizarin red staining (cat. A5533, Sigma-Aldrich) at 21 d of treatment. Heparin (0.2 U/ml) was used as a positive control.
**Results:** No difference in cell survival between DOACs- and vehicle-treated cells was found. Treatment with all DOACs significantly decreased (2-fold) alkaline phosphatase activity compared to vehicle-treated cells. Impaired mineralized nodule formation was observed in DOACs-treated cells with a 3-fold decrease in mineralization in DOACs-treated cells and was not significantly different from heparin-treated cells.
**Conclusion:** Apixaban, rivaroxaban and dabigatran adversely affect osteoblast differentiation and function in MC3T3-E1 cells. Future *in vivo* animal and human studies are warranted.

## P826
## METABOLIC SYNDROME AND MRI-DETECTED KNEE STRUCTURAL CHANGE

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**Objectives:** Metabolic syndrome (MetS) has been suggested a crucial role in the pathophysiology of osteoarthritis (OA); however, currently none of studies have examined the associations between MetS and structural changes on MRI. This study aimed to describe the associations between MetS and its components and strucutral changes on MRI including knee cartilage volume (CV) loss and bone marrow lesion (BML) change over 10.7 y.
**Methods:** Longitudinal data on 435 participants (mean age 61 y, 50% of females) from a population-based cohort study were analysed. Blood pressure, glucose, triglycerides, and high-density lipoprotein (HDL) were collected. MetS was defined based on the National Cholesterol Education Program-Adult Treatment Panel III criteria. MRI of the right knee was performed to measure CV and BML. Radiographic knee osteoarthritis (ROA) was assessed by X-ray.
**Results:** 32% of participants had MetS and 60% had ROA. In multivariable analysis, the following were independently associated with medial tibial CV loss [MetS: β=-0.30%; central obesity: β=-0.26%; low HDL: β=-0.26% per annum]. MetS, hypertriglyceridemia and low HDL were also associated with higher risk of BML size increase in the medial compartment [MetS: relative risk (RR) 1.72, 95%CI 1.22-2.43; hypertriglyceridemia: RR 1.43, 95%CI 1.01-2.02; low HDL: RR 1.67, 95%CI 1.18-2.36]. After further adjustment for central obesity, MetS and low HDL remained significant with both medial tibial CV loss and BML size increase. The number of components of MetS correlated with greater CV loss and BML size increase (both P for trend <0.05). There were no statistically significant associations in the lateral compartment.
**Conclusions:** MetS and low HDL are associated with medial compartment CV loss and BML worsening, suggesting that targeting MetS has the potential to prevent or slow structural change in knee osteoarthritis.

## P827
## ASSESSMENT OF BONE QUALITY AND QUANTITY IN THE LUMBAR SPINE IN TYPE 1 DIABETES PATIENTS

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**Objective:** According to modern data, the presence of diabetic osteopathy in patients with type 1 diabetes (T1DM) is beyond doubt. However, to understand the mechanisms of its development, it is not enough just to quantify the bone component. Thus, the aim of the study was to study of the quantitative and qualitative characteristics of the lumbar spine in T1DM patients.
**Methods:** 158 patients with T1DM (105 women, 53 males) (mean age: 33.6 (27.9–37.5) y, duration of DM: 13 (7–20) y, age of manifestation: 19 (14–23) y, BMI: 23.58 (22.06–25.76) kg/m$^2$; HbA1c: 8.2 (7.6–8.9)%) and 100 (68 women, 32 men) controls, comparable in sex, age and anthropometric data. The research involved general clinic examination, DXA. BMD was taken as a quantitative assessment and trabecular bone score (TBS) was used as qualitatively parameter.
**Results:** There were no significant differences in L1-L4 BMD and TBS in women compared with men: 1.16 (1.08 – 1.16) vs. 1.15 (1.08 – 1.27) g/cm$^2$; (U=5597; p=0.727) and 1.40 (1.35 – 1.46) vs. 1.44 (1.37 – 1.49) (U=3230; p=0.097). Similar results were obtained in subgroups of T1DM patients and controls. There was a definite significant correlation between BMD (L1-L4) and TBS (L1-L4) – $r^2$=0.33, p<0.001. Lower L1-L4 BMD and TBS were significantly found in patients with diabetes compared to controls: BMD 1.14 (1.04 – 1.22) vs. 1.23 (1.13 – 1.33) g/cm$^2$; U=3685; p<0.001; and TBS 1.39 (1.33 – 1.46) vs. 1.45 (1.39 – 1.48); U=2775; p<0.001. Detailed assessment in lumbar spine showed the largest decline in the first lumbar vertebra as T1DM patients as a control group, but more pronounced reduction was proved in T1DM patients – BMD L1 1.02 (0.94–1.13) vs. 1.12 (1.03–1.24) g/cm$^2$; U=3439; p<0.001; and TBS L1 1.29 (1.22 – 1.39) vs. 1.34 (1.29 – 1.42); U=2898; p=0.002).
**Conclusions:** There were no differences BMD and trabecular bone index by gender. T1DM patients have BMD and TBS decreased in the lumbar spine with a predominance this trend in the first vertebra.

## P828
## POSTTRAUMATIC MORTALITY IN PATIENTS WITH OSTEOPOROTIC HIP FRACTURES

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**Objective:** To assess posttraumatic mortality in older age patients with osteoporotic hip fractures within 12 months after the fracture.
**Methods:** 432 patients with osteoporotic hip fractures were included (328 women and 104 men, mean age was 75.4±9.27 y and 71.5±10.39 y, respectively). Mortality rates were evaluated both in hospital and during 12 months after the fracture.
**Results:** It was found that in the first 12 months after injury 137 out of 432 patients under observation died: in women - 104 (24.1%) cases, in men - 33 (7.7%) ($\chi^2$=9.22; p<0.0001). Overall mortality was 31.8%. In the structure of mortality by gender, no statistically significant differences were found: 104 out of 328 women died (31.78%), out of 104 men - 33 (31.73%) ($\chi^2$=0.01; p=1.0). When assessing the causes of mortality after a fracture, the majority of deaths in both men and women were attributable to cardiovascular system diseases. The total number of fatal cases was 93 (67.8%): for men - 22 (66.0%) cases, for women - 71 (68.3%) (p=0.65). Diseases of the respiratory system caused death in 23 (16.8%) patients: in men - 5 (15.1%) cases and in women - 18 (17.3%) (p=0.31). The causes of death from oncological diseases accounted for 15 (10.9%) cases without statistically significant differences by gender: for men - 3 (9.09%) cases and for women - 12 (11.5%) (p=0.45). Diseases of the digestive system, as the cause of death, were detected in 5 (3.6%) men and women (2 (6.06%) and 3 (2.9%) cases, respectively (p=0.1)).
**Conclusion:** During all periods of observation, most of the deceased men and women had cardiovascular and respiratory diseases.

## P829
## THERAPEUTIC MANAGEMENT IN OSTEOPOROSIS IN TURNER SYNDROME

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**Objectives:** Turner syndrome is a multiple malfunctions syndrome defined by four elements: disharmonic hypotrophy stature, severe somatic malformations, modified karyotype-specific as frequency 45, XO, and severe ovarian failure through anovarism. Perturbation of the hormonal biosynthesis process by altering the sexualisation process and the exclusion of the sex hormones and thyroids from the body's economy influences the bone structure representing the main cause of osteoporosis[1,2,3].
**Methods:** The study was performed on 12 cases with female phenotype syndrome with age between 12-30 years old. The biochemical markers of bone turnover (serum osteocalcin and CrossLaps) were evaluated, BMD was assessed by absorption of DXA patients received pharmacological therapy - in the past - growth hormone, estrogen therapy and thyroid hormone substitution and currently are associated with 150 mg ibandronic acid 30 d[4] .

**Results:** Osteoporosis was confirmed on 7 cases and in 5 cases the T-score was suggestive for osteopenia. The efficiency of ibandronic acid treatment after 12 months of administration was noted in 82% of cases with osteoporosis on both the lumbar spine and the femoral neck. BMD is also increased in the lumbar spine 4.1% and in the femoral neck 2.2% .

**Conclusions:** The study of BMD and biochemical markers of bone turnover is binding in all cases with Turner syndrome. At patients with osteopenia, the major objective is the prophylaxis of hypogonadal osteoporosis with the aim of increasing bone mass and reducing the incidence of fragility fractures[5,6] .

**References:**

1. Popescu M et al. Rev Chim 2018;8:2089
2. Albulescu DM et al. Rev Chim 2018;9:2438
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## P830

## PRESENTATION OF FINDINGS FOR BONE DENSITOMETRY, FRACTURES AND MOST COMMON RISK FACTORS FOR OSTEOPOROSIS IN PATIENTS EXAMINED IN BANJA KOVILJACA AT ANNUAL LEVEL

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**Objective:** Analysis of all parameters from bone densitometry finding of the low back and hip, most common risk factors and both previous and new fractures.

**Methods:** The study was conducted in Specialized Rehabilitation Hospital in Banja Koviljaca, in a period between January and December 2018. BMD was measured in low back vertebrae bodies (L1L4) and femoral neck with Lunar DPX Prodigy device as per the standard procedure prescribed for central DXA. Findings of bone densitometry and data from questionnaire for 395 patients, both men and women, were processed. BMD and T-score values obtained in hip and low back, number and location of previous and new fractures, age of subjects and most common osteoporosis risks were all observed.

**Results:** The average age of patients was 66.48 y, while the mean BMD value in the hip was 3.52 g/cm$^2$ and 0.84 g/cm$^2$ in the low back. At the latest examination, most common T-score values in the hip were at osteoporosis level (48% of respondents), and in the low back spine these were at the level of severe osteoporosis (80% of respondents). At the initial examination, 39 vertebral and 63 nonvertebral fractures were recorded, while at the latest examination 9 vertebral and 5 nonvertebral new fractures were recorded. Most common were hip fractures (31) and forearm fractures (19) in the age of 71- 80 (28 respondents). The most significant risk factor for osteoporosis was previous fractures, and the most frequent occurrence of fractures was recorded in this group, in 79 respondents. Within a group of rheumatic patients, the lowest values of bone density in spine and hip were in respondents with systemic sclerosis (hip BMD 0.659 g/cm$^2$, spine BMD 0.772 g/cm$^2$).

**Conclusion:** On average, BMD values and T-score values were lower in the low back spine than in the hip. Higher age and previous fractures are significant risk factors for osteoporosis and new fractures, but a number of new fractures is considerably less in patients who have passed diagnostics and been treated.

## P831

## BONE MANIFESTATIONS IN THE THYROID HORMONE DEFICIT

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**Objectives:** Hypothyroidism is the clinical expression of thyroid hormone biosynthesis deficiency as well as its transport and/or receptiveness. Hypothyroidism may be primary, secondary, or tertiary depending on the center of the disorder: the thyroid itself, the pituitary or the hypothalamus. The consequence of hypothyroidism on the osteoarticular system is represented by the increase in BMD. At women with menopause, the management of osteoporosis associates active forms of 25-OHD to prevent vitamin D intoxication by excessive accumulation [1,2,3]. There are researches that demonstrates that autoimmune thyroiditis may interfere as a confounding factor in the 25-OHD interpretation in relation with thyroid characteristics. Identification of cases with thyroid deficiency, clinical and paraclinical objectification of hypothyroidism etiology, BMD measurement by DXA [4,5] .

**Methods:** The study includes 24 cases (5 males and 19 females) with age between 27-46, from which 8 developed post-surgical thyroidectomy hypothyroidism and 16have occurred through autoimmune mechanism. The following investigations were performed: T4 dosing, TSH, ATPO titer, thyroid echography, and indirect thyroid function was evidenced by changes in lipid metabolism, glucose, enzyme, osteodensitometry was assessed in all cases.

**Results:** In all cases investigated with DXA, T-scores were between - 2.8 DS and - 3.9 DS. All cases showed high TSH values and the ATPO titre was increased at cases with autoimmune hypothyroidism.
**Conclusions:** Osteoarticular disorders are particularly common in cases of severe hypothyroidism (mixedem) . The therapeutic attitude is differentiated in relation to the evolutionary stage, visceral complications and osteo-articular complications.
**References:**
1. Popescu M et al. Rev Chim 2018;8:2089
2. Albulescu DM et al. Rev Chim 2018;9:2438
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## P832
## RISK ASSESSMENT OF OSTEOPOROTIC FRACTURES IN THE FRAX SCALE IN MEN WITH CORONARY HEART DISEASE DEPENDING ON THE INDICATORS OF LIPID

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**Objective:** To assess the risk of osteoporotic fractures on the FRAX depending on the parameters of the blood lipid spectrum in men with coronary artery disease.
**Methods:** 93 men over 50 y (mean age – 60.8±6.9 y) with coronary artery disease verified by coronary angiography were examined. Based on the information on the presence of clinical risk factors for osteoporotic fractures and densitometry data (Excel XR-46, Norland, USA) in all patients included in the study, the FRAX calculator was used to quantify the probability of major osteoporotic fractures and proximal femur fractures in the next 10 y. The concentration of total cholesterol (OHS), triglycerides (TG), high and low density lipoprotein cholesterol (HDL and LDL cholesterol) in serum was determined by spectrophotometric method.
**Results:** The 10-y absolute risk of major osteoporotic fractures by FRAX was 9.88±7.22, the risk of proximal femoral fracture was 3.97±6.27 in all patients included in the study. Dyslipidemia was found in most men with coronary artery disease (95.7% of patients): hypercholesterolemia – 76.3%, elevated LDL – 81.7% of patients, hypertriglyceridemia – 49.5% of cases, decrease in HDL – 44.1%. The results of the correlation analysis revealed a significant direct correlation between the level of OHS and the risk of hip fractures by FRAX ($r=0.21$; $p=0.050$). For other lipidogram parameters, there was no correlation with osteoporotic fractures.
**Conclusion:** Hypercholesterolemia is associated with an increased risk of osteoporotic fractures on the FRAX scale in men with coronary heart disease.

## P833
## BONE TURNOVER MARKERS IN A COHORT OF COMBINED ASYMPTOMATIC AND SYMPTOMATIC ROMANIAN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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**Objective:** Primary hyperparathyroidism (PHPT) has appeared to change in its clinical presentation, being mostly asymptomatic in western countries; in Romania is still common to see various clinical presentations. A regular feature that has not changed is evidence for increased bone turnover. Our aim was to evaluate bone turnover markers (BTM) in a wide variety of presentation forms, from asymptomatic to osteitis fibrosa cystica.
**Methods:** Our retrospective study included 236 patients with PHTP: 88.6% women, mean age at diagnosis 60.25±11.42 y, mean PTH=253.9±348.1 pg/ml, mean sCa=11.4±1.2 mg/dl, symptomatic hypercalcemia in 15.4%, osteitis fibrosa cystica in 3%, fractures in 25%, spine osteoporosis in 50%, hip osteoporosis in a quarter, 42% with kidney stones/nephrocalcinosis. 63% underwent surgery and 40.6% were treated with bisphosphonates. Serum intact PTH, C-telopeptide (CTX) and osteocalcin (OC) were measured using the chemiluminescence immunoassay. BMD was measured by DXA at the femoral neck and lumbar spine.
**Results:** Mean BTM levels were: CTX 1.22±1.68 ng/ml, OC 66.2±24.7 ng/ml, ALP 140±80 U/l in the whole group of untreated patients and CTX 0.64±0.45 ng/ml, OC 34.79 ±20.56 ng/ml, ALP 92.22±34.52 U/l in asymptomatic PHPT. There was an inverse correlation between the age at diagnosis and BTM: CTX ($r=-0.148$, $p=0.023$), OC ($r=-0.240$, $p<0.001$) and ALP ($r=-0.308$, $p<0.001$). BMI also inversely correlated with CTX ($r=-0.178$, $p=0.006$) and OC ($r=-0.127$, $p=0.05$), but not with ALP. Patients with symptoms of hypercalcemia had higher levels of BTM ($p<0.001$ for CTX and OC and $p=0.002$ for ALP). We found an inverse correlation between BMD and BTM, with higher correlation indices between LS and FN Z-scores and bone formation markers. Patients with fractures were older and had higher levels of OC; patients with kidney stones were younger and also had higher levels of OC ($p<0.001$). sCa correlated with PTH, CTX, OC

and ALP ($p<0.05$ for all) in a univariate analysis, but only the correlations with PTH ($p<0.001$) and CTX ($p=0.003$) remained statistically significant in a multivariate regression analysis.

**Conclusion:** Symptomatic patients have higher levels of BTM than asymptomatic ones. Patients with younger age at onset, low BMI and symptoms of hypercalcemia are likely to have more active bone disease.

## P834
## OSTEOPOROSIS IN ENDOCRINE DISEASES

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**Objectives:** The study focused on the identification and follow-up, during the study (2014-2016), of osteoporosis secondary evolution from endocrine disease before and after specific treatment[1,2].There are studies demonstrating the influence of endocrine diseases on osteoporosis[3]. Our aim were to evaluate the starting moment of secondary osteoporosis at patients included in the study, to monitor the progression of osteoporosis in relation to the staging of endocrine diseases, to evaluate the curative and symptomatic differentiated therapeutic algorithm as well as to evaluate the way in which the evolution of endocrine and osteoporosis was influenced [4].

**Methods:** 52 patients were randomly assigned to the study: 15 patients with hyperthyroidism, 27 patients with hypothyroidism, 6 patients with acromegaly, 1 with pheochromocytoma, 3 patients with hypercortisolism. All patients are aged between 31-53 y, and BMD was determined by DXA over 3-month period.

**Results:** Osteodensitometry revealed the presence of osteoporosis in 87% of all cases included in the study, and the rest of the patients - 13% - the T-score was suggestive of osteopenia (- 1.80 to -2.30 DS)

**Conclusions:** The BMD study should be performed periodically to identify patients who are rapidly losing bone mass and have highly risk of osteoporosis. The therapeutic approach is different in relation with evolutionary stage, visceral complications and osteo-articular complications[5].

**References:**

1. Popescu M et al. Rev Chim 2018;8:2089
2. Radu L et al. Rev Chim 2018;10:2754
3. Albulescu DM et al. Rev Chim 2018;9:2438
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## P835
## CONSIDERATIONS REGARDING SECONDARY CAUSES OF POSTMENOPAUSAL OSTEOPOROSIS

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**Objectives:** Postmenopausal osteoporosis is the most common form of bone lysis of endocrine etiology, induced by drastic estrogen deficiency in menopause, but there are other secondary causes of osteoporosis in postmenopausal women. Bone mass loss in postmenopausal is caused by trabecular bone but also cortical. Numerous hormones, growth factors, cytokines with implications in the immune system have important effects on the bone [1,2,3]. The purpose of this study was to analyze the prevalence of diseases that contribute to postmenopausal bone loss and to assess the impact of these disorders and its severity.

**Methods:** The study was performed on 48 postmenopausal women with age between 45-79 y who were diagnosed with osteoporosis by DXA. For all patients under study were evaluated the serum PTH, vitamin D, thyroid hormones, cortisol and calcium [4,5].

**Results:** 37 patients (77.08%) had low levels of 25-OHD (<30 ng/ml), 11women (22.92%) had elevated levels of PTH (>65 pg/ml). PTH levels were age-related and were higher at women with femoral Z-score-2.0 ($P=0.03$). Women with low vitamin D had low BMD and T-score in the lower femoral neck. In addition, patients with vertebral fractures had a higher prevalence of vitamin D levels <20 ng/ml ($P<0.05$). 10 women (20.83%) had elevated serum thyroid hormone levels.

**Conclusions:** There are secondary causes of postmenopausal bone loss represented by vitamin D deficiency, PTH disorder and thyroid hormone.

**References:**

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2. Popescu M et al. Rev Chim 2018;8:2089
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## P836
## PREDICTIVE VALUE OF BIOCHEMICAL MARKERS OF BONE TURNOVER IN OSTEOPOROSIS

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**Objectives:** The progression of osteoporosis is asymptomatic until the occurrence of a fracture, the circumstance in which the primary diagnosis is made before clinical presentation of osteoporosis[1]. Affects both sexes. Estrogen deficiency affects the rate of bone turnover that condition the age of bone tissue and its various physical and chemical properties[2,3,4,5].
**Methods:** A total of 82 patients with osteoporosis with age between 35-75 y were randomly assigned after menopause installation criteria - 47 patients with osteoporosis and physiological menopause 10 patients with premature ovarian failure (35-40 y) 37 patients with physiological menopause (47-75 y) and 25 patients with surgical menopause (44-75 y) The biochemical markers of bone turnover were evaluated (bone-specific alkaline markers phosphatase, serum propeptide of type I procollagen) and (serum crosslinked N-telopeptide, serum crosslinked C-telopeptide). At all patients BMD was evaluated by DXA. The FRAX algorithm has identified the risk of fragility, vertebral or nonvertebral fracture.
**Results:** At all cases investigated by DXA, the value of T-score were between - 2.8 DS and - 3.9 DS. In cases with premature ovarian failure - 5 cases serum osteocalcin 22.9 ng/ml and 115 ng/ml (comparable to those of postmenopausal women) - 3 cases 5 serum osteocalcin 18.7 ng/ml ±7.2 ng/ml (comparable to premenopausal women) - 2 cases normal. Bone resorption - values between 0.197-1.768 ng/ml comparable to pre- and postmenopausal.
**Conclusion:** Early menopausal patients correlate the mean markers of bone turnover with the risk of major fracture vertebral or nonvertebral. The age of menopause installation correlates directly with the risk of fracture
**References:**
1. Popescu M et al. Rev Chim 2018;8:2089
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## P837
## FOR ALL PRACTITIONERS AND RESEARCHERS TO ASSESS HAND DYSFUNCTION IN HAND OSTEOARTHRITIS (OA): THE QUICK, FRIENDLY AND AVAILABLE FOR FREE FUNCTIONAL INDEX FOR HAND OA WEBSITE FIHOA.NET

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**Objective:** Hand osteoarthritis (HOA) is a frequent polyarticular disease, which may lead to considerable pain and physical limitations. Applied to the almost 500 million inhabitants of the European Union, HOA might represent 150 million radiographic hand OA affected individuals of which 30 million will suffer from hand pain, stiffness, deformities and impaired function. The functional Index for hand OsteoArthritis (FIHOA) has been validated to assess HOA's functional impairment in 10 questions, both in daily clinical practice and in studies or clinical trials and is currently a recommended tool to be used for clinical studies/ therapeutic trials by international recommendations for the conduct of trials in HOA (1,2). We aimed at providing to all practitioners and the rheumatologic/orthopedic research community a free- of-charge, free-of-copyright and rapidly accessible numeric format, a free FIHOA website under the responsibility of the instrument's coauthors.
**Results:** FIHOA website provides the FIHOA scoring for daily clinical practice use, allows for a rapid assessment of the functional impairment of symptomatic hand OA, facilitates the assessment of treatments efficacy in clinical practice. or in therapeutic trials or hand dysfunction in a survey/cohort of HOA patients. It contains the 10 FIHOA's assessing questions in 21 different linguistic versions (new available validated linguistic versions: Persian, Korean, Japanese, Arab). Other linguistic versions are currently under validation (Portuguese, Brazilian, Turkish, Danish). It results in a direct calculation of the score, available for the patient's file either in a numeric or paper format. The website also provides users with a short history of the instrument and all references available in the international literature. Last, it allows for contacting directly the authors by email.
**Conclusion:** We assume that the FIHOA.net website should be helpful to practitioners for hand OA patients management in ambulatory practice, and will also help the entire scientific community involved in the field of researches in hand OA, and teams conducting therapeutic trials.
**References:**
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## P838
## STUDY OF INCIPIENT CARIES EVOLUTION AT PATIENTS WITH OSTEOPOROSIS

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**Objectives:** The study was performed on a group of 24 patients with osteoporosis who had explosive caries and hypomineralization. An analysis of the particularities of the caries evolution and of the evidence of the precarious hypomineralization state was made at patients with osteoporosis. The purpose of this study was to draw dentists attention about the early detection of hypomineralization and incipient caries in all day examinations.
**Methods:** In the study had participated 24 patients (34-55 y); 20 women - 4 men. Most patients were amateurs of sweets, acidified beverages, they do not prefer dairy products.16 patients showed signs of gastritis and 2 chronic bronchitis. At 18 of the patients examined, oral hygiene was faulty. All patients were adequately treated for osteoporosis. Patient diet was not consistent with the regimen at most patients, glucose and acidified beverages was predominant.
**Results:** At all patients examined the diagnostic was certainly explosive caries. To all patients were given a complex local and general treatment. Beside local remineralizing treatment, patients had a general remineralization treatment. After 1-2 months of treatment, at the majority of patients, macular caries areas and hypomineralization are starting to remineralize becoming hard and glossier.
**Conclusions:** The causes of these severe manifestations can be: hormonal changes[1,2,3,4,5]; the association of gastrointestinal, renal [6,7] or respiratory diseases. Early detection of dental demineralization and hypomineralization, and also administering curative and preventive measures can reduce the speed of the evolution and ultimately the early loss of teeth.
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## P839
## METABOLIC SYNDROME IS ASSOCIATED WITH PAIN SEVERITY AND MULTISITE PAIN TRAJECTORIES

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**Objectives:** To describe the associations of metabolic syndrome (MetS) and its components with trajectories of localised knee pain (pain severity) and generalised pain (number of painful sites (NPS)) in a general older population.
**Methods:** 1099 participants from a population-based older adult cohort study were recruited at baseline. 875, 768 and 563 participants attended years 2.6, 5.1 and 10.7 follow-up, respectively. Data were collected on demographic, psychological, lifestyle and comorbidities, blood pressure, glucose, triglycerides, and high-density lipoprotein (HDL) cholesterol. MetS was defined based on the National Cholesterol Education Program-Adult Treatment Panel III criteria. Radiographic knee osteoarthritis (ROA) was assessed by X-ray. Knee pain was measured by Western Ontario and McMaster Universities Osteoarthritis Index pain questionnaire at each time-point. Presence/absence of pain at the neck, back, hands, shoulders, hips, knees and feet was collected by questionnaire at each time-point. Group-based trajectory modelling was applied to identify pain trajectories. Multi-nominal logistic regression was used for the analyses.
**Results:** Of 985 participants included in this study,32% of participants had MetS and 60% had ROA at baseline. Three localised knee pain severity trajectories were identified: 'Minimal pain' (52%), 'Mild pain' (33%) and 'Moderate pain' (15%). Three NPS trajectories were identified: 'Low NPS' (12%), 'Medium NPS' (38%), and 'High NPS' (49%). In multivariable analysis without adjusting for central obesity, central obesity increased risk of belonging to both 'Mild pain' and 'Moderate pain' trajectories as compared to the 'Minimal pain' trajectory group, but MetS, hypertriglyceridemia and low HDL were only associated with 'Moderate pain' trajectory [relative risk (RR): 1.67-2.26, all $P<0.05$]. Similarly, central obesity was also associated with both 'Medium NPS' (RR 2.35, 95%CI 1.40−3.92) and 'High NPS' trajectories (RR 3.07, 95%CI 1.85−5.08) compared to 'Low NPS' trajectory group, whereas MetS was only associated with 'High NPS' trajectory (RR 2.60, 95%CI 1.54−4.41). These associations became weak and non-significant after further adjustment for central obesity or BMI.
**Conclusions:** MetS is predominantly associated with trajectories of localised and generalised pain through central obesity, suggesting that weight management may be the foundation of treatment for pain.

## P840
## A STUDY ON CLINICAL EVOLUTION OF CERVICAL DENTAL EROSION LESIONS AT PATIENTS WITH OSTEOPOROSIS

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**Objectives:** Cervical dental erosion is a lesion of undamaged etiology, which is formed on the vestibular, oral or occlusal surfaces of the teeth. Erosion lesions appear at patients who consume acidic drinks, have acidic gastric regurgitation, or have a medication that causes an oral acid pH. The study was to identify cervical dental erosion on a group of patients diagnosed with osteoporosis, following the appropriate treatment for the disease.
**Method:** A total of 32 patients diagnosed with osteoporosis participated in the study. The patients were followed for 6 months, both in terms of the occurrence and clinical evolution of erosion lesions, but also of the diet. The treatment of dental erosion injuries includes general and local measures. General treatment - calcium, phosphorus, microelements, vitamin complex lasting one month (calcium gluconate, lithium, vitamin C, B1, etc.). The following treatment methods were applied locally: the use of toothpastes that reduce the effects of dental hyperextension and the modification of dental brushing techniques[1], local application of various preparations (lacquer, gel, remineralization solutions) for the purpose of diminishing the dental sensitivity, obturation of the lack of enamel by using composite materials, compomere, glass ionomer, prosthetic restoration of teeth with extensive odontal lesions[2].
**Conclusions:** Osteoporosis generally appears at elderly patients with hormonal problems [3,4,5,6,7]. Treatment of osteoporosis includes a medication which induce an oral acid pH. All patients have positive treatment results. Monitoring the dental erosion damage at patients with osteoporosis is mandatory.
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## P841
## EFFICIENCY OF THERAPEUTIC MEANS IN OSTEOPOROSIS INDUCED BY GONADIC HORMONES

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**Objectives:** There are multiple therapeutic options in osteoporosis induced by gonadal insufficiency (ovarian or testicular), and the choice of the appropriate therapy should be based on the following principles: comorbidity, extraskeletal effects, cost-benefit report [1,2,3,4,5]. For cases with premature ovarian failure, we followed the evaluation of patients with high risk of osteoporosis, exclusion of secondary causes of osteoporosis, the selection of appropriate treatment.
**Methods:** The study was performed on 24 cases of premature ovarian failure with age between 19-34 y. The therapeutic options include the non-pharmacological approach, the therapeutic intervention with pharmacological agents in relation to the pathogenic mechanism of hypogonadal osteoporosis. Estro-progestative substitution is the first-line therapeutic attitude in premature ovarian failure to prevent osteoporosis, metabolic and visceral complications. Curative treatment was given with the following objectives: growth or at least bone stabilization; assurance of bone quantity and quality; fracture prevention; therapy of fracture complications; maintaining an optimal physical state.
**Results:** Requires curative therapy: patients with sexoid osteoporosis with a T-score below -1.5 DS; patients with sexoidopathy osteopenia that associate fractures of fragility; patients with hypogonadal osteoporosis with a T-score below -2.5 DS.
**Conclusions:** Several therapeutic agents are currently available that stop or slow down bone loss, reduce bone remodeling rate, and reduce the risk of fracture. In the current context of modern medicine, the prevention of osteoporosis aims the removing risk of first fracture and as such, the same drugs can be used both for the prevention and treatment of osteoporosis.
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## P842
## BONE TURNOVER IN DIABETIC OSTEOPOROSIS PATIENTS

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**Objective:** Diabetes mellitus is associated with an increased risk of fractures, which is not explained by BMD. Furthermore, in the fracture risk assessment tool (FRAX) model, common risk factors and BMD were underestimated the fracture risk in type 2 diabetes patients. Although, glycemic control condition, the duration of disease, hypoglycemia, risk of falling, and adverse effects of medication, which could lead to higher fractures in diabetic patients, and many studies have investigated biochemical bone turnover rate in diabetes patients, no definite inferences can be made, but bone turnover markers have useful in fracture risk assessment and monitoring treatment efficacy in postmenopausal osteoporosis. The aim of this study is to evaluate the bone turnover and fracture risk in postmenopausal osteoporosis women with diabetes.
**Methods:** This cross-sectional study investigated patients who were postmenopausal osteoporosis women with diabetes at endocrine clinic. In this study, country-specific fracture risk for 10-y probability of a hip or major osteoporotic fracture, were calculated by the WHO Collaborating Center, using the FRAX algorithm. The FRAX algorithm includes femoral neck BMD, age, sex, BMI, previous history of fracture, parental history of hip fracture, current smoking, recent use of corticosteroids, presence of rheumatoid arthritis, and at least 3 alcoholic beverages per day. A single, fasting blood sample to assess bone markers, and other biochemical tests were performed in the study visit. Patients were measure the bone specific alkaline phosphatase for formation, and β-CrossLaps for resorption were analyzed the bone turnover rate.
**Results:** In this cross-sectional study, we investigated 52 Taiwanese postmenopausal women, with 30 subjects diabetes and 32 nondiabetes at osteoporosis clinic, aged between 50-77 y, have high risk for fractures by FRAX, defined as 10-y major osteoporotic fracture probability (≥ 20%) or hip fracture probability (≥ 3%), and found both bone formation and resorption markers were elevated.
**Conclusions:** Our findings suggest that in diabetes osteoporosis women have high risk for fractures by FRAX, with 10-y major osteoporotic fracture probability or hip fracture probability and high bone markers, but no significant difference bone markers in diabetes and nondiabetes osteoporosis women.
**Acknowledgement:** Taiwanese Osteoporosis Association

## P843
## USE OF BONE MASS DENSITY ASSESSMENT IN FRAGILITY FRACTURE PATIENTS IN MALAYSIAN TERTIARY HOSPITAL

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**Objective:** Principal part of all clinical practice guidelines recommended that adults who sustained a fracture above the age of 50 should have BMD. Low BMD is associated with increased risk of fracture. We did a study to look at patients with fragility fractures who had their bone mass density using DXA in tertiary university hospital.
**Methods:** Patient admitted to the hospital with fragility fractures were identified from the admission registry from January 2017 to December 2017. BMD was checked from the hospital computer system if patients attended their DXA appointment within 6 months since their admission.
**Results:** A total of 219 patients (68, 31% male and 151, 69% female) were identified with fragility fractures. Majority sustained hip fractures followed by other lower limb fracture, upper limb fracture and vertebrae fracture. From this study, only 36 (18.6%) of patients had their BMD.
**Conclusion:** Multiple studies reported a wide range of 1% to 32% of patients had their BMD scans following fragility fracture (1). Another similar study by Kung *et al.* that looks at postmenopausal women in Asian countries who had fragility fracture reported that only 28.2% of them had BMD measurements (2). Internationally FRAX assessment tool is the most commonly used to estimate 10 years risk of major osteoporotic fracture and hip fracture. It can calculate with or without BMD but will give refined estimation with BMD result. Another assessment tool, the Canadian association of radiologist and osteoporosis Canada (CAROC) tool and Garvan in Australia will require BMD result to assess patients risk of osteoporotic fracture. Compared to international recommendation and the numbers of subjects at high risk of osteoporotic fracture, BMD testing through DXA scan are still underutilized in our center. More awareness needed to be emphasized among the clinician and patients to assess and guide the management of their osteoporosis.
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## P844
## ROLES AND LIMITS OF OSTEODENSITOMETRY WITH ULTRASOUND

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Ultrasound densitometry through attenuation of the ultrasonic band in the calcaneus is the most used method of determining the direct measurement of bone mass and density for establishing the paraclinic osteoporosis diagnosis in our country [1,2,3,4]. Taking into account the recent use, most frequently, of DXA in measuring bone mass and density, we have proposed in our study to make a comparison of the two methods. The study covered 140 patients with osteoporosis diagnosed through ultrasound densitometry in the Endocrinology Clinic between January and March 2016, whose T-score ranged between -2.5 and -5 .Then we determined at these patients T-score by the DXA technique and the results were compared. It was found that 105 patients were confirmed with osteoporosis by DXA technique, 34 patients with osteopenia (T-score between -1 and -2.5) and one patient presented the T-score within the normal range. Advantages of ultrasound osteodensitometry would be low cost, lack of exposure to irradiation, and as disadvantages consisted in the limitation of bone mass determination only at the calcaneus level and accuracy of the inferior outcome of the DXA technique. In conclusion ultrasonic osteodensitometry can be used as initial screening test, as an initial diagnosis of osteoporosis and DXA is recommended to confirm the diagnosis, both techniques suggesting the risk of pathological bone fracture[5].

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## P845

## BONE CHARACTERISTICS AND OBESITY PHENOTYPES IN AN IRANIAN ELDERLY POPULATION: BUSHEHR ELDERLY HEALTH PROGRAM (BEHP)

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**Objectives:** Obesity and osteoporosis are two major health problems with high impact on the morbidity and mortality of population worldwide. BMI is usually used to indicate the amount of obesity, but it cannot distinguish fat from lean body mass. Obesity phenotypes (OPh) are defined based on obesity and metabolic syndrome (MetS) criteria. Although, association between BMI and bone density was known, effects on complex of obesity and metabolic components on bone health particularly bone quality has not been revealed. The objectives of this study was determination of relationship between bone health with different phenotype of obesity in a representative older population in Iran.

**Methods:** results of this study was a cross-sectional view to Bushehr Elderly Health Program (BEHP) data. Sampling of the BEHP is a multistage stratified method from residents ≥60 y in Bushehr. Demographic and lifestyle information were collected using standard questionnaires. Weight, height, and waist circumference of the participants were measured. BMI was calculated by dividing weight by square of height. Definition of obesity was based on WHO definition. The BMD of lumbar spine (L1-L4) and neck of femurs also trabecular bone score were measured by DXA (using a software for calculation of TBS). Osteoporosis was defined as T-score ≥ -2.5 in each of mentioned sites. Low bone quality was defined as TBS<1.3. The participants were classified in four different obesity phenotypes according to general obesity and MetS (metabolic healthy obese, metabolic nonhealthy nonobese, metabolic no-healthy obese, metabolic healthy nonobese. Associations between osteoporosis and TBS of lumbar spines and with OPh were assessed using univariate and multiple variable logistic regression models.

**Results:** Totally, 2262 people (1171 women) were considered for analyses. The prevalence of MHNO, MHO, MNHNO, and MNHO were 902 (39.9%), 138 (6.1%), 758 (33.5%), and 464 (20.5%), respectively. In final multivariate logistic regression models those who had MHO (OR: 0.22; 95%CI: 0.12-0.36), MNHNO (OR: 0.52; 95%CI: 0.4-0.66) and MNHO (OR: 0.22; 95%CI: 0.16-0.3) phenotypes had a significant lower risk of cumulative osteoporosis and who had MHO (OR: 2.38; 95%CI: 1.51-3.76), MNHNO (OR: 1.49; 95%CI: 1.11-2) and MNHO (OR: 2.5; 95%CI: 1.82-3.42) phenotypes (in compared to the MHNO group) had a significant higher risk of low bone quality based on TBS cutoff (adjusted for sex, age, physical activity, and smoking).

**Conclusion**: It seems that despite the BMD is higher in different phenotypes of obesity, the bone quality is lower in these groups in compared to nonobese subjects.

## P846
## THE ROLE OF COMPLEX THERAPY IN FIGHT WITH PAIN AND SLEEP DISORDERS IN FIBROMYALGIA PATIENTS

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**Objectives:** Usually people how suffer from fibromyalgia are fatigue and have sleep disorders and the risk for fibromyalgia is increase if the patient is suffering from a rheumatic disease.
**Methods:** We observed a group of 60 patients with fibromyalgia (according to the criteria of the American College of Rheumatology) that we followed for 4 weeks and were divided into two equal lots: the study group - 30 patients and control group - 30 patients. All patients age is between 40-60 y. They all followed specific and appropriate drug treatment. Patients in the study group next to drug therapy followed 30 min of physical therapy (thermotherapy and physiotherapy). Patients in the control group followed only medical treatment. The assessment was made initially at admission and 4 weeks later (at discharge), following the VAS of pain and sleep disorders questionnaire SDQ.
**Results:** The control group presented a minimal reduction of pain from a VAS of 6.4 to 3.5 and the study group managed to significantly improve their status starting from a pain with a score on VAS of 7.1 and reaching 3.2. the sleep disorders were improved in study group with 23.5% compared with control group.
**Conclusions:** Physical therapy demonstrates its utility in combating pain and sleep disorders in fibromyalgia patients. Combining physical therapy with specific drug therapy also improves the functional status and quality of life.

## P847
## CURRENT CONCEPTS IN THE THERAPY OF HYPOGONADAL OSTEOPOROSIS

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**Objectives:** In modern therapy of hypogonadal osteoporosis is discussing two distinct aspects: prevention of osteoporosis, osteoporosis treatment. For the cases with late puberty - hypergonadotropic hypogonadism (gonadal dysgenesis) and hypogonadotropic hypogonadism - the major objectives of hypogonadic osteoporosis prophylaxis were ensuring the conducting of sexualization process, maintaining the stability of the bone mass during ontogenesis, fighting the factors that cause osteoporosis and its consequences (osteoporotic fractures) [1,2,3,4,5].
**Methods:** The study was performed on 36 cases with hypogonadal osteoporosis from which: pubertal tardive 18 cases with age between 11-26 y - gonadal dysgenesia -11 cases (feminine Turnercu phenotype syndrome 8, Klinefelter syndrome-3), hypogonadotropic hypogonadism 7 cases (pituitary dwarfism with infantile sexuality -2, adipose genital syndrome 5 case. Therapeutics options - the therapeutic solution associates estroprogestative/androgenic substitution with antiresorbent medications (bisphosphonate) or proformate.
**Results:** Requires curative therapy: patients with osteopenia/osteoporosis, with T-score under -1.5 DS; patients with osteopenia / osteoporosis, with T-score under -2.5 DS and having fractures
**Conclusions:** Modern osteoporosis therapy divides the pharmacological agents into two major classes: antiresorptive agents (bone resorption inhibitors), proformators (stimulators of bone formation)
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## P848
## INITIATION TIMING OF ANTIOSTEOPOROSIS MEDICATIONS THERAPY AND THE RISK OF SUBSEQUENT OSTEOPOROTIC FRACTURE: A NONLINEAR RELATIONSHIP

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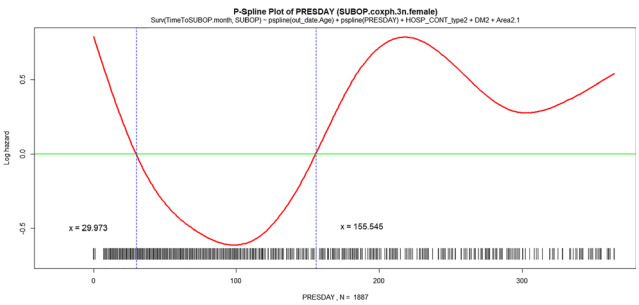
**Objectives:** To investigate how AOM initiation timing affects the risk of subsequent osteoporotic fractures, and what factors influence AOM prescription timing.

**Methods:** Women older than 50 years old with diagnostic codes indicating hospitalization for hip fracture, prescribed AOMs ≤1 y post index hip fracture and with AOMs medication possession ratio (MPR) between 0.8-1.2 within 1 y were sampled from the Taiwan National Health Insurance Research Database. Associations between different AOMs initiation timing with subsequent fracture-related hospitalizations were analyzed. Established evidence has shown the critical role of adherence of AOMs on patient's clinical outcomes. Therefore, in this study, we condition on patients with good adherence to illustrate the crucial influence of properly initiation timing of AOMs therapy on the antifracture benefit of AOMs therapy. The medication possession ratio is a measure for patient's adherence and defined as the proportion of days on AOM treatment. Multiple generalized additive models (GAMs) were fitted to detect nonlinear effects of different initiating time of AOMs. Factors influencing AOM initiation timing were elucidated using multivariate logistic regression analyses.

**Results:** There were 1887 hip fracture patients with a MPR between 0.8-1.2 within 1 y after initiating AOMs. AOM initiation timing was significantly associated with age, index year, index hospitalization duration, and geographic region; adherence, with index fracture after 2010, medical center vs. local hospital admission; adherence decreased with age. The GAMs analysis revealed the relationship between different initiation timing and risk of subsequent osteoporotic fractures was nonlinear. And patients initiated AOMs between 1 to 5 months post index fracture showed optimal results. (Figure 1)




**Conclusion:** In addition to good adherence, the antifracture benefit of AOMs depends crucially on properly initiation timing.

## P849
## OSTEOGENESIS IMPERFECTA: EVOLUTION OF THE BONE MINERAL DENSITY AND EVALUATION OF FRACTURE RISK UNDER BISPHOSPHONATES

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**Objective:** Osteogenesis imperfecta (OI), or Lobstein's disease, also known as 'glass bone disease' is a rare genetic disorder predisposing to low bone mass with impaired bone microarchitecture and abnormal quality of bone material, causing fracture susceptibility and bone deformities. The main objectives of our work was to study the clinical and paraclinical characteristics, and global management, of adult patients and children with OI in a rheumatology department by comparing them with data from the literature. Then to study the evolution of the BMD and to evaluate the fracture incidence under treatment by bisphosphonates.

**Methods:** This is a cross-sectional, observational, descriptive, analytical and monocentric study of subject with OI followed at Fattouma Bourguiba University Hospital in Monastir, Tunisia

**Results:** We collected 13 patients with OI, including 5 children and 8 adults. Seven patients were female and 6 were male, including 12 patients with type IB and one with type IIIB. Three adult patients had a family history of OI. For children, it was sporadic and the genetic survey did not reveal similar cases in the family. The mean age of clinical onset of the disease was 9 y and 3 months [0-33 y] with a mean age at diagnosis of 15 y and 7 months [14 months- 40 y]. The clinical manifestations were dominated by osteo-articular symptoms. Chronic mechanical bone pain related to fractures was present in eight patients. Twelve patients had a history of fracture. These were repeated fractures without trauma or minimal trauma in the majority of cases mainly in the lower limbs. The first fracture site was the femur associated with other fracture sites (there were no fractures in the pelvis, hands and skull). Deformities were observed in 7 patients, mainly in the limbs (6 patients), in the spine (2 patients) and in the thorax (1 patient). In our study the frequency of osteoporosis and/or osteopenia regardless of the measured site and using the T-score value for women≤-2.5 and the Z-score≤-2 for children and men was 84.62%. All patients received Pamidronate treatment according to Glorieux's protocol with calcium and vitamin D supplementation. The treatment was also multidisciplinary. Bisphosphonate treatment was well tolerated for the majority of patients. There was a decrease in the number of fractures and also a densitometric gain objectivized for the majority of patients.

**Conclusion:** Our results confirm the efficacy of BP in patients with OI regardless of age group. Short-term adverse effects are rare and transient.

## P850
## SEXOIDOPATHY HYPOGONADIC OSTEOPOROSIS

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The bone is a dynamic connective tissue whose structure has been developed to perform three major functions: it is the most important organ for maintaining calcium homeostasis and a significant deposit of phosphates, magnesium, potassium and bicarbonates; provides the mechanic support of soft tissues, being an important lever for the action of the muscles; is the major headquarters of hematopoiesis at the adult human. Consequently, osteoporosis is defined as a systemic disease of the skeleton, characterized by loss of bone mass, damage the bone tissue microarhitectomy, increased bone fragility, exaggeration of fracture risk. Hypogonadal sexoidopathy osteoporosis take in to discussion the absence or deficiency of estrogen, progesterone and androgen, singularly or in combination. It has been shown that estrogen deficiency induces an accelerated and irreversible bone mass, predominantly trabecular through increasing the frequency of activation of new remodeling units, accelerating bone turnover; excessive supplementation of osteoclastic resorption activity; reducing the intestinal calcium absorption by inducing a decrease of the concentration of active vitamin D3 (calcitriol). Progesterone deficiency at women with anovulatory cycles leads to decreased bone mass, especially trabecular. Gonadal androgenic output produces the reduction of cortical and trabecular bone through bone resorption and mineralization reduction; low calcitriol plasma levels and calcium malabsorption; reduction of circulating concentrations of estradiol and calcitonin [1,2,3]. From the above mentioned results: hypogonadal osteoporosis can be prematurely installed, is asymptomatic for a long time and the etiological diagnosis is sometimes laborious; early diagnosis of gonadal insufficiency requires the adoption of prophylactic measures, bone changes from prepubertal, pubertal or postpubertal stage to ensure a maximum bone mass corresponding to sex and age [5,6] .

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## P851

## EFFICIENCY OF LASER THERAPY IN COMPLEX TREATMENT OF RHEUMATOID ARTHRITIS

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**Objective:** Rheumatoid arthritis (RA) affects about 0.4-1% of the population, in Chuvashia - 0.34%. Laser therapy is successfully used to reduce the immune-inflammatory reactions of the body. The purpose of the study is to increase the effectiveness of pathogenetic treatment using laser therapy in a complex of patients with RA.

**Methods:** Surveyed 112 patients with RA with a duration of 3 to 10 y or more (men-30, women-100). The age of patients ranged from 27-61 y. The minimum degree of activity was in 52 (47.7%), the average - in 50 (38.5%), high - in 10 (13.8%) patients. Stage I is observed in 30 (26.9%), II - in 50 (41.5%), III - in 20 - (23.9%), IV - in 12 (7.7%) patients with RA. The patients were divided into groups: Group I - 90 patients who received complex treatment with the use of low-intensity laser therapy according to the method of supervision and Group II - 30 patients who did not receive laser therapy. The control group consists of 22 healthy individuals identified by sex and age of patients with RA. Examinations do not have corticosteroid therapy for at least 3 months prior to the time of the survey. The technique of laser therapy includes cutaneous laser irradiation of the joints in the projection of the joint space. For gluing with a wavelength of 0.89 microns. The pulse frequency is 80-1500 Hz, the pulse power is 5 W, the duration of exposure to the field is 1-2 min, the total radiation time does not exceed 10 min. The course is 10-15 procedures.

**Results:** Pain on a scale VAS in group 1 decreased by 16% compared with the control group. Morning stiffness decreased by 29%, fatigue by 26%. Improved sleep quality was recorded in 19% of patients in group 1 and 5% in the control group. Reduced dependence on the use of NSAIDs in 28%, although the dose of drugs has not decreased. Normalized clinical and laboratory indicators of the activity of the process with a minimum, medium and high degree of activity of the process, stages I and II and the duration of the disease up to 3 y.

**Conclusions:** It is recommended to use laser therapy in patients with rheumatoid arthritis at the second radiological stage in addition to the basic therapy.

## P852

## HYPOPARATHYROIDISM: EVALUATION AND TREATMENT

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Hypocalcemia is one of the most common endocrine disorders. It is caused by low PTH secretion, absence of its receptors, insufficient vitamin D intake or resistance to vitamin D. Clinically, occur acroparastesis. muscle cramps at both the striated and smooth muscles. Other complications are represented by premature cataracts, calcification of the core at the base of the skull, cardiac manifestations, psychic changes [1,2,3,4] . The diagnosis is based on anamnesis, clinical examination and laboratory dosing: total calcium and calcium ionic. serum albumin, magnesium, creatine, serum PTH, vitamin D [5]. The treatment is achieved with intravenous calcium preparations for severe. decompensated cases followed by the administration of oral calcium preparation. Vitamin D preparations are also associated with the recommendation to avoid overdosing. The treatment should be adjusted according to serum levels of calcium, phosphorus and creatinine to avoid precipitation in the tissues of the phosphoalkalic salts

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## P853

## OSTEOPOROSIS MANAGEMENT IN A FRAGILITY FRACTURE PATIENTS AT TERTIARY REFERRAL CENTER, MALAYSIA

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**Objective:** Osteoporosis is defined as deterioration in bone and architecture resulting in weakness of the bone. The major complication is fragility fracture, which occur after a simple fall from standing height. Patients who sustain fragility fracture are at increased risk of sustaining another fracture hence efforts are directed towards secondary fracture prevention. The aim of this study was to identify osteoporosis management in patients admitted with fragility fractures in tertiary university hospital.

**Method:** It is a prospective study. Patient admitted to a university teaching hospital with fragility fractures were identified from the admission registry from January 2017 to December 2017. The demographic data and drug prescriptions related to osteoporosis treatment were obtained upon discharged and within 6 months since diagnosed with fragility fractures.

**Results:** A total of 219 patients (68, 31% male and 151, 69% female) were identified. Mean age was 73.8 years old. Majority of patient sustained hip fracture (n=144, 65.8%) followed by lower limb fracture (n=46, 21%) then upper limb fracture (n=24, 11%) and vertebrae fracture (n=16, 7.3%). 70% of patients were prescribed with calcium and 68% were given vitamin D within 6 months since admission. Only about 39% of patients were given antiosteoporotic drugs.

**Conclusion:** Many studies have shown, only about 20% of osteoporotic fracture patients receive an assessment and treatment for osteoporosis (1). Study from Korea has shown 39% of their patients with hip fracture were prescribed with antiosteoporotic medication and this corresponds with our finding (2). A multidisciplinary team approach is recommended to manage patients with fragility fracture thus the implementation of fracture liaison service (FLS), which has shown better follow-up and improved treatment. Persistent care gap exists for people suffering fragility fractures caused by osteoporosis. Improvement in after fracture care can be achieved by implementing a FLS program in the hospital setting.

**References:**

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## P854

## TEN YEARS OF EXPERIENCE IN FIGHTING OSTEOPOROSIS WITH THE ESCEO-IOF-SONG POWERED BY JOHANN SEBASTIAN BACH

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**Objective:** In order to increase public awareness and knowledge about the osteoporosis, novel measures are necessary. I use the "ESCEO-IOF Song" for many years in the fight against osteoporosis. On its tenth anniversary, I would like to put a spot on my experiences with it.

**Methods:**

- In front of the J.S. Bach memorial in Leipzig I had an idea on October 25, 1992, which I shortly presented in a one minute presentation at the Osteoporosis World Congress 1993 in Hong Kong and named it "J.S. Bach Rule of Osteoporosis Prevention".
- At the World Osteoporosis Day in 2007, I presented an "IOF-Osteoporosis-Song" in a German version which was using the IOF topics of the World Osteoporosis Days from 2004 to 2008. These topics were converted into lyrics and music, arranged by Gert Fischer (Leipzig) and musically accompanied by the brass ensemble of the world famous "Leipziger Gewandhausorchester" in Bad Füssing/ Germany.

**Results:** After agreement of the "Neue Bach-Gesellschaft Leipzig (NBG)" and the choirmaster of the "Leipziger Thomanerchor" Prof. Georg Christoph Biller, I used the "Bach Rule" in over 1800 osteoporosis lectures. The NBG published this rule for its 3800 members worldwide. In a pilot survey of 350 listeners to this osteoporosis lecture, 349 (99%) liked this "Bach Rule". The German version of IOF-Song

2007 has been published in the magazine "Mobiles Leben" (4/2007) of the "Kuratorium Knochengesundheit", a former member of the IOF. The song was also presented at the 2nd International Educational Symposium in Bratislava/Slovakia on September 30, 2008 and the English version had its world premiere at ECCEO 9 in Athens, Greece on March 18, 2009. The song was also translated into Chinese at the 18th International Osteoporosis Symposium in Beijing/China at April 17, 2010. Meanwhile I used the "ESCEO-IOF-Song against Osteoporosis" in the last ten years since 18th March 2009 in over 200 lectures with a total of more than 50 000 listeners.

**Conclusions:**

- The "J.S. Bach Rule for Osteoporosis Prevention" has proved itself in almost two thousand lectures and therefore, hopefully increased the public awareness of the disease.
- The German version of the "IOF-song 2007" shows a very good acceptance, and many osteoporosis support groups have asked for the text and tune, using it for education and raising public awareness.
- The English version of the "ESCEO-IOF-Song against Osteoporosis" at ECCEO 9 in Athens experienced a good acceptance and was published on the website of IOF and ESCEO (see: *Google*: ESCEO – IOF Song Part 2).
- Last but not least, I hope, that the songs "BACH-Rule of Osteoporosis Prevention" and the "ESCEO-IOF Song against Osteoporosis" can remember my honoured surgical colleagues from all over the world: "Don´t forget the prevention of osteoporosis!"

## P855
## STUDIES ON DIFFERENT MODELS OF INFLAMMATION AND INFLAMMATORY PAIN IN DIABETIC AND NONDIABETIC RATS: EFFECT OF IBUPROFEN

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**Objective:** Clinical analysis showed that compared with people without diabetes, those with diabetes were 70 percent more likely to have rheumatoid arthritis, 33 percent more likely to suffer from osteoarthritis, and 29% more likely to have osteoporosis. (Molsted et al., 2018) People with diabetes are at increased risk of developing musculoskeletal complications, but the relationship between these complications and the diabetic control is not clear. Our aim was to compare the models of carrageenan and complete Freund's adjuvant (CFA)-induced inflammation and inflammatory pain in diabetic and nondiabetic rats. The effects of ibuprofen on these two models have been also compared.

**Methods:** Male Wistar rats were used for the experiments in accordance with the procedure approved by the Ethics Committee of the Medical University – Sofia. Diabetes was induced in rats by a single application of streptozotocin (STZ, 75 mg/kg, i.p.) and confirmed by blood glucose monitoring 3 d afterwards. Inflammatory hyperalgesia was induced by intraplantar injection of carrageenan. Adjuvant arthritis was induced by intraplantar injection of CFA. Hind paw volume (swelling) was determined by plethysmometry. Mechanical hyperalgesia was measured by paw pressure test (PPT). Rats were treated with ibuprofen 20 and 40 mg/kg i.p.

**Results:** It was found that the late phase of adjuvant arthritis was more pronounced in the diabetic rats. PPT showed a significant decrease in the paw withdrawal threshold in the diabetic rats. No significant difference was found in swelling and hyperalgesia between diabetic and nondiabetic rats in carrageenan-induced inflammation. Ibuprofen dose-dependently reduced paw volume in carrageenan-induced inflammation and in the early phase of CFA-induced arthritis.

**Conclusion:** Symptoms of CFA-induced arthritis in diabetic rats are more severe compared with those in nondiabetic rats. Ibuprofen by dose-dependent manner reduces paw volume and inflammatory hyperalgesia with no significant difference in the effect in diabetic and nondiabetic rats.

**Reference:** Molsted S et al. Diabetes is associated with elevated risks of osteoarthritis, osteoporosis, and rheumatoid arthritis. Presented at: 2018 European Association for the Study of Diabetes Annual Meeting; October 1-5, 2018; Berlin, Germany. Abstract 1112.

## P856
## MORPHOLOGICAL CHANGES OF THE SPINE IN ELDERLY PATIENTS WITH OSTEOPOROSIS

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**Objectives:** The study objective was to highlight the morphological changes of the spine during the evolution of primary osteoporosis in a target group of patients who received antiresorptive therapy with biphosphates in comparison with the ones who did not receive this treatment.

**Method:** In the retrospective study were included 144 female (70 and 80 years old) with primary osteoporosis and scoliosis divided in two subgroups: the first subgroup 62 patients that had biphosphate treatment for 5 y and the second subgroup 52 patients that did not receive antiresorptive treatment. The spine status was evaluated by measuring the patient's waist and determining the Cobb angle of scoliosis, and also using

the T-score determined by the DXA scan. For these three parameters was made an initial evaluation (T0) followed by two measurements done at 2.5 y (T1) and 5 y (T2).

**Results:** The bisphosphonate group, T-score showed an improvement from -3.9 (T0) to -3.5 (T1) and to -3.3 (T2). The average value of Cobb angle has changed from 12.5° (T0) to 14.3° (T1) and to 16.3 (T2). The mean height of the female patients in the treated group showed a decrease from 163.5 cm (T0) to 162.2 cm (T1) and to 160.1 cm (T2). The group without bisphosphonate treatment, the mean values of T-score depreciation were from -3.8 (T0) to -4.01 (T1) and to -4.2 (T2). The average Cobb angle value has modified from 12.9° (T0) to 14.8° (T1) and to 17.2° (T2). The average height changed from 164.6 cm (T0) to 162.3 cm (T1) and to 160.2 cm(T2).

**Conclusions:** Osteoporosis decreases BMD, with consequences on spine morphology, translated by alignment changes and compression of the vertebrae. The administration of bisphosphonates has the effect of slowing the progression of structural changes induced in the spine by the development of osteoporosis.

## P857

## EFFECT OF HORMONE TREATMENT ON BONE HEALTH IN TRANSGENDER MALES: A SYSTEMATIC REVIEW

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**Objective:** Not much data exists on the effect of transgender hormone treatment on bone health. We conducted a systematic review of studies to examine the effect of hormone treatment on BMD in transgender males.

**Methods:** Two authors independently searched Embase and Medline for studies.

**Results:** 15 studies (8 cohort and 7 cross-sectional, N=607 subjects) were eligible. Subjects were aged between 18-47 y. Duration of hormone treatment ranged from 12 months to 12 y**.** Three studies reported lower BMD at the lumbar spine and hip at baseline compared to controls. Out of the eight longitudinal studies analyzing BMD, three reported significant increase in lumbar spine and others documented maintenance of BMD at spine and hip. Among the 5 studies analyzing BMD at 24 months, significant increase was noted by 3 studies at the lumbar spine and at the femoral neck by one study. Stable trends were noted by two studies at both hip and spine. Data from cross-sectional studies mostly suggested maintenance of BMD at one year. One study documented stabilization up to 10 y.

**Conclusion:** Hormone treatment in transgender males either increases or maintains BMD. Available evidence is weak as most studies have smaller sample size, shorter follow-up and lack control groups. Fracture outcomes have not been reported.

Table. Study characteristics and change in BMD (reported by longitudinal studies)

| | Author | Country | Year | N | Age [years] | Change in BMD |
|---|---|---|---|---|---|---|
| 1 | Meriggiola | Italy | 2008 | 15 | 18-45ª | Spine 0.98± 0.06 vs. 1.01 0.08 |
| 2 | Van Caenegem | Belgium | 2015 | 23 | 27 (7) | Spine 1.029 ±0.085 vs. 1.028 ± 0.084<br>Femoral neck 0.861 ±0.101 vs. 0.862 ±0.102<br>Total hip 0.861 ±0.101 vs. 0.861 ±0.101 |
| 3 | Wiepjes | Belgium, Netherlands | 2017 | 199 | 24 (21-31)ᵇ | Spine 1.028 ±0.121 vs. 1.037± 0.122<br>Total hip 0.951 ±0.116 vs. 0.962± 0.117<br>Femoral neck. 0.836± 0.115 vs. 0.832±0.2 |
| 4 | Pelusi | Italy | 2014 | 15<br>15<br>15 | 30.9 (27.9-33.9)ᵇ<br>29.4 (26.6-32.1)ᵇ<br>28.2 (25.6-30.9)ᵇ | Spine 1.07 (0.96–1.19) vs.1.03 (0.94–1.13)<br>Total hip 1.13 (1.07–1.19) vs.1.13 (1.05–1.19) |
| 5 | Haraldsen | Norway | 2007 | 21 | 25.1 (4.8) | Mean change at the lumbar spine: 0.01<br>Mean change at the total hip: -0.002 |
| 6 | Turner | USA | 2004 | 15 | 37.0 (3.0)ᵈ | *7.8% increase in hip BMD at two years<br>0-984 ±0-05 g/cm2-1-060 ± 0-04 g/cm2;<br>3.1% increase in spine BMD at two years |
| 7 | Van Kesteren | Netherlands | 1998 | 19 | 25.0 (16-39)ᵇ | 1.04 ±0.12 vs. 1.08 ±0.12 at one year |
| 8 | Mueller | Germany | 2010 | 45 | 30.4 (9.1) | Hip 1.07 (0.12) vs.1.08 (0.12)*<br>Spine1.22 (0.14) vs. 1.23 (0.130* |
| 9 | Broulik | Czech Republic | 2018 | 35 | 47 (4) vs 48.2 (4) | No data |
| 10 | Reutsche | Switzerland | 2005 | 15 | 34.3 (5.6)ᶜ | No data |
| 11 | Van Caenegem | Belgium | 2012 | 50 | 37 (8) | No data |
| 12 | Miyajima | Japan | 2012 | 18<br>32 | 33.4 (5.3)<br>33.7 (5.5) | No data |
| 13 | Schlatterer | Germany | 1998 | 10 | 39.9 | No data |
| 14 | Goh & Ratnam | Singapore | 1997 | 5<br>27<br>32 | 22-37ª<br>25-39ª<br>NS | No data |
| 15 | Lips | Netherlands | 1996 | 15 | 30 (6.1) | No data |

*Statistically significant. BMD is expressed as g/cm²
**0 to indicate at time of study (not before start of treatment) ᵃData presented as range only. ᵇData presented as median (IQR) ᶜData presented as mean (95% CI) ᵈData presented as mean (SEM) ᵉData presented as mean (range) ᶠData presented as median and median absolute deviation (MAD) ᵍData presented as median only.
Abbreviations:CHT – cross-sex hormone treatment (ie. testosterone) SARI – 5-alpha reductase inhibitor nAI – aromatase inhibitor
LS – lumbar spine HIP – total hip WB – whole body R – radius TG – transgender TS - transsexual

## P858

## INCIDENCE OF HIP FRACTURE IN A TERTIARY REFERRAL CENTER, MALAYSIA

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**Objective:** Hip fracture is an osteoporosis related fracture with significant consequences for the individual and the society. There is a wide variation in the incidence of hip fracture in the different regions of the world. Aim of the study was to identify incidence of hip fracture and management in our tertiary university hospital, Malaysia

**Method:** It is a prospective study from 1 January 2017 to 31 December 2017. Patients admitted to our tertiary care hospital with hip fracture were identified from the admission registry. The diagnosis and demographics data were recorded. Patients who had fracture following severe trauma or known to have malignancy and atypical fracture were excluded from the study.

**Results:** A total of 144 (45 male and 99 female) were identified with hip fracture. Majorities were from Chinese ethnicity of 95 (66%) patients followed by Malay 42 (29%) patients and Indian 7 (5%) patients. There were 71 patients sustained extracapsular hip fracture and 73 intracapsular hip fractures. 91 patients (63%) had surgical intervention and 53 (37%) were treated conservatively. The average number of days from admission to surgery was 8 d and average length of stay was 15 d. There were 4 (3%) inpatient mortality before operation.

**Conclusion:** Most reliable hip data incidence in Malaysia are from 1996 and 1997, where those over 50 y was 90 per 100,000 individuals per year (1). The inpatient hospital cost for hip fractures in 1997 was estimated to be 6.8 million USD (RM 22 million), not including rehabilitation or nursing care costs. With an ageing population, hip fracture numbers and cost are expected to increase. Hip fractures registries are a good way to improve

knowledge about this condition and its quality of cares. It also can provide a unique opportunity to compare how healthcare systems of different countries are responding to the same clinical challenge.
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## P859

## ROLE OF SHOCKWAVE THERAPY IN IMPROVING JOINT FUNCTION IN PATIENTS WITH SPASTICITY

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**Objectives:** Extracorporeal shock wave therapy is a noninvasive method of treatment which consists in applying shock waves directly to the affected area, thus an acceleration of tissue regeneration is achieved with an improvement of circulation through muscles and tendons and reducing the tissue tension. The aim of the study is to highlight the role of extracorporeal shock wave therapy in patients with varying degrees of spasticity after stroke by restoring the correct posture of affected limbs and improving the joint function.
**Method:** The study included 50 patients. All of them presented on admission a 3rd grade spasticity on the Ashworth scale. Patients were divided into two groups: group A patients followed treatment with central myorelaxants and group B patients received, additional to the drug therapy, shockwave therapy aiming towards spastic muscles. The patients were evaluated, initially and after 3 weeks, with VAS scale of limb pain, Ashworth spasticity scale and 6MWD scale.
**Results:** The evaluations revealed that the pain was decreased by 25.2% more at the patients from B group comparing with the first group. Spasticity remained unchanged in the first week, and at the final assessment we observed an improvement of 32.4% at the patients from group B. The walking distance measured by 6MWD scale also had an improvement of 13.4 more meters at patients from group B who received shockwave therapy
**Conclusions:** Shockwave therapy has been proved to be beneficial in reducing spasticity in patients with stroke in combination with drug therapy. In addition to therapeutic use, we must highlight that it is a noninvasive, easy to use method with insignificant side effects.

## P860

## BODY MASS INDEX IS ASSOCIATED WITH IMPROVED BONE MINERAL DENSITY: EVIDENCE FROM AN IRISH POPULATION

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**Objectives:** Recent studies have challenged the traditional view that high BMI is protective against osteoporosis, particularly in people with a BMI ≥40 kg/m$^2$ (1). Our aim was to establish the relationship between BMI and BMD in patients attending a Bone Health Clinic and to explore the association in the very obese.
**Methods:** Data was obtained from a database of patients attending a tertiary Bone Health Clinic from 2003-2018. We analysed the relationship between BMI and BMD at AP spine, total hip and neck of femur and in a subgroup with BMI >40 kg/m$^2$. We also looked at the relationship between vertebral fractures and BMI.
**Results:** We identified 4740 patients; mean age was 66.97 years and 1319 (27.8%) had ≥1 vertebral fractures. There was a positive correlation between BMI and BMD at all sites: total hip ($r$=0.44, $p$<0.0001), AP Spine ($r$=0.128, $p$<0.0001), femoral neck ($r$=0.291, $p$<0.0001), independent of age. In those with BMI > 40 kg/m$^2$, there was a negative trend between BMI and BMD at all *sites (r=-0.266, p=0.155).* In addition, patients with vertebral fractures were more likely to have a higher BMI ($p$=0.01).
**Conclusions:** This study confirmed that BMI is associated with greater BMD. This effect was particularly pronounced in total hip BMD, possibly reflecting the protective effect of weight-bearing. This protective effect of BMI may be lost in those who were very obese. Higher BMI was associated with a greater prevalence of vertebral fractures, a relationship previously noted in a number of small studies (2), but not before demonstrated in a study of this size (3).
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1. Oldroyd A et al. *Int J Clin Pract* 2014;68:771.
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## P861

## NEUROLOGICAL EVENTS POSTSYNTHETIC REMISSION THERAPY AND BIOLOGICAL THERAPY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objectives:** Rheumatoid arthritis benefits from modern therapies that have greatly reduced disease progression. Of these, the most important are biological therapies. We aim to assess neurological risk in a cohort of patients with rheumatoid arthritis over 2 y in DMARDs therapy and biological therapy.

**Method:** 95 patients were enrolled in the study who were in 2-y treatment, 50 patients with biological therapy and were initially evaluated neurologically at 1 y and 2 y, and the group of patients with remission therapy, 45 patients: 23 patients treated with leflunomide and 22 patients treated with methotrexate. The biological therapies used included chimeric anti-TNFα5 antibodies, partially humanized anti-TNF receptor α23 antibodies, fully immunized anti-TNF α12 antibodies and anti-CD4-10 antibodies. Patients were clinically evaluated, imaging skull and electrophysiological electromigraphy.
**Results:** Clinical evaluation revealed 23 neurological clinical events in group with DMARDs (paraesthesia-6, dizziness-9, headache-5, superficial sensitivity-3, sensory-motor-2 neuropathy). The group of patients in biological therapy presented only 12 clinical events (paraesthesia-2, headache-4, dizziness-6, visual disturbances -4 disorders, superficial sensitivity disorders-1, deep-sensitivity disorders-1). MRI imaging has evolved into the group in biological therapy 9 cases with nonactive demyelinating lesions, 5 cases with mild cortical atrophy. The DMARDs treatment group presented only 1 cases of cortical atrophy without demyelinating lesions. The electrophysiological evaluation revealed 11 cases of changes in sensory nerve speed in patients with remission therapy and 2 cases of reduction of nerve speed motors. The biological treatment group had only 2 cases of sensory nerve speed reduction.
**Conclusions:** Although neurological manifestations have existed in both groups, a profile of neuropathic affections in patients with synthetic remission therapy DMARDs is configured, and in those who undergo biological treatment, the prevalence of central lesions but without clinical expression is established.

## P862
## OSTEOPOROSIS AND OSTEOPOROTIC BONE FRACTURES IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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**Objective:** Osteoporosis and osteoporotic bone fractures significantly contribute to the morbidity and mortality in patients with systemic lupus erythematosus (SLE). It is thought that inflammation is an important predictor of increased bone fragility due to the action of inflammatory mediators, factors involved in a disturbed immune system, and bone remodeling. The activity of a chronic inflammatory disease could be one of the principal factors of osteoporosis in SLE patients, and suppression of the inflammation and disease remission is important for the prevention of osteoporosis, among other things. Our aim was to examine BMD in SLE patients, prevalence of osteoporotic fractures and association of BMD with disease activity, organ damage and quality of life.
**Methods:** The study involved 105 SLE patients, hospitalized at the Clinic of Rheumatology, Institute Niška Banja, in whom the diagnosis was made based on the revised ACR criteria (1997 update). In addition to a clinical examination, in all enrolled patients the disease activity was evaluated using the *Systemic Lupus Erythematosus Disease Activity Index* (SLEDAI), organ damage was evaluated using the SLICC/ACR damage index (SDI), quality of life using the *Medical Outcome Survey Short Form 36* (SF-36). The measurement of BMD of the lumbar vertebrae L1-L4 and the hip was performed using DXA on the Hologic x-ray system. Osteoporosis and osteopenia were determined based on the 1994 definition by the WHO.
**Results:** The studied group involved 94 women (89.52%) and 11 men (10.48%) aged on the average 45.04±10.49 y. Their average disease duration was 10.26±8.34 y. Normal bone density was found in 27 patients (25.71%), osteopenia in 66 (62.86%), and osteoporosis in 12 patients (11.43%). Fifteen patients (15.29%) had osteoporotic fractures, out of which 12 (80%) had BMD values corresponding to osteopenia, and 3 (20%) patients the values corresponding to osteoporosis. The subgroups with osteopenia and osteoporosis had significantly longer disease duration compared to those with normal BMD ($p<0.05$). The patients from the group with osteoporosis had significantly higher prednisolone doses in their therapy ($p<0.05$) compared to the subgroup with normal BMD. There were no significant differences in the activity of their disease measured by SLEDAI between the studied subgroups, nor between the patients with osteoporotic fractures and those without osteoporotic fractures. There was a negative correlation between BMD values at the level of L1-L4 vertebrae and damage index ($r=-0.236$, $p<0.05$), and positive correlation with quality of life: physical health ($r=0.224$, $p<0.05$), mental health ($r=0.208$, $p<0.005$), and general health ($r=0.209$, $p<0.05$). BMD at the level of the hip did not demonstrate correlation with any of the studied parameters.
**Conclusion:** Lower BMD values in SLE patients are associated with longer disease duration, higher doses of prednisolone, higher organ damage index and poor quality of life. The SLEDAI activity index in this studied group did not show any correlation with BMD. Spine BMD measurement in SLE patients is a better indicant of bone changes and bone fragility compared to hip BMD measurement.

## P863
## TWO CASES OF OSTEOPETROSIS: PRESENTED WITH AND WITHOUT FRACTURE

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**Objective:** Osteopetrosis is a very rare metabolic bone disease usually is not associated with fracture. Here we report two

consequent osteopetrosis cases one presented with fracture the other with loss of hear.

**Case 1:** 28 years old male patient diagnosed osteopetrosis during childhood with bone biopsy, no mental disorder and fracture history. He complains bilateral progressive hear loss for the last 3 y. He referred to our endocrinology clinic to rule out Paget disease of bone. His physical examination reveals large head appearance. There was no feature and family history of bone disease His bone scintigraphy reported diffuse osteoblastic activity increased in scalp and bilateral extremity periostal reaction associated with hypertrophic osteoarthropathy. Mix type hear loss was detected. Biochemistry test results were calcium (Ca) 9.7 mg/dL (N:8.8-10.6), phospor (P) 2.6 mg/dL (N:2.4-4.4), 25(OH)vitamin D 20.94 ng/mL (N:30-100), PTH 42.1 pg/mL (N:15-65), alkaline phosphatase (ALP) 99 U/L (N:30-120), C-telopeptide (CTx) 0.73 ng/mL(N:0.12-0.95) and osteocalcin 0.48 ng/mL (N:0.4-8.2). DXA showed that increased BMD levels (L1-L4 BMD 2.778 g/cm$^2$. Z-score 13.6; femur neck BMD 2.779 g/cm$^2$. Z-score 13.6).

**Case 2:** 52 years old women diagnosed osteopetrosis by genetic testing during childhood . She has a history of multiple hip, arm fractures for the last 15 y and a recent mandible fracture after teeth extraction. Her aunt and cousin had a clinical diagnosis of osteopetrosis. She complained purulant secretion from skin fistula on left mandibular area after teeth extraction. Plastic surgery refer to our endocrinology clinic for the further evaluation. She was on armchair due to the defects of left arm and leg. Mandibular asymmetry and left mandibular skin fistula was observed. Biochemistry exam was in normal range except elevated alkaline phosphatase level. (Ca 10.2 mg/dL, P 4.7 mg/dL, PTH 34 pg/mL, ALP 168 U/L, CTx 0.19 ng/mL, osteocalcin 5.45 ng/mL). Bone scintigraphy reported increased osteoblastic activity in cranium, bilateral proximal humerus and left femur right 9. costa and 11.costa. DXA showed showed that increased BMD levels (L1-L4 BMD 2.758 g/cm$^2$ T-score 13.0. Z-score 14.0; femur neck BMD 2.109 g/cm$^2$, T-score 9.7 Z-score 10.4). Antibiotic treatment was modified for mandibular osteomyelitis.

**Conclusion:** Although osteopetrosis known as a stable disease osteopetrosis patients need lifelong follow-up for complications including fracture and osteomyelitis.

## P864
## VITAMIN D AND CALCIUM LEVELS IN SARAJEVO CANTON CHILDREN FROM 8-12 YEARS OF AGE WITH VERIFIED SPINE DEFORMITIES

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**Objective:** Vitamin D and calcium play an important role in the formation of bone tissue inciting osteoblasts to develop increased quantities of osteocalcin – bone proteins and alkaline phosphatases. Optimum vitamin D and calcium levels, especially during the stage of fast growth and development of children, play a decisive role in the proper mineralization, maturation, bone tissue formation and in the reduction of risk factors concerning bone tissue deformities. Our aim was to establish serum vitamin D and calcium levels in the Sarajevo Canton area children from 8-12 y of age with diagnosed spine deformities.

**Method:** The research involved 121 children, their age ranging from 8-12 y. They were diagnosed some of the spine deformities, verified both clinically and by x-ray images. as well as treated in CBR Saraj Polje within the period from 1 October 2017 to 1 October 2018. To all the patients total serum vitamin D and calcium concentration as well as body weight index were verified.

**Results:** The research group covered 121 children, of which 56% (68) were girls and 44% (53) were boys of 10.3 average age. Average D vitamin level in the quoted group amounted to 28.5 ng/ml, with the variable ranging from 11.2-51.2 ng/ml, whereas the average level of BMI amounted to 18.02 kg/m$^2$, the variable ranging from 14.0-25.4 kg/m$^2$. Insufficient D vitamin level was registered in 56.4 (68) children. Average D vitamin level in the quoted group amounted to 21.7 ng/ml, the variables ranging from 11.2-29.8 ng/ml. Average BMI level of the group amounted to 17.14 kg/m$^2$. The group of children consisted of 77.3% (53) girls, with the average D vitamin level of 20.8 ng/ml, and of 22.7% (15) boys with the average D vitamin level of 24.9 ng/ml. The most frequent spine deformity in the group was scoliosis vertebrae lumbalis sinistroconvexa, diagnosed in 41% (28) children of the group. Calcium serum levels in all the patients were within referential levels, with variables ranging from 2.20-2.51 mmol/L, the average amounting to 2.34 mmo/L.

**Conclusion:** The above research showed that the children between 8-12 y of age with diagnosed spine deformities exhibit insufficient D vitamin levels, 56.4% of them requiring therapeutic intervention, adjusted to their exclusive individual needs and strict follow-up. Also, the above results require serum vitamin D follow-up in the fast growing and development stage of the children in order to prevent vitamin D insufficiency in the children of the quoted ages.

## P865
## EPIDEMIOLOGY OF RHEUMATIC DISEASES IN KAZAKHSTAN

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**Objective:** Diseases of the musculoskeletal system and connective tissue (DMSCT) are on the leading position on the negative impact on society. The aim of this study was to analyze the number of cases and prevalence of major rheumatic diseases (RD) in Kazakhstan.

**Methods:** The incidence and prevalence of RD according to the official medical statistical report (form No.12, Medinform) of Kazakhstan for 2012-2017 was analyzed.
**Results:** The proportion of DMSCT in the overall morbidity structure of the country's population was 4.9% (2017). The total number of patients with DMSCT in 2017 was 941,629, of which 364,762 were first identified (5220.4 and 2022.2 per 100,000 of the whole population, acc.). The increase rate was 33.1%. The greatest proportion (19.2%) in the structure of RD had osteoarthritis (OA). The prevalence of OA increased 2.7 times for this period from 365.4 per 100,000 (61,355 cases) to 1002.6 per 100,000 population (180,849 cases). 70.2% of patients with OA were women (2017). The number of patients with rheumatoid arthritis was increased 1.8 times: in 2012 – 40,158 (239.2 per 100,000 of population), in 2017 – 73,826 cases (409.3/100,000). 76.2% of patients were women (2017). The number of patients with systemic pathology of connective tissue was increased 1.3 times during the analyzed period: in 2012 – 7,421 (44.2 per 100,000 population), in 2017 – 9,661 cases (53.6/100,000), of which 81% were women. From this group, patients with systemic lupus erythematosus (SLE) are distinguished. In 2012 - 2,732 (16.3 per 100,000 population), in 2017 - 4,448 patients (24.7/100,000) with SLE were identified and the number was increased 1.5 times for this period. Patients with osteoporosis in the adult population have been registered only in recent years: in 2012 – 1,129 patients (9.6 per 100,000 of adult population), of which first diagnosed - 307 cases (2.6/100,000 of adult population), in 2017 – 1,526 patients (12.4/100,000) and 456 cases (3.7/100,000), acc. The prevalence of acute rheumatic fever decreased 4.8 times for the analyzed period: in 2012 – 5,245 cases (31.2 per 100 thousand of population), in 2017 – 1,181 (6.5/100,000) were identified, of which the diagnosis was first established in 1,035 (6.2/100,000) and 645 patients (3.6/100,000, respectively). The number of patients with rheumatic heart disease was decreased 1.6 times: in 2012 – 33,361 (198.7/100,000), in 2017 – 22,422 cases (124.3 per 100,000 population), but the incidence was still high - 15.3 per 100,000 population (2017).
**Conclusion:** The analysis of the incidence and prevalence rates of rheumatic diseases suggests that the social significance of the problem remains. High growth rates of major rheumatic diseases may be associated with improved diagnostics, but require further improvement of specialized care, the use of innovative technologies in the early diagnosis and treatment of patients.

## P866
## HUMOR AS PSYCHOLOGICAL STRENGTH IS ASSOCIATED WITH LESS PAIN INTENSITY INDEPENDENT OF CLINICAL AND RADIOLOGICAL SEVERITY OF KNEE OSTEOARTHRITIS

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**Objective:** Positive psychology interventions have been shown to be effective in improving psychological and physical wellbeing in general populations and patients with chronic pain. The goal of the current exploratory cross-sectional study is to identify psychological strengths that can be targeted in patient with osteoarthritis (OA) for subsequent development of positive psychology interventions.
**Methods:** A consecutive 147 OA patients referred to a joint replacement center participated in this study. They complete a questionnaire measuring their psychological strengths and emotional experience. Radiographs of knee were taken and physical examination of the knee were performed and also quantified with Knee Society Score and Oxford Knee Score.
**Results:** Correlational analysis revealed that humour, a psychological strength, is significantly correlated with both psychological (increased positive emotional experience, r=.31, p<.01) and medical (decreased perceived pain intensity, r=-.29, p<.01) outcomes. In subsequent hierarchical regression analyses, we found that humour has significant incremental predictability even after controlling for the disease severity (radiographic Kellgren-Lawrence grading, range of movement, alignment, and knee scores), emotional experience, and demographical measurements (r2=.09, p<.01).
**Conclusion:** Our results are the first to show that people with higher humour have less pain intensity, independent of clinical and radiological severity of knee osteoarthritis. This study suggests that humor could be a potential therapeutic target for chronic pain associated with knee osteoarthritis and further studies to investigate its biological pathway (like change in endorphins level) and using positive psychology interventions to cultivate humor in OA patients for pain relief are warranted.

## P867
## IS CALF CIRCUMFERENCE A VALID CLINICAL MEASURE FOR EVALUATING MUSCLE MASS IN THE ELDERLY?

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**Objective:** Sarcopenia, resulting from reduced skeletal muscle mass is associated with aging and is a major public health consideration for its functional consequences. Calf circumference (CC) measurements, which are simple to obtain and non-invasive, have been used as a tool for assessing nutritional status and muscle mass in general population. The aim of this study was to explore whether calf circumference and its cutoff values are a valid tool for assessing muscle mass in the elderly.

**Methods:** The study's cohort consisted of community-dwelling Greek elderly recruited from two sited; the University Hospital of Rio, Greece and the laboratory of Technological Educational Institute of Western Greece. Muscle mass was assessed using bioelectrical impedance (BIA) analysis. Calf circumference was measured with inelastic tape with the elderly participants in the upright position, with feet 20 cm apart. CC was measured at the calf's greatest girth. The receiver operating curve (ROC) analysis was performed to determine cutoffs of CC.
**Results:** A total of 331 adults (females 248; males 83) aged 60-95 y (71.55±7.49) participated in the present cross-sectional study. Testing the validity of CC as a proxy marker for low muscle mass, an area under the curve (AUC) of 0.82 for males and 0.84 for females were found and their optimal cutoff values of CC were 34.5 cm for males and 33 cm for females. Skeletal muscle mass index (SMMI) were positively correlated with CC (males $r$=0.53; females $r$=0.49).
**Conclusion:** CC can be used as a measure for identification of muscle mass decrease in routine evaluations of the elderly in primary care. The suggested cutoff values of calf circumference for predicting low muscle mass are <34 cm in men and <33 cm in women.

## P868
## PREVALENCE OF VITAMIN D DEFICIENCY AND ITS DETERMINANTS IN PREDEFINED MYANMAR HEALTHCARE-USER POPULATIONS

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**Objective:** To determine the prevalence of vitamin D insufficiency (21-29 ng/ml) and deficiency (≤20 ng/ml), in at-risk groups compared to healthy volunteers in Myanmar.
**Methods:** We recruited 181 participants (age ≥45 y) in this cross-sectional study: Group 1 (n=60) with acute osteoporotic fragility fractures; Group 2 (n=60) outpatients who had prior fragility fractures (>6 weeks) and/or had clinical risk factors; Group 3 (n=61) age-matched healthy volunteers. Comparison is made for vitamin D (25OHD), calcium, phosphate, alkaline phosphatase, PTH after capturing demographic, dietary and lifestyle factors.
**Results:** Mean 25OHD concentrations were 19.83, 24.69 and 16.40 ng/mL for groups 1, 2 and 3. Group 2 (at-risk outpatients) had higher 25OHD compared to group 1 (P=0.012) and group 3 (P=0.00). Vitamin D deficiency (≤20 ng/mL) was found in 51.7%, 31.7% and 81.6% and insufficiency (21-29 ng/mL) in 40%, 46.6%, 11.7% for groups 1 to 3. Multiple logistic regression analysis after adjusting for covariates (age, sex, diet, exercise, smoking, alcohol) showed adjusted OR of 0.36 in group 2, 3.51 in group 3 compared to group 1 ($p<0.05$).
**Conclusion**: Vitamin D deficiency and insufficiency is common in Myanmar. Age, BMI and activity levels did not affect 25OHD in this study. Our findings mirror previous literature showing low 25OHD in Asian populations. Skin pigmentation, dietary choices and traditional clothing may be contributory. Healthy controls (group 3) were health professionals: their indoor urbanised work pattern may be relevant. More research is needed to inform strategies to optimise vitamin D status in Myanmar population.

## P869
## STANDARDIZED INCIDENCE OF OSTEOPOROTIC FRACTURES IN THE REPUBLIC OF KAZAKHSTAN

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**Objective:** There is scant information on the epidemiology of fracture in Kazakhstan. The aim is to determine the incidence of osteoporotic non-vertebral fractures in women and men aged 50 y and over in Kazakhstan based on regional data.
**Methods:** This study is the component of the international multicenter "Epidemiology of osteoporotic fractures in Eurasian counties" study (EVA). We carried out a population-based survey in Taldykorgan, which is representative to the entire country in terms of ethnicity, gender and age distribution. The low-energy nonvertebral fractures, in 2015-2016, retrospectively from hospital registers and in 2017 prospectively with the inclusion of information from primary care sources were identified.
**Results:** The annual age-standardized hip fracture incidence among people of 50 y and older was 338/100,000 for women and 226/100,000 for men, the distal forearm fracture rate reached 755/100,000 for women and 201/100,000 for men, humerus fracture incidence was 242/100,000 for women and 114/100,000 for men. These epidemiological data allow attributing Kazakhstan to high rank countries of osteoporotic fractures for men and women.
**Conclusion:** The Republic of Kazakhstan is in dire need in programs aimed at prevention, early detection and treatment of osteoporosis. These age- and sex-specific osteoporotic fracture incidences is going to incorporate into the 'authentic' FRAX model for Kazakhstan.

## P870

## VALIDATION OF THE FRACTURE RISK ASSESSMENT TOOL (FRAX) CALCULATOR IN TAIWAN: TWO COHORTS STUDY

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**Objectives:** In 2030, the aging population will reach to 20% in Taiwan. The incidence of osteoporotic hip fracture in Taiwan was 9th ranking in Worldwide and top one ranking in Asia-Pacific regions. Taiwan FRAX® calculator was launched in 2010, but the appropriateness had never been validated by the long-term follow-up cohort.

**Methods:** The two cohorts including 776 (M/F=408/468) subjects aged 65 from Tianliao district in 2009-2010 and 1200 (M/F=524/676) subjects aged 40 and over from Douliou district in 2009-2010 were follow-up. The clinical risk factors (CRFs) for osteoporotic fracture were assessed along with DXA derived BMD to generate the baseline FRAX (with or without BMD) either major osteoporotic fracture (MOF) or hip fracture (HF) scores accordingly. We identified all claims records of outpatient clinic emergency room visits or hospital admissions of patients from 2009-2016 in the Taiwan National Health Insurance Research Database (NHIRD). The primary outcomes were the rate of major fractures (vertebral, hip, upper arm, or wrist), hip fracture and non-hip fracture according to ICD 9.0 code. Pathological fractures and high-energy fractures were excluded.

**Results:** Of the 1573 subjects with completed data, the fracture rate of major fracture is 1.843% (1843/100,000 population) during 2009-2016. Using the cutoffs by MOF FRAX score ≥20% or HF FRAX score ≥3%, the fracture rate were significantly higher in high score group (either with or without BMD, MOF or HF) (The ratio of fracture rate between high and low score group were shown in Table).

| | FRAX HF Score (without BMD) At 3% | FRAX HF Score (with BMD) At 3% | FRAX MOF Score (without BMD) At 20% | FRAX MOF Score (with BMD) At 20% |
|---|---|---|---|---|
| Hip Fracture | 15.94 | 15.42 | 9.51 | 4.99 |
| Non-Hip Fracture | 2.91 | 4.03 | 1.85 | 7.22 |
| Major Fracture | 4.02 | 5.18 | 4.26 | 6.91 |

**Conclusions:** The 2010 Taiwan FRAX is preliminarily validated and the cutoffs of MOF at 20% and HF at 3% are acceptable. However, the different cutoffs might be needed to provide better discrimination of high risk patients in advance.

## P871

## APPLICATION OF FRAX® FOR THE DEVELOPMENT OF SPECIFIC INTERVENTION THRESHOLDS IN OSTEOPOROSIS TREATMENT IN RUSSIAN FEDERATION

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**Objective:** To determine the reasonable treatment threshold for Russian Federation (RF).

**Methods:** The FRAX-based probabilities using Russian FRAX model were calculated in 3866 unselected postmenopausal women aged 50 y or more from 6 DXA centers from different parts of RF. Different intervention thresholds including a fixed threshold irrespective of age (20% for major osteoporotic fractures [MOF] and 3% for hip fracture [HF]), age-dependent (AD) thresholds (European and Russian thresholds based on the probabilities of MOF) and hybrid threshold (AD threshold with a transition to fixed thresholds of 20% for MOF and 4% for HF at 70 years and older) were tested. The proportion of women eligible for treatment using different intervention thresholds was calculated.

**Results:** In the sample tested the mean 10-y probability of MOF was 13.8%, HF - 2.4%. For fixed threshold 26.8% women aged 50 y or more were eligible for treatment, for Russian AD threshold (for MOF and HF) - 27.4%, for European AD threshold – 53.6%. For hybrid threshold (for MOF and HF) 31.8% women aged 50 y or more were eligible for treatment. The fixed thresholds (20% for MOF and 3% for HF) identified for treatment 12% of women aged 50-54 y and 72% in age group of 80 y and older. The use of AD thresholds identified very low proportion of women aged 80 y and older eligible for treatment: the European threshold found 5% and the Russian

threshold – 18%. In contrast, in women aged 50-54 y 90% were eligible for treatment using the European threshold and 28.3% - using Russian threshold. The use of both Russian hybrid thresholds (MOF and HF) identified 28.3% of women aged 50-54 y and 64% in older age groups (85 y and older).
**Conclusion:** In Russian sample, combination of intervention hybrid thresholds for MOF and HF identified the most reasonable proportions of women in different age groups.

## P872
## COMPARISON OF JAW OSTEONECROSIS OCCURRENCE AFTER TOOTH EXTRACTION IN PATIENTS WITH AND WITHOUT BISPHOSPHONATE TREATMENT

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The objective of the observation was to evaluate occurrence of the jaw osteonecrosis (ONJ) in osteoporotic patients in the Czech population. 75 patients mean age 62.67±8.66 with antiresorptive treatment longer than 3 y were observed. The patients were split according the type of medication: alendronate, ibandronate, risedronate, denosumab and combined antiresorptive treatment. Number of extracted tooth, severity of osteoporosis as a T-score in LS spine and hip and in case of longer therapy also the length of drug holiday in months was evaluated. Number of vertebral, hip and nonvertebral fractures before and during antiresorptive treatment, concomitant treatment with proton pump inhibitors or corticoids, occurrence of diabetes as a risk factor and atypical fractures as a treatment complication were also evaluated. The authors observed a frequency of OPG scans of jaw before beginning of treatment. There was no ONJ found. The set of 10.000 osteoporotic patients with tooth extraction and antiresorptive therapy shorter than 3 y or calcium and vitamin D supplementation was used as a control group. The set of 5.000 oncology patients after tooth extraction was used as the second control group.
The authors compared the incidence with own ONJ database, 24 women osteoporotic patients and 49 men oncology patients. The authors found no case of osteonecrosis when the patients were treated in University Clinic of Stomatology. All patients with ONJ were treated in other institutions and the University Clinic was involved in complication treatment after tooth extraction in nonuniversity institutions. The most significant values of the statistical evaluation; age (mean 62.67, median 8.53) and duration of treatment completed (mean 9.17, median 8.53), reveal the "Most at risk patient". aged in the 7th decade with 10 y of treatment. The situation in oncology patients group was different. The preventive stomatology examination with antibiotic prophylaxis was not standardly used in patients with highly dosed short term antiresorptive therapy and concomitant antiangiogenic treatment.

## P873
## RESULTS OF TECAR THERAPY IN PATIENTS WITH ACUTE OR CHRONIC SHOULDER PAIN

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**Objective:** To investigate the effect of Tecar therapy on patients with shoulder pain. The device used is composed of a generator that distributes signals at a frequency 0.5 MHz at a maximum power of 300 W.
**Methods:** A total of 40 patients who applied to our clinic with acute or chronic shoulder pain and complied with the selection criteria were included in the study. The patients were randomly assigned into Group I ($n$=20, Tecar treatment) and Group II ($n$=20, control). In Group I, patients were given Tecar treatment and an exercise protocol for 10 sessions during a period of 2 weeks. The sessions were started with resistive treatment with an electrode positioned on the area to be treated for 10 min, followed by another 10 min with a capacitive electrode applied. In Group II, placebo Tecar therapy and the same exercise protocol was given for the same period. Patients were evaluated according to the parameters of pain, palpation sensitivity, algometric sensitivity and shoulder joint range of motion before and after treatment.
**Results:** Analysis of measurement results within each group showed a significant posttreatment improvement for some active and passive movements in both groups, and also for algometric sensitivity in Group I ($p<0.05–0.01$). Posttreatment palpation sensitivity values showed improvement in 17 patients (85%) for Group I and six patients (30%) for Group II. The majority of the patients in Group I expressed a reduction in pain evaluated on a visual analogue scale (VAS) and the changes were statistically significant in acute and chronic cases. Comparison between two groups showed superior results ($p<0.01$ and $p<0.001$) in Group I for the parameters of pain, passive extension and palpation sensitivity but no significant difference for other parameters.
**Conclusions:** The results of our study have shown better results in pain, palpation sensitivity and passive extension, but no significant improvement active range and algometric sensitivity in Tecar treatment group compared to the control group in the patients with shoulder pain.

## P874
## RAPAMYCIN IMPROVES BONE MASS IN HIGH-TURNOVER OSTEOPOROSIS WITH IRON ACCUMULATION THROUGH POSITIVE EFFECTS ON OSTEOGENESIS AND ANGIOGENESIS

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**Objective:** Iron accumulation is an independent risk factors of I type osteoporosis, and mTOR plays an important role on the

crosstalk between osteogenesis and angiogenesis. Our aim was to identify the role of mTOR in the high-turnover osteoporosis with iron accumulation, the underlying molecular mechanism, and whether rapamycin can target at mTOR treating I type osteoporosis with iron accumulation effectively.
**Methods:** We establish mouse models of iron accumulation and transgenic mouse models ($Hepc^{-/-}$) of high-turnover type osteoporosis with iron accumulation to observe the variety of mTOR in these mice, and treat osteoblasts with FAC to watch mTOR in vitro. Then we injected rapamycin to mouse models of high-turnover osteoporosis with iron accumulation, transfected the FAC treated osteoblasts with mTOR relative siRNA and cultured HUVECs with CM extracted from osteoblasts, to detect indexes of bone, osteogenesis and angiogenesis in bone and in vitro. Finally, relative biomarkers of cell signaling pathways were measured.
**Results:** We found the osteoblastic mTOR was activated both in mouse models of iron accumulation and high-turnover osteoporosis with iron accumulation, and the deteriorative bone, osteogenesis and angiogenesis induced by iron accumulation were improved by suppressing mTOR with rapamycin in mice and siRNA transfection in vitro. The mTOR/STAT1/Cxcl9 pathway signals were stimulated by iron accumulation in osteoblasts.
**Conclusion:** Our study shows that iron accumulation impairs the bone regeneration of osteoporosis via osteoblastic mTOR/STAT1/Cxcl9 pathway, and rapamycin can target at mTOR improving osteogenesis and angiogenesis in bone of high-turnover type osteoporosis with iron accumulation to increase bone mass.

## P875
## MATERNAL FOKL VDR POLYMORPHISM IS A DETERMINANT OF BOTH MATERNAL AND NEONATAL 25(OH)D STATUS AT BIRTH: A VALIDATION COHORT FROM NORTHERN GREECE

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**Objective:** Accumulating evidence underlines the relationship between optimal 25-hydroxyvitamin D [25(OH)D] concentrations during pregnancy and normal fetal growth and development. We aimed to assess the role of VDR FokI (rs10735810) gene polymorphism as a determinant of maternal and neonatal 25(OH)D status in a Greek cohort of mothers and their children.
**Methods:** We studied 70 pairs of newly delivered neonates and their mothers at birth. Only healthy mothers with full-term, uncomplicated births were included in the study. VDR FokI polymorphism was assessed in mothers and children using polymerase chain reaction and restriction fragment length polymorphism analysis. Maternal and neonatal 25(OH)D levels were determined at the time of birth.
**Results:** Mothers' mean age, term BMI and gestational age were 31.9±0.7 y, 29.6±0.7 kg/$m^2$and 38.8±0.2 weeks, respectively. Both mothers and children were found to be vitamin D deficient [25(OH)D concentrations 45.6±3.1 and 40.6±2.6 nmol/l, respectively]. Maternal 25(OH)D concentrations were found to be positively correlated with neonatal 25(OH)D status ($p<0.001$). Maternal heterozygosity (Ff genotype) was significantly related to lower maternal and neonatal 25(OH)D concentrations ($p=0.02$ and $p=0.003$, respectively). In contrast, no significant association between neonatal VDR FokI status and neonatal 25(OH)D concentrations was observed.
**Conclusions:** Results from a vitamin D deficient maternal–neonatal cohort from Northern Greece, indicate a strong impact of maternal vitamin D status during pregnancy on neonatal 25(OH)D concentrations and suggest that this relationship is mediated by maternal polymorphisms in vitamin D regulatory genes. Further trials with larger sample sizes are needed in order to validate our findings, from this region.

## P876
## EFFECT OF ZOLEDRONIC ACID ON TRABECULAR BONE SCORE AND OTHER MARKERS OF BONE HEALTH IN HEART TRANSPLANTED PATIENTS

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**Objective:** Trabecular bone score (TBS) is understudied as a marker of bone health in heart transplanted patients. The aim of our pilot study was to evaluate the effects of zoledronic acid (ZA) on bone health including TBS in this population.
**Methods:** We included 13 treatment naïve (TN) patients (9 men, 4 women) and 9 patients (8 men, 1 women) who already received at least one application of ZA (TR). All patients received cholecalciferol, alfacalcidiol and calcium supplements. We measured TBS, BMD, corrigated calcium (cCa), estimated glomerular filtration (eGF), c-terminal telopeptide (CTX), procollagen type I N propeptide (PINP), intact PTH (iPTH).

**Results:** Time from transplantation was 6.2±5.4 months for TN and 76.1±66.1 month for TR. In TR compared to TN, there were lower CTX 1151.9±557.7 pmol/L; 2936.6 ±1763.0 pmol/L; p<0.009), lower Ca (2.11±1.0 mmol/L; 2.24±0.7 mmol/L; p<0.002), and higher iPTH (83.6±46.1 ng/L; 44.8±18.9 ng/L; p<0.017). There were no significant difference in TBS (1.285±0.08; 1.274±0.13), lumbar BMD (0,935±0,08 g/cm$^2$; 0,901±0,19 g/cm$^2$), neck BMD (0,681 ±0,09 g/cm$^2$; 0,731±0,14 g/cm$^2$), hip BMD (0,846±0,12 g/cm$^2$; 0,893±0,16 g/cm$^2$), T-score on lumbar (-1.4±0.7 SD; -1.6±1.8 SD), neck (-1.7±0.6 SD; -1.4±1.0 SD) and hip (-1.0 ±0.8 SD; -0.8±1.0 SD), PINP (39.39±13.53; 52.64±44.33), and eGF (76±14 mL/min/1.73 m$^2$; 70±18 mL/min/1.73 m$^2$), between TR and TN. No patients had fractures in the time of observation.

**Conclusions:** CTX was significantly lower in TR than in TN. Lack of difference in TBS and BMD despite the longer exposure to corticosteroid and immunosuppressive treatment in TR compared to TN also implied a protective role of ZA on bone health after heart transplant. Our results indicated that treatment with vitamin D and calcium should be more intensively tailored when patients receive ZA to prevent secondary hyperparathyroidism. The role of TBS in this population needs further investigation.

## P877

## HOME TRAINING KINETIC PROGRAM FOR SECONDARY KNEE OSTEOARTHRITIS AFTER STROKE

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**Objectives:** Knee osteoarthritis is a common disease determinate by spasticity on the side of hemiparesis in patients with stroke.

**Method:** There were enrolled 58 patients with at least 2 y after onset of stroke and spasticity quantified by Ashworth scale in grade 2-3. The patients were divided into two groups. The first, control group, received myorelaxant and painkiller treatment, and the study group also received the same medication and a home training kinetic program for two months. The evaluations were made at enrolment point and after two months. The following parameters were evaluated: visual analogue scale (VAS), Ashworth scale, and WOMAC.

**Results:** There have been noticed significant changes in knee functionality in the study group. The pain assessed for the VAS was reduced in study group from 6.5 to 3.2, compared to the control group starting at 6.8 and reached 5.4. Spasticity was reduced in the study group by 23.4% compared to the control group. The WOMAC score showed an improvement in the study group starting from a composite score of 127.3 and reaching 76.7, and the control group remained at values close to initial score, from 132.4 to 121.3.

**Conclusions:** It is proven that medication therapy to combat spasticity and pain, improves joint function, but the results are far superior if a sustained kinetic program is added.

## P878

## FRAILTY SYNDROME AND BONE HEALTH PARAMETERS IN OLDER ADULTS: RESULTS FROM BUSHEHR ELDERLY HEALTH PROGRAM (BEHP)

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**Objectives:** frailty is a chronic condition was accompanied by several health conditions such as mortality and hospital admission. The association between frailty and bone health included osteoporosis and low trabecular bone score (TBS) has not been cleared yet. Our objective was to assess the association between frailty and bone health in the elderly.

**Methods:** The sample of this cross-sectional study was elderly ≥60 y that was selected from a city in the south of Iran, using a multistage stratified cluster random method. Demographic and medical history data were gathered using expert approved questionnaires. Anthropometric indices were standardly measured. BMI calculated by dividing of weight by square of height. Two times systolic and diastolic blood pressure were measured according to guidelines. Bone densitometry and TBS were assessed by a DXA device on lumbar spines and neck of femurs. Osteoporosis was defined as T-score ≤–2.5 in each of the mentioned sites. Fasted blood sample was collected and fasting blood sugar, $HbA_1C$ were measured by autoanalyzer. Diabetic Mellitus and hypertension were defined using standard guidelines. Univariate and multivariable logistic and linear regression models were used to evaluate the associations.

**Result:** After removed the missing data of 2233 subjects were analyzed. The mean age of the participants was 69.2 (69.0 - 69.5) y and 51.5% of them were female. The prevalence of osteoporosis was 30.5% (28.6% - 32.5%). that more common in elderly women than men [44.4% (41.5% - 47.3%) in women vs. 15.9% (13.8% – 18.2%) in men]. The mean of TBS had a decreasing trend from non-frails to frails subjects. In the univariate model, there is a strong association between frailty and osteoporosis [odds ratio (OR) 4.57; 3.29 - 6.36]. The relationship between frailty and osteoporosis remind significant after adjustment for age, gender, BMI, smoking, and alcohol consumption (OR of prefrailty=1.33; 1.05 - 1.68, OR frailty: 1.67;1.08 - 2.58). Moreover, prefrailty and frailty had a negative association with TBS in multivariable linear models (β=-0.06, P=0.002 and β=-0.08, P<0.001, respectively).
**Conclusion:** The frailty syndrome is a predisposing factor for several health outcomes Moreover, it may accompany by the worse bone health parameters in elderly.

## P879
## HEPCIDIN IMPROVES POSTMENOPAUSAL BONE LOSS BY INHIBITING OSTEOCLAST FUNCTION

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**Objective:** To explore the effect of hepcidin on bone mass in postmenopausal osteoporosis.
**Methods:** The study consisted of two stages. In the first, collecting the data of physical examination population (all female) age from 55-74 y and serum samples which were used to examine hepcidin PINP and β-CTX by ELISA. In the second, 8-week-old female mice were divided into Sham operation (Sham), ovariectomied (OVX) and ovariectomized + hepcidin overexpression group (OVX+Hamp). The OVX+Hamp group mice were hepcidin conditional overexpression. Both OVX and OVX+Hamp mice had bilateral ovaries removed to establish postmenopausal osteoporosis mice model. The three group mice received intraperitoneal injection of tamoxifen after 1 week of surgery to induce hepcidin overexpression. Another 8 weeks later, levels of hepcidin, serum ferritin, and CTX were detected by ELISA. MicroCT was used to detect bone microstructure; Prussian blue staining to observe liver and bone iron deposition; TRAP staining to observe osteoclasts; bone pits experiment to evaluate osteoclast capacity of bone resorption; q-PCR to test the expression levels of osteoclast associated genes.
**Results:** Physical examination data shows a linear correlation between hepcidin and BMD (r=0.45658, p=0.0058), a linear correlation between hepcidin and β-CTX (r=-0.35244, p=0.0479), but no linear correlation between hepcidin and PINP (p=0.8776). BMD in OVX+Hamp mice improved compare to OVX group. Serum hepcidin and liver iron in OVX+Hamp group were higher than those in other two groups, but serum ferritin, bone iron deposition and CTX were decreased. Next, we turned to cells committed to the osteoclast phenotype, we found the number of TRAP-positive osteoclasts derived from bone marrow and in the distal femur and bone resorption area proportion were significantly increased in OVX group while suppressed in OVX+Hamp group. In vitro experiments revealed that hepcidin overexpression significantly inhibited osteoclastogenesis by inhibiting cell metabolism and regulation of osteoclasts, such as MMP9, CTSK, and TRAP, mRNA expression.
**Conclusions:** Hepcidin slows bone loss and improve bone metabolism in postmenopausal women or ovariectomied mice by suppressing the differentiation and resorption capacity of hyperactive osteoclasts.

## P880
## PERSPECTIVES OF WOMEN WITH EXPERIENCE OF A FRAGILITY FRACTURE IN EUROPE: ATTITUDES TOWARDS FUTURE FRACTURE RISK, OSTEOPOROSIS AND PHARMACOTHERAPY

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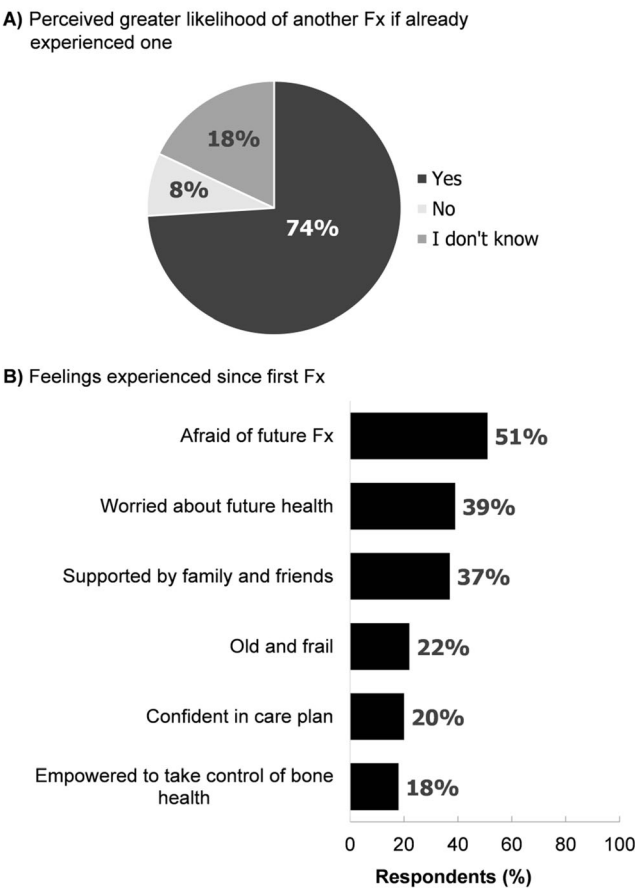
**Objective:** Fragility fractures (FF) are common in women >50 y, with 1 in 3 experiencing a fracture (Fx).[1] However, the cause of these Fx is poorly recognised and measures taken to prevent future Fx are often inadequate. Recent US patient (pt) survey data suggest that awareness of osteoporosis (OP) and its contribution to Fx risk, appreciation of the benefits of OP pharmacotherapy (Rx), and discussion about OP with healthcare professionals (HCPs) are limited.[2] This study gained insight into the attitudes and experiences of post-FF women in Europe regarding future Fx risk management.
**Methods:** Women ≥51 y from Germany (DE), Spain (ES), UK, France (FR) and Italy (IT) (EU5) with self-reported experience of a FF completed a 30-min online survey (AplusA; 13–20 Feb 2018). Data are reported for EU5 pts who had their first Fx at ≥50 y; pts whose first Fx was a hand/finger or ankle/foot/toe Fx were excluded.
**Results:** 199 women participated (DE: 38; ES: 36; UK: 41; FR: 34; IT: 50). The most commonly experienced Fx was of the lower arm/wrist (43%). 43% reported >1 Fx (any type). Most women discussed bone health with an HCP within 6 months (mo) (70%; 42% with a GP) and HCPs were their primary source of information on OP (85%). Around a third reported taking a DXA test within 6 mo of their first FF (37%). Advice from HCPs to prevent Fx focused on calcium/vitamin D supplements (74%) and diet/exercise changes (54%); 46% were prescribed OP-Rx. After having a FF, around half worried about future Fx (51%) and 39% voiced concerns about

their general health (Figure). A third of pts thought that OP had caused their Fx (33%), most were likely to attribute it to a fall (67%). Only 18% felt empowered to manage their bone health; 61% did not think OP-Rx reduces risk of Fx or were unsure. 97% had never joined a support group.

**Conclusions:** These results indicate that pts discuss future Fx risk with an HCP soon after having a FF and are concerned about future Fx. However, low levels of DXA testing and OP-Rx, and poor awareness of the link between OP and Fx risk remain. Better education to empower women at risk of FF is critical.

**Figure:** Women in Europe [a] who have experienced a FF [b] are concerned about future Fx and their long-term health (n=199)




[a] Countries included: Germany, Spain, UK, France and Italy; [b] Fx included: lower arm/wrist (43%), rib (21%), upper arm/shoulder/clavicle (19%), hip/pelvis (14%), lower leg (14%), spine/vertebrae (14%), other (14%). FF: fragility fracture; Fx: fracture.

**References:**

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**P881**

## DOES A TREAT-TO-TARGET STRATEGY APPLY IN THE MANAGEMENT OF PATIENTS WITH FRAGILITY FRACTURES? A EUROPEAN OVERVIEW

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**Objectives:** To develop an international consensus on best practice management of fragility fracture (Fx), with a specific focus on the applicability of a treat-to-target (T2T) strategy for prevention of subsequent Fxs.

**Methods:** 12 experts (5 rheumatologists, 5 endocrinologists, 2 orthopedic surgeons) from 8 European countries used a modified Delphi approach to reach consensus on statements pertaining to aspects of Fx management. Panelists reported their level of agreement with a series of statements ("strongly disagree", "disagree", "agree" or "strongly agree"). Consensus was defined as ≥75% agreement with a statement, with refinement and revoting until consensus was reached. All voting was electronic and blinded.

**Results:** All panelists answered every survey question; consensus was reached for 21/22 (95.5%) items. The main management goals for patients (pts) with Fx are to maximise and preserve pt independence and to prevent new Fx, and the best approach to achieve such goals is to set a treatment target with pts, and make therapeutic decisions based on the probability of reaching that target. Treatment adherence is thus an important means to achieving treatment goals. BMD, assessed via DXA scan, is the best available surrogate of Fx risk, albeit with some limitations, and is therefore the most clinically appropriate target. Experts suggest the target T-score should be a level associated with no increase in Fx risk (e.g., -2.5 to -1.0 at the total hip) dependent on what is feasible for the pt to achieve; whilst a single overarching treatment target can be established for most post-Fx pts, some require a personalized target. The timepoint for assessment of whether the treatment target has been met will also vary, with frequency of monitoring dependent on the type of treatment.

**Conclusions:** This expert consensus supports the value of a T2T strategy in osteoporosis and establishes key principles for goal-directed therapy. Importantly, the study aligns with other European workgroups.[1] Further work should focus on recommendations for the sequence of specific osteoporosis treatments in pts at varying levels of risk of fragility Fx.

**References:** 1. Nogués X. Osteoporos Int 2018;29:489.

**Acknowledgements:** The study was designed and overseen by Jen Timoshanko (UCB Pharma) and Daniella Taylor (Ogilvy Healthworld) with Thierry Thomas and Lorenz Hofbauer as the chairs of the panel. The study was funded by UCB Pharma and Amgen. Editorial services for the

abstract were provided by Costello Medical. The authorship would like to thank those that participated in the expert panel.

## P882
## THE EFFECTIVENESS OF CHOLECALCIFEROL FOR THE TREATMENT OF HYPOVITAMINOSIS D

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**Objective:** To evaluate the effectiveness of different doses of cholecalciferol for treatment of vitamin D deficiency in menopausal women.
**Methods:** 67 women with serum 25(OH)D values below 20 ng/ml were enrolled in the study (mean age 61.3±8.5 y). Enrolled subjects were randomized into two groups. Group I - treatment group of cholecalciferol at dose of 50,000 IU orally - 1 tablet once a week; patients of group II received 7000 IU of cholecalciferol daily as an oil solution in drops. Level of total vitamin D (25(OH)D), PTH in serum was determined by the method of electrochemiluminescence (Cobas e411, Roche Diagnostic, Germany). Quantitative measurement of total calcium, inorganic phosphorus, alkaline phosphatase in serum was performed on a Beckman Coulter analyzer of the AU series. Laboratory testing was performed at baseline and after 8 weeks of treatment. Significance was assessed by parametric statistics using analysis of variances and the criterion of least significance in the ANOVA module. The differences were considered significant at $P<0.05$.
**Results:** Statistically significant increase in total vitamin D concentration was observed in patients of group I: in 32 out of 32 (100%) patients taking 50,000 IU of cholecalciferol once a week 25(OH)D levels exceeded 30 ng/ml and reached target values, the average content of 25(OH)D was 39.93 ng/ml. In group II, the average concentration of 25(OH)D after 8 weeks of treatment was 30.21 ng/ml, while 27 patients (71.4%) reached the target serum hydroxyvitamin D level. During the study, no adverse events were observed in both groups, no deviations in laboratory parameters of calcium, phosphorus, alkaline phosphatase, PTH were detected at baseline and during follow-up.
**Conclusion:** The results of our study indicate the efficacy and safety of weekly administration of 50,000 IU of cholecalciferol to achieve target levels of 25(OH)D in menopausal women with vitamin D deficiency.

## P883
## FREQUENCY OF LOW BONE MINERAL DENSITY AND ANDROGENIC STATUS IN PATIENTS WITH PSORIATIC ARTHRITIS

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**Objective:** To study BMD and androgenic status in men with psoriatic arthritis (PsA).
**Methods:** 50 men with PsA were examined (mean age 46.5 (10.7) y) and 30 men of the control group (CG) (mean age 45.6 (7.5) y). Exclusion criteria were glucocorticoid treatment, endocrinopathy, systemic connective tissue diseases, malabsorption syndrome, malignant neoplasms. Determination of levels of total testosterone (TS) and sex hormone-binding globulin (SHBG) was performed by electrochemiluminescence method (Cobas e411, Roche Diagnostic, Roche Diagnostics GmbH, Germany). The level of free TS was calculated based on the levels of albumin total TS, SHBG using electronic calculator (www.issam.ch/freetesto.htm). BMD was measured by DXA. Statistical analysis was performed using parametric and nonparametric statistics. The differences were considered significant at $P<0.05$.
**Results:** 29 (59%) patients with PsA had low BMD (osteopenia and osteoporosis). Levels of TS in patients with PsA corresponded to reference values, median was 4.82 [3.55; 5.34] ng/ml and was not significantly different from the CG (4.12 [2.68; 5.50] ng/ml), p 0.419. Median level of SHBG was 38.67 [22.96; 48.30] nmol/L in patients with PsA and 38.51 [22.88; 45.33] nmol/l in CG, p 0.930. Estimated level of free TS in the group of patients with psoriatic lesions was 0.0989 ng/ml (or 2.05%), in CG 0.0946 ng/ml (or 1.96%), which corresponds to physiological values.
**Conclusion:** The absence of androgen deficiency in men with psoriatic lesions of the skin and joints necessitates further study of factors affecting BMD. The study is ongoing.

## P884
## DIAGNOSIS OF PSEUDOPSEUDOHYPOPARATHYROIDISM IN A PATIENT ON A RHEUMATOLOGY CONSULT

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**Objective:** Pseudopseudohypoparathyroidism is an autosomal dominant disorder with unknown prevalence. The patients presented the same phenotype as pseudohypoparathyroidism type 1A, with which the differential diagnosis should be made. Both diseases present the same genetic defect: a mutation of the GNAS 145 gene at the 20q13.325 locus.
**Methods:** We report the case of a 31 year old man who was diagnosed with pseudopseudohiparatyroidism in our hospital and we describe the main epidemiological and clinical characteristics.

**Results:** Our patient is a 31 years old man with brachydactyly and acrodysostosis diagnosis in childhood. He also presents short stature, facial malformations and skeletal alterations in thorax. He was admitted in our department for hands and feet arthralgias for which radiographies were performed. Hands radiographies showed shortening of the metacarpals and distal phalanges and epiphysis of the proximal phalanx of the second finger of the left hand with a conical shape could be seen and feet radiographies showed globally short bones with hypoplasia of the fourth metatarsal. Given the suspicion of pseudohypoparathyroidism a study of phosphocalcic metabolism was performed which didn´t show any abnormalities. Family molecular study of the GNAS gene was requested confirming a paternal inheritance mutation leading to pseudopseudohypoparathyroidism diagnosis.
**Conclusion:** Pseudopseudohypoparathyroidism is a rare entity with scarcity of reported cases. In patients with Albright's hereditary osteodystrophy phenotype without hypocalcemia or hyperphosphatemia pseudopseudohypoparathyroidism should be considered as a possible cause. The confirmation of heterozygous GNAS mutations on the paternal GNAS allele will lead to definitive diagnosis.

## P885
## LIMITATION OF UTILITY THE LUMBAR SPINE SCAN DXA FOR WOMEN OVER 50 YEARS OLD

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**Objective:** To determine the age of limitation of utility analysis results of DXA scans and cost-effectiveness in women older than 50 y.
**Methods:** The BMD was assessed with DXA by Lunar Prodigy Advance, GE, USA, 2008 in the lumbar spine (LS) (assessment of BMD L1-L4, g/cm$^2$; Z-score L1-L4, SD; T-score L1-L4, standard deviation (SD)) and femoral neck (FN) (BMD region total, g/cm$^2$; Z-score region total, SD; T-score region total, SD). Standard radiography of the LS in the lateral projection carried out as necessary. Statistical processing was performed using the program MedCalc Software reg. number is BE 0809344640.Win pro №X18-45392. Work order №162000450.
**Results:** There were examined 365 women aged over 50 y (n=365, mean age in the examining group was 77 [73:81] y). Vertebra`s deformities of the lumbar spine, based on the standard radiography scans or vertebral morphometry scans, were detected in 103 (28.2%) women; degenerative and focal changes processes lead to additional pathological ossification – diffuse idiopathic skeletal hyperostosis (DISH or Forestier's disease), osteochondrosis of the lumbar spine, spondyloarthropathy) were detected in 120 (32.8%) women. The quantity of artifacts (osteoarthritis, congenital or acquired hip dislocation, aseptic necrosis of the femoral head) in the DXA scans of the femoral neck was significantly less and was diagnosed in 10 (2.7%) women. With the help of ROC analysis, there was determined the age of limitation of using LS DXA: associated criterion 72,14, +PV (Positive Predicted Values) 97,4; -PV 12,9.
**Conclusion:** Femoral neck DXA is more preferable and reliable for women over 72 y than lumbar spine DXA. DXA of the lumbar spine is recommended to complement vertebral morphometry or standard radiography in order to visualize artifacts and improve the reliability of the analysis. Carrying out DXA of the femoral neck allows you to more accurately interpreting the results of the measurement of BMD in women over 72 y for the verification of osteoporosis. The presence of artifacts is not allowed to exactly estimate the BMD's changes in time and reduce cost-effectiveness for clinical screening and BMD testing.

## P886
## PROBLEM OF DEFICIENCY OF VITAMIN D AT ADULTS AND THEIR CHILDREN

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**Objective:** Vitamin D deficiency is associated with an increased risk of developing cardiovascular, endocrine, autoimmune and neoplastic diseases, a decrease in the body's immune defense and an increase in mortality. Vitamin D deficiency is registered in half of the world's population. Ekaterinburg is located at 56 degrees north latitude, i.e. in the zone of insufficient insolation. Our aim was to assess the level of knowledge about vitamin D and the lifestyle of students and their parents.
**Methods:** A one-stage survey was conducted among students of the 3rd class of the School No. 99 of Ekaterinburg and their mothers. 30 pupils and 30 mothers took part in the review from September to October. All participants completed an anonymous questionnaire to study the risk factors for vitamin D deficiency, which took into account: age, gender, frequency of eating food containing vitamin D (milk and dairy products, fish, eggs), insolation regimen, bone fractures, and the frequency of cold, level of awareness of vitamin D.
**Results:** The average age of children was 8.6 y. The ratio of boys and girls is 1:1. The average age of parents was 35.6 y (from 28-49 y), 87% had a higher education, the rest had a secondary special education. Half of the mothers had low physical activity. Most children (84%) regularly received milk (50%), hard cheese (80%), yogurt (30%) and cottage cheese (10%). But 35% of children don't eat fish, 76% liver. The rest get the fish no more than 1 time per week. All children receive butter 3 times a week. Among parents, 60% consume daily dairy products, oily fish on average 1 time per week. Eggs are eaten 3 times a week by 80% of mothers, 60% by liver <1 time per week, 90% of parents consume butter 3 times a week. The

walking time in 65% of children was 30-60 min. 70% of mothers give walks 30-60 min, <30 min - 20%, 1-2 h - 10%. They have a cold more than 3 times a year, 66% of children, 70% of parents have a cold once a year, and the rest more often. The daily intake of vitamin D was considered important by 43% of children, 31% were not very important, and 26% found it difficult to answer. 70% of parents considered daily intake of vitamin D important for their health and claimed that they received adequate amounts of vitamin D with meals. Only 20% of children did not hear about the existence of vitamin D. They received information on the Internet (16%), in the media (30%), from parents (13%) and from the attending physician (41%). All parents knew about vitamin D: from information in school 10%, in the media and on the Internet - 60%, from the attending physician - 30%. Vitamin D received 10 children (30%): 5 - as part of a multivitamin complex, 3 people - in capsules and 2 - in drops. A direct correlation ($p<0.05$) between the risk factors of mothers and their children was revealed.

**Conclusions:**

1. The lack of awareness of children and their parents about vitamin D and the need for its supplementation was revealed.
2. Most children and one third of their mothers are often ill, which also requires the elimination of vitamin D deficiency.
3. It is necessary to inform children and their parents about vitamin D and the principles of a healthy lifestyle more and more access.

## P887
## DXA AND QCT DENSITOMETRY IN LATVIA: 10-YEAR DATA QUALITATIVE AND QUANTITATIVE ANALYSIS

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**Objective:** Osteoporosis (OP) is the leading cause of low energy trauma fractures which often lead to severe disability and death. In 2017, there were 8094 registered fractures in Latvia. 37.2% of these fractures were acquired by patients in the age group 65 y and older, 78.4% of which were women. The main aim of this study was to analyse the availability of diagnostic tools for OP and osteopenia in Latvia and improve the national management of patients with decreased BMD. Improving OP diagnostics with DXA and QCT could improve its treatment and reduce fracture rates among Latvia`s population.

**Methods:** In 2009 Latvian Osteoporosis and Bone Metabolic Disease Association made a united register for all the Latvia's DXA and QCT units which was based on the EU OP Consultation Panel Questionnaire (2008). For the last 10 y starting from 2009 data have been collected and analysed in this cross-sectional study.

**Results:** As of 2019 there is a total of 25 DXA and 3 QCT units in Latvia. 13 DXA units are located in the capital city Riga, and 12 are located in different regional towns. EU has recommended a DXA unit count of 10.6 per 1 million citizens, which Latvia fulfils with 25 DXA units per 1.93 million citizens. Despite a steady increase of DXA units from the 1st unit in 1989, 17 in 2009 to 25 in 2017, the amount of DXA measurements carried out has decreased from 32677 in 2009 to 29148 in 2017. Nonetheless, the number of patients diagnosed with OP has increased from 10035/year (30.7%) in 2009 to 11876/y (40.7%) in 2017. Since 2009 QCT unit count has remained the same but the amount of scans done has decreased from 1206 to 573 in 2017. The waiting time has increased from 6.1 d in 2009 to 18.3 d in 2017 for DXA and 0 d to 3.8 d for QCT accordingly.

**Conclusions:** We conclude that better patient selection has been made since 2009 as fewer DXA scans have been performed, nevertheless more patients have been diagnosed with OP. Further data collection is needed, and reorganisation of unit localisation must be done to reduce the increasing waiting lines for DXA which could also increase the total number of DXA scans done.

## P888
## DYSLIPIDAEMIA: DOES IT ACCELERATE THE ONSET OF OSTEOPOROSIS IN SPONDYLOARTHRITIS?

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**Objectives:** Dyslipidaemia is associated not only with atherosclerosis process, but also with bone remodeling. Elevated LDL serum levels and low HDL were linked to decreased BMD. Inflammation plays a similar role in these two processes previously mentioned. Recent studies reported a decline of BMD in patients diagnosed with spondyloarthritis, the prevalence of osteoporosis varying between 3-47% (depending on selection process and diagnosis tools) and osteopenia 88% of cases. This study is aimed at establishing a correlation between dyslipidaemia and the increased fracture risk in spondyloarthritis patients.

**Methods:** In this case-control study we have included patients diagnosed with spondyloarthritis between 2010-2018,

according to modified New York criteria for ankylosing spondylitis and CASPAR for psoriatic arthritis involving the axial segment. In all patients we determined cholesterol serum levels including its fractions (HDL and LDL), triglycerides, BMD being measured using DXA (total hip). The fracture risk was established using FRAX calculator.

**Results:** 91 patients have met the criteria:31 cases with psoriatic arthritis and axial involvement, and 60 ankylosing spondylitis cases. After we determined BMD, we identified 21 osteoporosis cases (11 ankylosing spondylitis cases, 10 psoriatic arthritis) the average age was 57.55 y, and 70 control cases (normal BMD), average age 51.27 y. In the first group total cholesterol values ranged between 169-284 mg/dl, and 72-208 mg/dl in the second group. We observed the fact that in osteoporosis group LDL serum level had a 28% higher mean value as compared to the control group and a 26% higher value for triglycerides. The average risk fracture in patients with low BMD was 5.9% as compared to 2.2% in patients with normal BMD. In both groups the average period for the disease evolution was 14 y.

**Conclusion:** Dyslipidaemia can play a significant role in BMD decrease, causing an increased fracture risk in spondylarthritis patients. In this case statin use could have two beneficial effects: correction of dyslipidaemia and possibly increasing BMD.

## P889

## SEARCH FOR CLINICAL AND GENETIC MARKERS OF OSTEOARTHRITIS AND CONNECTIVE TISSUE DYSPLASIA DEVELOPMENT IN AN ISOLATED AND COMORBID STATE

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**Objective:** A clinical and genetic assessment of the presence of osteoarthritis (OA) with various localizations, undifferentiated connective tissue dysplasia (uCTD) and joint hypermobility (JHM) in 484 individuals of both sexes of different age groups was carried out. The main task was to identify risk markers and build prognostic models of the pathology development.

**Methods:** We searched for associations of 4 polymorphic variants of matrix metalloproteinase genes (rs35068180 (MMP3), rs2252070 (MMP13), rs226794 and rs2830585 (ADAMTS5)) with the development of osteoarthritis as a whole, taking into account the localization of the pathological process, and the presence of uCTD as a whole and its individual phenotypic markers, as well as in the comorbid state with OA was carried out. 158 patients had osteoarthritis, 252 had a symptom complex of uCTD, 92 of them were in the comorbid state with OA. Intergroup comparison of the data obtained was carried out taking into account the sample size and the distribution of data using nonparametric criteria ($\chi 2$). Pathology risk prediction models were constructed using the method of multivariate logistic regression, with ROC analysis and calculation of the area under the curve (AUC).

**Results:** The significance of the polymorphic loci of MMP3, MMP13, ADAMTS5 genes in the formation of the symptom complex of uCTD in general and its individual phenotypes was detected. The polymorphic locus of MMP3 gene was associated with OA in the comorbid state with uCTD. Statistically significant models based on clinical-genetic data using the method of multiple logistic regression, that allow predicting the development of osteoarthrosis of knee, hip joints and polyosteoarthrosis were calculated with only one gene involved (rs226794 ADAMTS5).

**Conclusion:** Matrix metalloproteinases are involved both in the formation of phenotypic signs of uCTD, and in the development of OA. This indicates the general genetic links of the pathogenesis of these conditions and the possibility of genetic testing for preclinical assessment of the risk of pathology developing.

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## P890

## HIGH PREVALENCE OF ABNORMAL STRENGTH AND PHYSICAL PERFORMANCE TESTS IN ROMANIAN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS USING REGIONAL REFERENCE DATA

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**Objectives:** EWGSOP2 recommends the use of regional normative references, with cutoff points usually set at -2 SD compared to the mean reference value. Our aim was to define the cutoff points of a reference Romanian population and to assess the prevalence of abnormal tests in a cohort of older patients with postmenopausal osteoporosis.

**Methods:** 88 healthy subjects (43.2% females), with ages between 18-62 y and normal mean BMI (24.7 kg/m$^2$) were used to calculate reference cutoffs for our population (set at -2 SD) of the following tests: grip strength (GS) (Jamar dynamometer); gait speed (GSp); chair rise test (CRT); time to climb a flair of stairs (CFS). The cutoffs were then used to assess the prevalence of abnormal tests in a group of 64 female patients over 65 y (72±5.89), 90% had osteoporosis by DXA (39% at the femoral neck), 58% with prevalent fractures, 16% with at least one fall in the previous year (11% with at least 2 falls).

**Results:** We calculated and used the following cutoffs: GS of the nondominant hand 19.3 kg, GSp 0.95 m/s, CRT 16.7 s and

CFS 0.35 m/s. The prevalence of abnormal tests results was: GS of the nondominant hand 33.8%, GSp 46.9%, CRT 59.7% and CFS 59.7%, respectively. Results of all tests depended on age and BMI and correlated significantly between them and were significantly different from the reference population. GS correlated significantly with FN BMD (r=0.353; p=0.008). Subjects with abnormal balance were significantly more likely to have low performance by GS (45.5% vs. 11.9%; p=0.03), GSp (36.7% vs. 9.1%; p=0.009) and CFS (36.8% vs. 10.3%; p=0.015). Subjects with at least 2 falls were significantly more likely to have low GS than those with either no or one fall (22.7% vs. 4.8%; p=0.029). For the other tests, there were numerically more falls in subjects with lower physical performance.

**Conclusions:** We found a high prevalence of abnormal strength and physical performance tests in patients with postmenopausal osteoporosis, using calculated cutoffs from a regional reference population.

## P891
## FRAILTY AND CHRONIC PAIN

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**Objective:** Frailty is most often defined as a syndrome of physiological decline in late life, characterized by marked vulnerability to adverse health outcomes. Frail older adults are less able to adapt to stressors such as acute illness or trauma than younger or nonfrail older adults. This increased vulnerability contributes to increased risk for multiple adverse outcomes, including procedural complications, falls, institutionalization, disability, and death. We aimed to assess prevalence of frailty in elder people and it is relationship with other conditions in this study.

**Methods:** 1107 individuals ≥60 y of age admitted to Istanbul Medical School Geriatrics outpatient clinic for the first time the period between 2013-2016 were enrolled to study. We used The International Association of Nutrition and Aging's FRAIL scale contains 5 simple questions to define frailty. Frail person was accepted as who gets ≥3 points in scale. Patients were asked about their fallings, urinary incontinence, chronic pain, sleep disorders, activities of daily living (ADL), instrumental activities of daily living (IADL). cognitive status, number of illness and medication, postural instability and assessed about their nutritional status by Mini Nutritional Assessment (MNA).

**Results:** 1107 patients were analyzed with a geriatric assessment. The sample was composed of women (66.8%) and men (33.2%) with mean age of 78.5±5.7 y. Prevalence of frailty was 16% (n=179). Correlation analyses and multivariate regression analysis were performed to investigate the association between frailty and other factors. In multivariable analysis frailty was found independently associated with age (p=0.041), chronic pain (p=0.021), usual walking speed (p<0.01), malnutrition (p<0.01), instrumental activities of daily living (IADL) (p=0.024) respectively.

**Conclusion:** Frailty is a common clinical syndrome in older adults, which carries an increased risk for poor health outcomes, including falls, incident disability, hospitalization, and mortality. Elucidating its etiology and natural history is therefore critical for identifying high-risk subsets and new arenas for frailty prevention and treatment. an important strength of our study is assessment of chronic pain which is a new area of research in frailty concept. our findings provides data on the significance of chronic pain and its association with frailty.

## P892
## RISK FACTORS OF OSTEOPOROSIS IN WOMEN WITH ARTERIAL HYPERTENSION OF DIFFERENT AGES

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**Objective:** To assess the incidence of clinical factors (CF) and the risk of osteoporosis (OP) in women with arterial hypertension (AH) of different ages.

**Methods:** We have investigated 76 postmenopausal women with AH who were divided into 2 age groups: group I – women aged 45-55 (n=37), group II – aged 56-65 (n=39). The groups were comparable by systolic and diastolic blood pressure (SBP and DBP) and by the heredity of cardiovascular diseases (CVD). Several anthropometric parameters and BMI have been evaluated. By means of questionnaire survey using the Adapted International *Osteoporosis Risk Test* (IOF) CF and OP risks in the assessed females have been analyzed.

**Results:** Women in both groups had I-II stage AH and showed no statistically significant difference in SBP, DBP and BMI as well. Hereditarily tainted by CVD were 78.3% respondents in group I and 64.1% – in group II. Regression analysis did not show any statistically significant differences between hereditarily tainted subjects in CVD or OP parameters. Assessment of CF of OP incidence in both groups showed the following differences: group II showed higher incidence (17.9% vs. 2.7% in group I; p<0.03) of OP heredity (fractures or diagnosed OP in parents); lower dairy products intake (15.7% vs. 2.7% respectively; p<0.04); visual disturbances (71.8% and 32.4% (p<0.001); backache (92.3% vs. 63.2%; p<0.003), these were the factor contributing to the increased amount of medications taken by females in group II – 2.6±1.6 as compared to group I – 1.8±1.2 (p<0.004). The fact is proved by the established moderate correlation (r=0.34; p<0.05) between visual analog pain scale and the amount of taken medications in group II only. Psychotropic drugs were taken only by group

II respondents – 5.3%. High incidence accompanied by secondary OP was marked in both groups (27% and 30.8% respectively). High OP risk (more than 3 CF) had 24.6% of the respondents, moderate risk – 37.7% (2–3 CF), low risk – 24.6% (1CF); differences in both groups were not found. History of fractures in minor traumas had 7.9% of postmenopausal women.

**Conclusion:** In postmenopausal women with AH under 56 years of age the incidence of certain CF is not age-dependent. With older age females show lower dairy products intake, visual disturbances, backache, OP heredity (fractures or diagnosed OP in parents) and increased medications intake. Postmenopausal women with AH having high OP risk (32.5%) require prophylactic OP medications.

## P893

## IDENTIFICATION OF PATIENTS AT HIGH RISK FOR OSTEOPOROTIC FRACTURES THROUGH RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS): RESULTS OF A 5-YEAR FOLLOW-UP STUDY

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**Objective:** To investigate the ability of the BMD values provided by the innovative technology called REMS [1] in the identification of patients at risk for osteoporotic fractures.

**Methods:** 1272 women (30-90 y, BMI $\leq$35 kg/m$^2$) underwent both DXA and REMS investigations on lumbar spine and a follow-up period up to 5 y to assess the incidence of osteoporotic fractures. The enrolled subjects were then divided into 2 groups: those who suffered an osteoporotic fracture during the follow-up period and those who did not. Among the nonfractured subjects, we selected the oldest ones in order to have a group of nonfractured subjects being equal in number to the fractured ones and with a similar age range. The performance of REMS and DXA in fracture prediction was comparatively assessed by determining sensitivity and specificity in the identification of fractured patients when the typical BMD threshold for the diagnosis of osteoporosis (i.e., T-score $\leq$ -2.5) was employed.

**Results:** After a mean of 3.5±0.7 y of follow-up, the incidence of osteoporotic fractures was 14.2% (180 out of 1272 subjects). The selection of the 180 oldest patients among the nonfractured ones (controls) allowed the comparison of two number- and age-matched groups (67.2±7.6 y for fracture group vs. 66.9±7.2 y for controls, p=0.62). The two groups were also reasonably homogeneous regarding height (p=0.28), weight (p=0.62) and BMI (p=0.33). The only significant differences were shown for the T-score values: REMS provided -1.96±1.27 for controls and -2.68±1.28 for fractured subjects (p<0.001), whereas DXA scans resulted in -1.94 ±1.21 for controls and -2.52±1.20 for fracture group (p<0.001). Employing T-score $\leq$ -2.5 as the cutoff value, REMS identified the fractured subjects with sensitivity=65.0% and specificity=59.4% (OR=2.7). By employing the same cutoff, DXA identified the fractured subjects with sensitivity=56.7% and specificity=59.4% (OR=1.9).

**Conclusions:** REMS investigations on lumbar scans showed a good performance in the identification of patients at risk for incident osteoporotic fractures. This confirms the potential of this nonionizing approach for early diagnosis of osteoporosis.

**References:** [1] Di Paola et al. Osteoporos Int 2019 (in press, online available)

## P894

## RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS): CLINICAL EXPERIENCE

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**Objective:** To illustrate the clinical experience on the use of a nonionizing technique for BMD assessment at the Internal Medicine Department in Siena (Italy).

**Methods:** REMS is a new approach for the assessment of BMD. This technology was clinically validated through single centre and multicentre studies [1]. By using this method daily, at the department of Internal Medicine in Siena (Italy,) we drew some preliminary clinical considerations.

**Results:** REMS can be performed on almost the entire population unless there are serious physical impediments. It is easy and fast. It is feasible in populations that are not normally assessable (i.e., pregnant women) or difficult to assess by DXA [2] (children, subjects with psychomotor delays). It is feasible in many different settings: In the Emergency Departments to make early diagnosis in subjects with low

intensity trauma fracture. In orthopaedics departments to assess treatment in subjects diagnosis with hip fractures or to assess the best pharmacological treatment before vertebroplasty in patients with vertebral fracture. REMS can assess the quality of bone revealing the presence of many false negatives in particular among patients with lumbar osteoarthritis or vertebral fracture. If this is confirmed, we could explain why osteopenic, or even patients with a normal BMD, present fragility fracture.

**Conclusion:** Fragility fractures weigh on health expenditure in every European country. It is important to have methods and paths to make an early diagnosis. A recent multicentre clinical study showed that REMS is an accurate technology to osteoporosis diagnosis in lumbar spine and femoral neck [1]. If these observations are confirmed, REMS could be a valid diagnostic tool to investigate the disease that induce bone fragility.

**References:**

[1] Di Paola et al. Osteoporos Int 2018
[2] Caffarelli C et al. CCMBM 2018

## P895

## PREVALENT AND INCIDENT MORPHOMETRIC VERTEBRAL FRACTURES IN ADULTS WITH REFRACTORY EPILEPSY AND INTELLECTUAL DISABILITY

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**Objective:** To determine prevalent and incident morphometric vertebral fractures (VF) in adults with refractory epilepsy and intellectual disability residing at a long-stay care facility.

**Methods:** In 2009, all institutionalized patients aged 18 y or older (n=261) were invited to undergo a DXA measurement and a vertebral fracture assessment (VFA). In 2016, DXA and VFA were repeated. If evaluable, vertebrae T4-L4 were assessed using quantitative morphometry. VFs were graded as mild (20-25% reduction in height), moderate (25-40% reduction) or severe (>40% reduction) according to the method described by Genant. Prevalent VFs were analyzed at baseline. A VF present in 2016, but not in 2009, was considered an incident VF. Worsening VFs were defined as prevalent VFs with at least one grade deterioration at follow-up.

**Results:** A total of 141 patients (87 male, 61.7%) aged between 18-79 years old (44.8±15.7) at cohort entry could be studied. In 2009, 56 patients (39.7%) had one or more prevalent VFs (Table 1), 40 (28.4%) had at least one mild VF, 34 (24.1%) at least one moderate and 3 patients (2.1%) had a severe VF. For follow-up, 23 vertebrae (in 19 patients) with a prevalent VF could not be evaluated at follow-up and 4 vertebrae (in 3 patients) with a fracture at follow-up were not evaluable at baseline. During 7-y follow-up, 39 new VFs occurred in 29 patients (20.6%) and 15 patients (10.6%) had a worsening VF. The combined incidence of new and worsening VFs was 27.7%.

**Conclusion:** In adults with refractory epilepsy VFA is challenging, due to physical and behavioral aspects, resulting in a substantial proportion of unevaluable vertebrae. Nevertheless, 40% had a VF at baseline and after 7-y follow-up, 28% had at least one new and/or worsening VF.

Table 1

| Nr of VFs | 2009 N (%) | 2016 N (%) |
|---|---|---|
| 0 | 85 (60.3) | 80 (56.7) |
| 1 | 27 (19.1) | 26 (18.4) |
| 2 | 14 (9.9) | 19 (13.5) |
| 3 | 14 (9.9) | 8 (5.7) |
| 4 | 1 (0.7) | 7 (5.0) |
| 5 | 0 | 1 (0.7) |

## P896

## LOW TRAUMA BONE FRACTURES AND MAGNESIUM DEFICIENCY TEST RESULTS IN YOUNG MALE ADULTS WITH BENIGN JOINT HYPERMOBILITY SYNDROME

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**Objective:** The frequency of monogenic hereditary connective tissue disorders (Marfan syndrome, Ehlers-Danlos syndrome, etc.) being low, benign joint hypermobility syndrome (BJHS) is reported to occur quite often in young adults. Muscle and joint pain as well as low traumatic bone fractures are the most obvious phenotypic features of BJHS. Magnesium deficiency clinical presentation also include twitches, tremors, muscle weakness, cramps and other locomotor system symptoms. Our aim was to assess frequency of BJHS, bone fractures and magnesium deficiency in a sampling of healthy young males.

**Methods:** 143 young male adults aged from 18-25 (median age 23) consented to take part in a cross sectional study. Inclusion criteria were the following: signed informed consent, absence of known rheumatologic or metabolic diseases. Exclusion criteria: monogenic hereditary connective tissue disorders, professional sports activities, history of severe trauma, any chronic disease or long term medication. Evaluation of clinical signs of hereditary connective tissue disorders, assessment of Beighton score, BJHS Brighton criteria (1990) and Russian Satellite Center "Trace Element Institute for UNESCO" Magnesium deficiency self-assessment test were performed. History of bone fractures was registered.

**Results:** 62 (43.4%) of the sampling had BJHS, while 51 males (35.7%) had a history of low traumatic fractures: there were 24 cases of a single fracture, and 27 cases of multiple bone fractures. BJHS increased fractures risk OR=5.89 (95%CI 2.83-12.26), $chi^2$=24.66; P<0.001. A weak positive correlation was found between the number of fractures and Beighton score value (Spearman R=0.258; p=0.018) and scores of magnesium deficiency test (0.28; p=0.047).
**Conclusion:** low traumatic peripheral bones fractures in a sampling of young healthy males were associated with BJHS. The role of magnesium deficiency in propensity to bone fractures in young males require more profound studies with laboratory confirmation.

## P897
## SYSTEM OF SECONDARY PREVENTION OF RECURRENT OSTEOPOROTIC BONE FRACTURES IN VOLGOGRAD

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**Objective:** In Russia, fracture liaison services (FLS) was introduced several years ago. Our aim was to estimate the number of patients with low-energy fracture (LEF) in the Traumatology. Rate the participation of the traumatologist in the efficiency of the FLS.
**Materials:** a sample of patients with LEF (gr. I) was taken from the register of patients in the Trauma. Gr. II of the recommendations of the traumatologist. These are patients with a high energy trauma, but with a history LEF. Risk factors for fractures of all patients were assessed.
**Results:** 69 patients (69.66±12.06 y, M±σ) - I gr, 17 patients (75.4±4,005) - II gr. In gr I, fractures of the bones of the lower leg - 33.3%, neck of the femur - 24.6%, proximal femur - 15.9%, humerus - 11.5%, forearm bones - 10.1% and vertebrae - 4, 3%. In gr II - 52.9% of fractures of the bones of the leg, 23.5% of the humerus, 17.6% of the forearm and 5.9% of the vertebrae. The high risk of major fractures for FRAX in gr I was 40.6%, the high risk of hip fractures was 52.2%, DXA was required to clarify the risk for 26.1% of patients, in gr II there was a high risk in 100% of patients. In gr I, 66% of patients knew about osteoporosis, 20% had previously passed DXA, 23% followed prevention guidelines, and 0% took antiosteoporotic drugs. In gr II, they knew about the disease "osteoporosis" - 94% of patients, 17% were examined, 26% followed the prevention recommendations, and 0% took antiosteoporotic drugs. After interacting with the staff of the FLS, 56% of patients in gr II and 58% of gr II began specific therapy.
**Conclusions:** A high percentage of patients in the Traumatology after a minimal injury. There is a high awareness of the presence of the disease "osteoporosis" and the complete absence of treatment of this disease. Some patients (24.7%) are not in the field of view of the FLS coordinator. The recommendations of the traumatologist increase the compliance therapy of osteoporosis.

## P898
## MORPHOLOGICAL FEATURES OF SYNOVIAL MEMBRANE REMODELING IN HIP OSTEOARTHRITIS

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**Objective:** Existing publications on pathomorphology of osteoarthritis (OA) are mostly limited to cartilage and subchondral bone studies. Despite its crucial role, to date, synovial membrane remodeling in OA has not been sufficiently investigated. Our aim was to assess structural changes of synovial membrane in hip OA.
**Methods:** In 20 patients undergoing hip replacement surgery for OA, a light optical study of synovial membrane specimens was performed. Articular damage was staged according to modified Bandi classification: stage I - chondromalacia, stage II - up to 50% of cartilage thickness damage, stage III - >50% of cartilage thickness damage, stage IV - whole thickness cartilage loss with bone exposure. Hematoxylin - eosin, Mallory's trichrome, Weigert's resorcin fuchsin, and periodic acid - Schiff reaction stains were used to study the tissue sections.
**Results:** Stage I-II hip OA was diagnosed in 8 patients, stage III-IV hip OA was found in 12 patients undergoing hip replacement surgery. In stages I-II of OA, plethoric capillaries and venules were seen. Dilated lymphatic capillaries were filled with homogeneous eosinophilic fluid and occasional red blood cells. Arterioles were dilated and plethoric with marked wall edema and subendothelial layer fibrosis. Scarce lymphohistiocytic infiltration and compact arrangement of fuchsinophilic fibers was noted in superficial collagen-elastic layers. Diffuse lymphohistiocytic and fibroblastic infiltration, fuchsinophilia of collagen fibers, interstitial edema, thickening, disarray and fragmentation of elastic fibers was observed in the deep layer. Stages III-IV of OA were characterized by predominant destructive changes of synoviocytes and villi. Plethoric venules, constricted arterioles with perivascular sclerosis and lymphohistiocytic infiltration, dilated lymphatic vessels were seen. Collagen-elastic layers were thickened due to sclerosis, edema and lymphohistiocytic infiltration. The collagen fibers were fuchsinophilic and chaotically arranged. The elastic fibers were disarrayed and fragmented.
**Conclusion:** Marked synovial remodeling is seen in stages III-IV of hip OA. It is characterized by villous disorganization, degenerative lesions of fibers of both superficial and deep layers, and impaired microcirculation.

## P899

## ROLE OF VITAMIN D IN THE TREATMENT OF PARATHYROID ADENOMA

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**Objective:** Primary hyperparathyroidism is a rather frequent disorder characterized by high plasma PTH and calcium. Vitamin D deficiency is prevalent in all areas of the world. Vitamin D deficiency has been described in patients with primary hyperparathyroidism. When present, vitamin D deficiency may be associated with large size parathyroid adenomas and musculoskeletal pain. Our aim was to evaluate the efficacy of vitamin D in the treatment of adenoma of the parathyroid glands and primary hyperparathyroidism.
**Methods:** 41 patients (age 25-60, 9 males and 32 females) with parathyroid adenoma where enrolled in the study. All of them were in the stage of primary hyperparathyroidism. The patients were treated with vitamin D (6000 IU/d) and calcium (1000 mg/d) for a follow-up period of 6 months. No surgical intervention was performed. The determination of serum levels of PTH, calcium, vitamin D, as well as neck CT scan and ultrasound were performed twice – at baseline and at the end of follow-up period. All patients were informed about the potential aim of the study and expectations from the treatment with vitamin D.
**Results:** Eventually, follow-up was complete in all patients. The treatment was well tolerated, no serious adverse effects occurred. In 13 patients out of 41 we determined significant ($p<0.05$) reduction of the sizes of adenoma as well as normalization of laboratory parameters.
**Conclusion:** Taking into account all above mentioned, it can be concluded that vitamin D and calcium can be considered as a treatment modality of parathyroid adenoma and primary hyperparathyroidism.

## P900

## VITAMIN D DEFICIENCY AND AUTOIMMUNE MARKERS: WHICH IS A KEY PLAYER?

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**Objective:** Vitamin D is a neuro-hormone regulating calcium-phosphate homeostasis. However, vitamin D deficiency has been reported in several chronic conditions associated with increased inflammation and disregulation of the immune system such as type 1 diabetes (T1D), Hashimoto's thyroiditis, autoimmune gastritis. The role of autoimmune gastritis in the pathogenesis of nutritional deficiencies has been reported therefore we assumed a possible association between gastric parietal cells autoantibodies (PCA) which often appear in T1D and 25(OH)D deficiency. The aim of this study was to evaluate the prevalence of 25(OH)D deficiency in patients with T1D and vitamin D status association with PCA. We also assessed the prevalence of thyroid peroxidase autoantibodies (TPOAb) in T1D patients and its potential influence on vitamin D status.
**Methods:** 68 T1D patients (42 females; mean age 43.5 ± 12.8 y) were followed up in Endocrinology Research Centre from December 2017 to November 2018. 25(OH)D, parathormone, calcium, PCA, TPOAb were measured in all T1D patients. We also evaluated autoantibodies to glutamic acid decarboxylase (GAD), islet antigen 2 (IA2) and zinc transporter isoform-8 (Znt8) to confirm autoimmune genesis of diabetes. The results were compared with a control group of 42 healthy subjects.
**Results:** In T1D group (n=68) 25(OH)D levels were significantly lower than in the control group 14.6 [9.1; 23.0] vs. 27.0 [22.1; 34.7] ng/ml, $p< 0.0001$. 23 out of 68 patients with T1D were positive to PCA and 45 patients were negative to PCA. Vitamin D values in these groups were 17.3 [9.9; 23.6] and 12.4 [7.1; 23.0] respectively. Only 3 out of 42 patients (7%) were positive to PCA in control group without autoimmune diseases. It is noteworthy that T1D patients with TPOAb (30 out of 68 patients) had lower 25(OH)D values as compared to those without TPOAb (38 patients) - 11.8 [6.8; 22.1 ] vs. 20 [11.1; 26.7] ng/ml; $p = 0.0047$.
**Conclusion:** Data from the present study showed a significant reduction of 25(OH)D levels in T1D patients. No meaningful difference in Vitamin D status was found in patients with and without PCA. Possible impairment of vitamin D absorption in autoimmune gastritis may be caused by mucosal atrophy which may appear years after PCA start to be detectable in blood. TPOAb in T1D patients may play a role in Vitamin D deficiency in such patients.
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## P901

## LATVIAN VALIDATION OF SARQOL®: A QUALITY OF LIFE QUESTIONNAIRE SPECIFIC FOR SARCOPENIA

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**Objective:** Translate and adapt the SarQoL (quality of life questionnaire specific for sarcopenia) into Latvian and assess the psychometric performances of the translated questionnaire.

**Methods:** The English version was used. The translation was performed according to the standard guidelines. No difficulties were faced in the translation process. A total of 45 Caucasian subjects were enrolled in the study. The questionnaire form was filled, grip strength was measured using a hand dynamometer Jamar Plus Digital. According to the criteria suggested by the EWGSOP, only 3 participants were sarcopenic; therefore we divided the participants into 2 groups with low and normal muscle mass. To test the psychometric performance, we assessed the discriminative power, internal consistency, test-retest reliability, floor-ceiling effects, and constructed validity. Data were analysed according to the SarQoL standards.

**Results:** A total of 45 participants (39 female, mean age 58.9 (CI 95% 46.3–71.7) (min 27; max 84) were included. Mean BMI was 25.4 kg/m$^2$ (CI 95% 21.4-29.5). Mean SarQoL result was 77.8 (CI 95% 65.1-90.4). Mean hand grip strength was 30.2 kg (CI 95% 22.7–37.6). All subjects were divided into 2 groups depending on the average grip strength between both hands (Group 1–<30 kg, n=26 and Group 2–≥30 kg, n=19). The results indicated good discriminative power – Group 1 mean SarQoL 74.41 (CI 95% 61.11–87.71) vs. Group 2 mean SarQoL 82.4 (CI 95% 72.1–93.6) [p=0.035]. Cronbach's α between SarQoL domains was 0.84 indicating excellent internal consistency. We found a good positive correlation between SarQoL and SF-36 (Spearman's Correlation test r=0.84; p<0.0001). There was an excellent agreement between the test-retest reliability with an ICC of 0.98 (CI 95% 0.92–0.99). No floor nor ceiling results were detected.

**Conclusion:** Our results show that the Latvian version of the SarQoL questionnaire could be a useful instrument in assessing the quality of life in patients with sarcopenia.

## P902
## DETERMINANTS OF NEONATAL 25(OH)D STATUS IN A GREEK POPULATION COHORT

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**Objective:** Accumulating evidence highlights the relationship between optimal 25-hydroxyvitamin D [25(OH)D] concentrations during the first months of life and normal growth and development. We aimed to assess maternal and neonatal determinants of neonatal 25(OH)D concentrations in a Greek cohort of mothers and their children.

**Methods:** We studied 70 pairs of newly delivered neonates and their mothers. Only healthy mothers with full-term, uncomplicated births were included in the trial. Biochemical, demographic and anthropometric parameters were recorded in both groups. Stepwise linear regression analysis was performed to identify factors associated with neonatal 25(OH)D status.

**Results:** Mothers' mean age, term BMI and gestational age were 31.9±0.7 y, 29.6±0.7 kg/m$^2$ and 38.8±0.2 weeks, respectively. 71.2% of mothers were receiving calcium supplementation. Both mothers and children were found to be vitamin D deficient [25(OH)D levels 45.6±3.1 and 40.6±2.6 nmol/l, respectively]. Maternal 25(OH)D concentrations and BMI at term were found to be positively correlated with neonatal 25(OH)D status (p<0.001 and p=0.009, respectively). In contrast, mothers' calcium serum concentrations and daily calcium supplementation were inversely related to neonatal 25(OH)D concentrations (p<0.001and p=0.023, respectively). In terms of neonatal characteristics, a positive correlation was detected between upper arm length (p<0.001) and abdominal skin fold (p=0.002) and a negative association between height (p=0.037), PTH levels (p=0.004) and neck-rump length (p=0.036) and 25(OH)D status.

**Conclusions:** Results from a vitamin D deficient maternal–neonatal cohort from Northern Greece, indicate that in addition to maternal vitamin D status, maternal anthropometry might affect neonatal vitamin D concentrations at birth. Additional trials are needed in order to further elucidate the aforementioned associations and translate the findings into daily clinical benefit.

## P903
## INFLUENCE OF CHRONIC PROTEIN-ENERGY MALNUTRITION ON BONE MINERAL DENSITY IN CHILDREN WITH SEVERE SOMATIC DISEASES

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**Objective:** To evaluate the peculiarities of BMD in children with chronic protein-energy malnutrition (CPEM) due to severe somatic diseases.

**Methods:** 45 patients aged from 5 to 20 years old (62% female) with chronic somatic diseases were examined. CPEM was found in 31.1%. BMD was measured by "Discovery wi". Short stature was diagnosed in 24% of the examined. Height adjustment formula was used for recalculating BMD Z-score.

**Results:** Low BMD was registered in 40% of children; three of them (0.07%) had osteoporosis with multiple vertebral fractures. The average age of children with CPEM was the same as in those who did not have malnutrition (12.64±3.67 vs.

12.01±4.60 yrs.). Children with CPEM had significantly lower Z-score at total body (-2.65±0.93 vs. 1.02±0.90 SD, p<0.001) and L1-L4 (-2.73±1.53 vs. -0.95±1.12 SD, p<0.001). Furthermore, low BMD was found in 86% in group with CPEM while in group without malnutrition it was registered only in 16%. Also, we found significant correlation between BMI and Z-score at the level L1-L4 (r=0.40, p<0.01) and total body (r=0.55, p<0.001). Likewise, BMI influenced on trabecular bone score (r=0.48, p<0.025).

**Conclusion:** Chronic protein-energy malnutrition is one of the important factors which could influence on BMD in children with severe somatic diseases. It is important to use effective nutritional screening tools for early CPEM diagnosis and intervention and permit the child to reach the optimal peak bone mass.

## P904

## METABOLIC BONE DISEASE IN PATIENTS WITH THORACIC TUBERCULOUS SPONDYLITIS AND HIV INFECTION

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**Objective:** To determine the frequency of metabolic bone disease in HIV infected patients with thoracic tuberculous spondylitis and its connection with the degree of immunodeficiency.

**Methods:** We analyzed the results of the IOF one-minute osteoporosis risk test, DXA and biochemical bone turnover markers in 40 adult patients aged 18-45 with verified thoracic tuberculous spondylitis who underwent radical reconstructive spine surgeries in our clinic. Patients were divided into two groups. 20 patients with HIV infection and thoracic tuberculous spondylitis (group 1) and 20 patients with thoracic tuberculous spondylitis and HIV-negative status (group 2).

**Results:** The IOF test results showed a higher risk of bone fracture due to osteoporosis in group 1 patients. The combination of HIV infection and spinal tuberculosis contributes to a 3-fold decreased BMD compared to patients with tuberculous spondylitis without HIV infection. Bone turnover markers and results of BMD measurements in patients with HIV infection and spinal tuberculosis do not depend on the degree of immunodeficiency according to the CD4+ T-cell count.

**Conclusions:** HIV infection causes the higher risk of bone fracture due to osteoporosis in patients with thoracic tuberculous spondylitis. There is no connection of bone turnover markers and BMD with the degree of immunodeficiency according to the CD4+ T-cell count.

## P905

## BONE MINERAL DENSITY MEASURED BY THE RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) TECHNIQUE IN PATIENTS IN LONG TERM STEROID TREATMENT WITH AND WITHOUT FRACTURE

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**Objective:** Glucocorticoid-induced osteoporosis (GIO) is the most common form of secondary osteoporosis. The diagnosis of osteoporosis is currently established by measurements of BMD. DXA of proximal femur and lumbar spine is the reference technology used to establish or confirm a diagnosis of osteoporosis. The innovative REMS approach, clinically validated for osteoporosis diagnosis, allows to measure the densitometric parameters BMD, T-score and Z-score directly on lumbar vertebrae and proximal femur. The present work is focused on the use of the REMS approach [1] in women taking long-term corticosteroids therapy with and without fracture.

**Methods:** 30 female patients in chronic treatment with corticosteroids, referred to a South-Central Osteoporosis clinic, were recruited (mean age 65.4±10.6 y). Fifteen showed fragility fractures while the remaining patients did not have a fracture history. Patients were submitted to an ultrasound scan of the lumbar spine and proximal femur by using the REMS technique.

**Results:** Femoral and lumbar BMD values measured by REMS technology resulted more reduced in patients in steroid treatment who presented fractures than those not fractured (p<0.05).

**Conclusions:** These preliminary results show that REMS technology can discriminate patients with and without fractures even during corticosteroid therapy. Bone loss in these patients occurs early after initiation of steroid therapy and is related to dose and treatment duration. The extent of bone loss is variable and not clearly determinable. If these data are confirmed in larger studies, REMS technology could become a valid method for assessing and monitoring patients taking long term steroid therapy to establish the most effective and safe therapeutic approaches.

**References:** [1] Di Paola et al. Osteoporos Int 2018

## P906

## MICROCIRCULATION IMPROVEMENT AS A RESULT OF BIOFEEDBACK TRAINING IN PATIENTS WITH SYSTEMIC SCLEROSIS

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**Objective:** Microcirculatory disorders are the most important clinical symptoms in patients suffering from systemic

sclerosis (SS), therefore we found it feasible to evaluate the clinical efficacy of biofeedback (BFB) in the complex therapy of SS patients based on analysis of nailfold capillaroscopy. Our aim was to study the impact of biofeedback on microcirculation disturbances in patients with SSc.

**Methods:** We observed 50 patients with SS Among the patients examined, 94% were women and 6% were men. The average age of the patients was 38±3.6 y, duration of illness – 14±3.7 y. Raynaud's phenomenon (RP) was noted in all SS patients. A severe form of RP was seen in 80% of the patients. The effectiveness of biofeedback was analyzed by studying dynamics of the measures from the nailfold capillaroscopy and comparing the data obtained of patients from the main and control groups.

**Results:** It was found that SS patients who were under biofeedback training, showed significant positive dynamics in the following signs of capillaroscopic picture: dilation of the capillaries ($\chi^2$=9.646 p=0.026), morphological changes of the capillaries ($\chi^2$=4.89 p=0.027), and hemorrhage ($\chi^2$=4.521 p=0.034). In the control group of patients, in only one indicator of capillaroscopy that a significant change was noted, particularly by the presence of dilated capillaries ($\chi^2$=5.834 with p=0.016). These findings suggest that treatment results were significantly better in the main study group of patients with SS.

**Conclusions:** The biofeedback implementation favors a decrease in reflex muscular tonic syndromes, improvement of microcirculation and peripheral blood flow and significantly allows an amelioration in the results of SS therapy.

## P907

## USE OF TERIPARATIDE IN NONUNION HEALING: BRIEF REPORT

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5-10% of bone fractures do not heal spontaneously and need treatment. The nonhealing (27-34%) of segmental fractures leads to high rates of disability (40-50%). Allograft healing procedures for fractures are associated with high complications rate namely late graft fracture (24%–27%), and infection (9%–16%). Human PTH stimulates osteoblasts and reduces osteoblast apoptosis. Intermittent administration of human PTH increases callus formation and improves mechanical strength. It has proven to increase skeletal bone mass in osteoporotic patients.

Research on human PTH is conducted mainly on animal models. A recent study from the USA has reported that delayed short treatment with teriparatide in rats enhances intramembranous bone formation at the graft-host junction and therefore improves femoral allograft healing.

There are several case reports among humans. A study from Japan has reported 2 cases of ulnar fracture in smokers who had nonunion after ulnar shortening osteotomy. Both were treated with teriparatide in addition to low intensity pulsed ultrasound. At follow-up after 10 and 6 months of treatment with teriparatide, both patients had successful bone healing without additional surgical interventions. teriparatide and low intensity pulsed ultrasound are presented as a possible alternative to surgical intervention particularly among smokers who have a higher incidence of nonunion (30%).

Another report from the UK in a 21-year-old female with extended oligoarticular juvenile idiopathic arthritis diagnosed at age of 8 y who also sustained a low-impact short oblique closed fracture of her right lower tibia. She was treated with teriparatide and later zoledronic acid. She started showing signs of healing within a 12 months' period. But authors have advised interpreting the results with caution.

A case series from Italy reports successful callus formation and healing of traumatic fractures of the lower limb with Teriparatide in 4 patients who had undergone open fixation.

Summary: The effect of human PTH on callus formation and its potential role in the nonunion of fractures cannot be doubted. But we have to interpret data from animal models with great caution. We need RCT comparing gold standard procedures before we can replace surgical options in the treatment of a fracture with teriparatide.

## P908

## ASSOCIATION BETWEEN PLASMA CHEMERIN CONCENTRATION AND BONE MINERAL DENSITY IN POSTMENOPAUSAL OSTEOPOROTIC FEMALES

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**Objective:** Chemerin is a novel adipokine associated with bone erosion in small observational studies. The objective of this study was to explore relationship of serum chemerin with BMD in postmenopausal osteoporotic females.

**Methods:** In this study, 150 postmenopausal females were recruited. BMD assessment was done through DXA Scan and according to the criteria of WHO, females having T-score -2.5 and below were defined as osteoporotic and women with T-score -1 or above was selected as control group. Serum chemerin levels were determined by commercially available ELISA kit.

**Results:** The median age in postmenopausal control group (n=60) was 54 (50-57) y and in postmenopausal osteoporotic group (n=90) was 60 (55-66) y. Serum chemerin levels were significantly increased 0.128 ng/ml (0.144-0.574) vs. 0.270 ng/ml (0.079-0.261) in osteoporotic group as compared to control group ($p$<0.001). In postmenopausal females serum

chemerin levels were significantly correlated with BMD at lumbar spine ($r$=-0.28, $p$<0.001), right femoral neck ($r$=-0.29, $p$<.001), right hip ($r$=-0.25, $p$=0.002), left femoral neck ($r$=-0.31, p<0.001) and left hip (r=-0.25, $p$=0.002). Linear regression analysis of serum chemerin revealed its significant association with BMD at right femoral neck ($r^{2=}$0.028, $p$<0.05) and left femoral neck ($r^2$=0.037, $p$<0.05)

**Conclusion:** This study indicates that serum chemerin levels were significantly higher in osteoporotic group as compared to control group. Chemerin clearly assumes a negative role in connection with BMD. Further investigations are expected to show whether chemerin assumes a job in the pathophysiology of osteoporosis and whether chemerin is qualified as a marker or indicator of osteoporosis.

## P909

## CLINICAL PROFILE OF PATIENTS WITH OSTEOPOROSIS TREATED WITH ZOLEDRONIC ACID

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**Objective:** Zoledronic acid is an intravenous, highly potent aminobisphosphonate and the first once yearly treatment to have been approved for use in patients with postmenopausal osteoporosis or at high risk of fracture. The aim of this work is to study the clinical profile of patients with osteoporosis treated with zoledronic acid.

**Methods:** **10**-month prospective study including patients with osteoporosis treated with zoledronic acid. Indications for treatment are postmenopausal osteoporosis (PMO), corticoid-induced osteoporosis (CIO), severe osteoporosis with or without hip fracture. Osteoporosis is defined by a femoral neck T-score and/or lumbar spine ≤-2.5 by DXA. Zoledronic acid is administered as an annual infusion of 5 mg. A pre-treatment assessment including serum creatinine and serum calcium and oral assessment was performed prior to infusion of zoledronic acid.

**Results:** We collected 11 patients treated with zoledronic acid including 9 women; the average age is 65 y. Among women, there were 3 cases of PMO, 1 case of hyperparathyroidism and 5 cases of CIO: the underlying pathologies were rheumatoid arthritis (RA) in 3 patients, one case of Gougerot-Sjogren syndrome and a case of sarcoidosis. Both men had CIO: a 23-year-old man with lupus and a 74-year-old man with RA. 6 patients had a T-score ≤-3 and 7 patients had at least one fracture.

**Conclusion:** The majority of our patients treated with zoledronic acid have severe osteoporosis complicated with fractures. Intravenous zoledronic acid 5 mg once a year is a convenient and effective treatment option especially in our patients at high risk of fracture.

## P910

## TERIPARATIDE AND DENOSUMAB COMBINATION THERAPY: PATIENT CHARACTERISTICS AND OUTCOMES IN AN IRISH BONE HEALTH AND OSTEOPOROSIS UNIT

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**Objective:** Recent studies show that dual therapy with denosumab and teriparatide is superior to teriparatide alone in improving BMD at the lumbar spine and total hip. [1] We aimed to identify patients at a bone health clinic where dual therapy was used, profiling their characteristics as well as biochemical and BMD response to treatment.

**Methods:** Patients commenced on dual therapy between 2015-2018 were identified from a Bone Health Clinic database. Data were collected for age, gender, baseline BMD (as assessed by DXA) and baseline bone markers (CTX and PINP). In addition, follow-up bone markers and BMD assessments (where available) were recorded.

**Results:** 17 patients were identified, 14 (82%) were female and mean age was 77.2 (range 61-92). Mean baseline T-score at hip was -3.7 and at spine -4.7. Treatment was tolerated well with no side effect reported. CTX was significantly suppressed from baseline to 14 months 0.288 to 0.165 (p<0.05) with nonsignificant changes in PINP (p>0.05). In three patients where DXA was completed at 2-y follow-up, there was a significant improvement in mean BMD at the hip by 10.7%. and spine by 16.4%.

**Conclusion:** Dual therapy was reserved for patients at our clinic with severe osteoporosis of hip (T-score typically -3.0 or below) and spine. Treatment resulted in a very substantial improvement in hip BMD. Bone marker changes in CTX were similar to previously reported though there was less change in PINP which may reflect the differential effect on bone remodelling vs. new modelling.

**Reference:** 1. Lou S et al. Osteoporos Int 2019;30:59

## P911

## CLINICAL CONSIDERATIONS IN PREMENOPAUSAL BONE HEALTH THROUGH A GYNECOLOGICAL ROUTINE ASSISTANCE

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Brazil has an aging population, with an associated increase in the prevalence of chronic diseases. Osteoporosis is of particular concern because it leads to an increased risk of fractures, with subsequent negative impacts on women's health. From a gynecological perspective, bone health should be addressed

during all women's life span and not only to postmenopausal period of life. The Women's Health Hospital (tertiary university hospital) from State University of Campinas – UNICAMP has a stablished assistance routine in most of the outpatient clinics to prevent osteoporosis during a routine gynecological and obstetrics consultation. The routine assistance in selected ambulatories has the objective to address high risk patients for bone loss on special clinical conditions during adolescence and puberty, women with gynecological endocrinological morbidities (primary amenorrhea, premature ovarian failure, hypothalamic amenorrhea), surgical induced-menopause, during pregnancy and lactation period and in breast and gynecological cancer survivors. The assistance to bone healthcare is based on nutrition orientation, adequate physical activity to specific age groups, call attention to lifestyle habits, fall prevention and when necessary provide hormonal and antiresorptive pharmacological treatment. The gynecological involvement to prevent osteoporosis and fragility fracture during women's life span will have an important impact in high risk patients and it will create a better understand and consciousness of this silence epidemy.

## P912
## PREVALENCE OF LOW BONE MASS IN BREAST CANCER PATIENTS ON ENDOCRINE THERAPY WITH AROMATASE INHIBITORS USING T-SCORE, FRAX AND TBS-ADJUSTED INTERVENTION THRESHOLDS

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**Objectives:** The bone health guidelines for hormone responsive breast cancer (HRBC) patients treated with aromatase inhibitors (AIs) recommend the management of low bone mass based on BMD testing using DXA and according to the fracture risk assessment (FRAX) tool. The trabecular bone score (TBS)-adjusted FRAX incorporates TBS as a surrogate measure of bone microarchitecture. The aim of the study was to determine the prevalence of low bone mass in HRBC patients based on T-score, FRAX and FRAX-TBS criteria and its impact on treatment decision.
**Methods:** 69 HRBC postmenopausal patients treated with AIs, not previously receiving bone-modifying agents, were examined. Spine and hip BMD were measured using DXA, and TBS was calculated from L1-L4 spine BMD. The FRAX tool was calculated in two ways manner: as authentic (FRAX, FRAX-TBS) and by selecting glucocorticoids (GCs) as a counterpart for AIs (FRAX-GC, FRAX-TBS-GC). FRAX thresholds of MOF >20% and HF >3% were used.
**Results:** The patients aged 60.72±9.29 (mean, SD) years while the BMD evaluation was performed 15.34±15.08 months after starting AI treatment; in 23.2% out of them after 24 months. The mean BMI was 26.69±3.69 kg/m$^2$, and patients were menopausal for 13.53±11.65 years. A low bone mass was detected in 42% and 58% of patients using T-score ≤-2.5 and T-score <-2.0 threshold, respectively. A mean TBS was 1.382±0.08 (range 1.172- 1.543). Applying the FRAX-TBS tool among 28 patients with a T-score ≥-2.4, the high fracture risk was observed in 5 patients: according to HF >3% in both FRAX-GC and FRAX-TBS-GC and one patient out of them had MOF >20% in FRAX-GC model.
**Conclusions:** Applying the T-score ≤-2.5 and T-score <-2.0 thresholds we observed a low bone mass in half of our patients, and in almost a quarter of them DXA was performed more than two years after starting AI treatment. The application of the FRAX-GC and FRAX-TBS-GC tools among patients in osteopenic range additionally increased the number of patients requiring treatment. A longer follow-up is needed to determine if FRAX-TBS-GC tool could be routinely used among HRBC patients receiving AIs.

## P913
## FRAX ESTIMATED FRACTURE RISK MIGHT BE A GOOD MAJOR OSTEOPOROTIC FRACTURE PREDICTOR IN TYPE 2 DIABETIC FEMALES WITH OSTEOPOROSIS

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**Objective:** Diabetes is an important risk factor for bone fragility. However, the 10-y probability risk of major osteoporotic fracture (MOF) and hip fracture (HF), calculated with fracture risk assessment tool (FRAX) is often underestimated in diabetic patients, mostly due to higher BMI as one of the variables included in FRAX calculation. Thus, we aimed to investigate the association in FRAX calculated risk in BMI matched, postmenopausal, osteoporotic females, with and without type 2 diabetes mellitus (T2DM).
**Methods:** This cross-sectional study included 63 age and BMI matched postmenopausal women. They were divided in two groups, according to T2DM presence. FRAX probabilities were calculated and T-score measurements were obtained with DXA. We compared FRAX MOF and HF risk between groups. In addition, we did an intra group differences in T2DM according to osteoporosis presence, detected by DXA.
**Results:** The study population was 66.8 years old, with BMI mean value of 27.89 kg/m$^2$. There were 33 (52.4%) T2DM females, and 30 (47.6%) controls. We detected 12 osteoporotic patients, 8 in T2DM, and 4 in control group. There were no significant differences in age (mean, median 72.1, 74.0 vs. 64.7, 63.0), BMI status (mean, median 29.0, 28.6 vs. 26.8,

26.4) and T-score values in femoral neck area (mean, median -0.951, -0.700 vs. -0.989, -1.3), as expected. There was no significant difference between T2DM females and controls in FRAX estimated MOF risk (p=0.094), as well as in HF risk (p=0.077). However, T2DM females with osteoporosis revealed significant higher FRAX MOF risk in comparison to T2DM females without osteoporosis (p=0.044 assessed with Mann-Whitney U test). Hip fracture risk in osteoporotic and nonosteoporotic T2DM patients wasn't significantly different (p=0.098).

**Conclusion:** Our results indicate that T2DM patients might be disposed to higher frequency of fractures. This might be due to the metabolic disbalance as a natural core of the disease, which is in accordance to the FRAX calculation. Further study investigation are required in order to elucidate the contribution of BMI and other risk factors that affect the FRAX calculation in diabetic patients.

## P914

## APPRECIATION OF OSTEOPOROTIC TREATMENT COMPLIANCE WITH ALENDRONATE 70 MG ORALLY

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**Objective:** Patients suffering from osteoporosis (OP) have not the opportunity to enjoy from an accurate and concrete parameters response to OP treatment. They therefore have no palpable evidence of the favorable effect generated by antiosteoporotic treatment (AOT). given the silent nature of the pathology. That is way we see the noncompliance with treatment in some patients. It was imperative to estimate the extent of the lack of compliance with AOT in order to deduce the factors related to this deficiency in order to reduce the size of the problem.

**Methods:** It is a descriptive cross study performed in all patients over 38 y for both sexes and that exhibit postmenopausal or corticosteroid-induced OP justifying AOT orally (alendronate 70 mg orally per week) observed over a period of at least 6 months.

**Methods:** We collected data of 153 patients. in 9 out of 10 cases this was a woman, the mean age was 59.3±8.1 y, the average duration of gain of treatment was 32.2±18.2 months, 3 of 5 patients believe that treatment is for musculoskeletal pains. 1/3 of respondents confess not to take their weekly treatment regularly. regular physical activity was performed by only 21% of patients. the factors related to noncompliance were lack of education (p=0.032) and sedentary lifestyle (p=0.044).

**Conclusion:** OP is unfortunately underestimated by both patients and physicians, and its short- and long-term repercussions are often minimized. Our study has shown that the various measures required in its management are poorly followed by patients despite their proven effectiveness in reducing fractures. One in three patients in our sample do not follow their treatment properly. Therapeutic education seems to be the answer to overcome this lack of adhesion.

## P915

## EFFECT OF IGF-1 GENE POLYMORPHISM ON BONE MINERAL DENSITY IN OSTEOPOROTIC POSTMENOPAUSAL SUDANESE WOMEN

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**Objective:** BMD is the hallmark of OP and exhibits high heritability; efforts to understand OP genetic determinants have therefore been increased. In this study a polymorphism of IGF-I gene was examined in Sudanese postmenopausal women to analyse the genetic background for osteoporosis.

**Method:** A cross-sectional study conducted during the period of 2014-2015. We studied 836 women refereed to our hospital. Based on the DXA results and inclusion criteria 121 postmenopause women (45-80 years old) were selected. Classified into three groups, osteoporotic, T-score (≥-2.5), osteopenia, T-score (-1 to -2.5) and normal, T-score (≤-1) as the control group. A most common single nucleotide polymorphisms (SNP) in (IGF-1) gene (rs35767) were measured using RT-PCR TaqMan. Serum concentration of IGF-1 was measured by ADVIA (Siemens Healthcare Diagnostics Inc., Deerfield, IL, USA).

**Results:** The IGF-I SNP (rs11568820) CC genotype was found to be associated with osteoporosis and BMD at the total hip (not lumbar spine (L1–L4) under recessive and additive genetic model (AOR (95%CI)=2.0(1.0-8); p=0.0) and (OR (95%CI)=1.5 (0.1-7); p=0.02) respectively. Serum level of IGF-I was strongly associated with decreased BMD with level significantly decreasing ($P<0.01$).

**Conclusions:** We found significant associations between CC genotype of IGF-1 rs35767, BMD and osteoporosis risk, suggesting that IGF-1 rs35767 can be used as a predictive factor for determining the risk of osteoporosis. Serum IGF-1 can be used as predictor marker for determine early decreased BMD. Further study with large sample size are needed to confirm the results of our study.

## P916

## PARATHYROID ADENOMA AS A PREDICTOR OF SEVERITY OF OSTEOPOROSIS IN HYPERPARATHYROIDISM

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**Objective:** Hyperparathyroidism is a known cause of bone disease (1), and its management and treatment are an important factor in the prevention and treatment of osteopaenia and osteoporosis. This study aimed to evaluate the significance of the presence of a parathyroid adenoma in the severity of osteoporosis in a cohort with primary hyperparathyroidism.
**Methods:** We identified patients from our tertiary referral, bone health clinic who had a biochemical diagnosis of primary hyperparathyroidism and had both a DXA and Sestimibi scan (±ultrasound parathyroid). We used regression models to explore for associations between the presence of parathyroid adenoma and age, gender and severity of osteoporosis/osteopaenia (as assessed by BMD).
**Results:** 100 subjects were identified: 81 were female and mean age was 67.5±13.3 (range 37-94). 79% were osteopenic and 33% had osteoporosis as defined by WHO criteria. 12 had vertebral fractures on VFA and six had fractures at multiple sites. 60 had a parathyroid adenoma confirmed on Sestimibi scan±ultrasound parathyroid. Age or gender did not predict the presence of parathyroid adenoma on imaging (P>0.05). In addition, no relationship was found between the presence of parathyroid adenoma and the severity of osteoporosis (P>0.05)
**Conclusion:** In our cohort, a significant proportion of patients with primary hyperparathyroidism had negative imaging. However, in those found to have a parathyroid adenoma, there was no difference in the severity of osteoporosis. Primary hyperparathyroidism is an important risk factor irrespective of imaging results and requires close follow-up. Repeat imaging including with the use of MRI should be considered in patients with negative scans who are candidates for surgery.
**Reference:** Fraser WD. Lancet 2009;374:145.

## P917
## UTILITY OF FOREARM DXA AT IDENTIFYING OSTEOPOROSIS IN AN IRISH COHORT WITH PRIMARY HYPERPARATHYROIDISM

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**Objective:** Hyperparathyroidism is a known cause of severe bone disease(1), and its management and treatment are an important factor in the prevention and treatment of osteopaenia and osteoporosis. It has been increasingly recognised that primary hyperparathyroidism has a more profound effect on the bone of the distal forearm due to its relatively high rate of cortical bone(2). Our study aimed to investigate the utility of forearm DXA at identifying osteoporosis in an Irish population with primary hyperparathyroidism vs. traditional DXA (AP spine, femoral neck and total hip) as measured by T-score.
**Methods:** Chart review was performed on patients attending a bone health clinic in a large tertiary referral centre. 32 subjects were identified as having a biochemical diagnosis of primary hyperparathyroidism and DXA of forearm (total) and AP-spine/total hip/femoral neck. Analysis was then performed using a discrete statistical analysis software, STATA.
**Results:** Of the 32 subjects 7 were men, 25 women. 17 had a diagnosis of osteoporosis by T-score identified at any site. 5 had a diagnosis of osteoporosis as measured by T-score identified on forearm DXA which was not picked up on AP spine, total hip or femoral neck DXA. This was a statistically significant result on chi-squared test, p=.001. Those subjects who had osteoporosis identified at AP spine/total hip/femoral neck had a tendency towards a worse T-score in their forearm, however this was not statistically significant (mean -3.8, range:-7.3 to -2.1).
**Conclusion:** Forearm DXA is an important modality in diagnosing osteoporosis in the context of primary hyperparathyroidism. All patients with a diagnosis of primary hyperparathyroidism should be referred for DXA with a forearm DXA as standard.
**References:**
1. Fraser WD. Lancet 2009;374:145.
2. Wood K et al. Oncologist 2012;17:322.

## P918
## OSTEOPOROTIC FRACTURES IN THE ELDERLY: IS HYPONATREMIA PLAYER OR BYSTANDER?

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**Objective:** To evaluate the role of hyponatremia in fragility fractures and mortality in elderly.
**Method:** 284 hospitalized geriatric patients without secondary causes of hyponatremia or osteoporosis were recruited in the study. Age, sex, comorbidities, drugs and previous fragility fractures were recorded. Blood levels of sodium, potassium, phosphate and calcium were measured. Cognitive function, nutrition, muscular strength and balance were evaluated by standard tests. Normo- and hypo-natremic patients were compared for the analysed variables. The mortality rate of the patients was recorded with a follow-up after hospital discharge. The ethics committee of our hospital approved the study.
**Results:** Hyponatremic patients were more malnourished (BMI, MNA score), without significant differences in cognitive performance (MMSE), in risk of falls (Tinetti scale) nor in

muscle strength. Interestingly, hyponatremic patients reported higher prevalence of fragility fractures (Table 1).

| Variable | Normonatremic (234) Median (IQR) | Hyponatremic (50) Median (IQR) | p |
|---|---|---|---|
| MMSE | 24.8 (22.2-26.7) | 24.6 (22.2-26.3) | 0.503 |
| MNA | 21.5 (18.5-24.5) | 20.0 (17.0-22.5) | 0.005 |
| BMI (kg/m$^2$) | 25.3 (22.7-29.0) | 22.6 (20.9-24.6) | 0.000 |
| Force to the dynamometer (Kgp) | 20.0 (14.0-28.0) | 18.0 (12.0-24.0) | 0.099 |
| Tinetti score | 17.0 (12.0-23.0) | 18.0 (12.0-24.0) | 0.556 |
| Previous fragility fractures (%) | 22 (44.0%) | 59 (25.2%) | 0.008 |

Survival analysis showed that hyponatremia at baseline was associated with higher mortality rate (p=0.005), hazard ratio (HR) crude=1.80 (95%CI 1.19-2.71), HR adjusted for comorbidities, sex, age=1.75 (1.16-2.65).

**Conclusions:** Our result shows that hyponatremic patients are generally more affected by malnutrition; our results highlight the roles of hyponatremia as worse prognosis indicator and risk for fragility fractures regardless to other important variables as age, sex and co-morbidities. Serum sodium is an easily available and affordable biochemical measurement in clinical practice; hence, the assessment of hyponatremia could be used as an index of worse outcome in old patients, supplementing the patient assessment clinical scales.

## P919

## UTILITY OF FOREARM DXA IN THE EVALUATION AND MANAGEMENT OF PATIENTS ATTENDING A SPECIALIST OSTEOPOROSIS AND BONE HEALTH CLINIC

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**Objective:** To review the utility of forearm DXA in the evaluation of patients attending a specialist osteoporosis and bone health clinic, the indications for its use, and to assess if forearm DXA provided any change in diagnosis of osteoporosis when compared to results in DXA from the spine.

**Methods:** Data was retrospectively extracted from a bone database of patients who had undergone forearm DXA in a tertiary referral centre for Osteoporosis and Bone Health, from 2003-2018. The results were analysed using SPSS.

**Results:** Forearm DXA was carried out in 339 of 8000 patients included in the database from 2003-2018. The mean age of patients was 73.17, 269 (79%) were female. Hyperparathyroidism was an indication for forearm DXA in 49 patients, 160 patients did not have a corresponding spine measurement and the assumption was made spinal DXA was not tolerated in these patients and thus an indication for forearm DXA. Of those that did have comparative spine T-scores measured (n=180), osteoporosis was diagnosed in 112 (62.2%) of patients with forearm DXA, and 84 (46.6%) on spinal DXA. A chi-square test was conducted to assess whether the proportion diagnosed with osteoporosis on DXA forearm significantly differed to DXA spine, the results were found to be significant $X^2$=15.397, p<0.01. Forearm DXA upgraded the diagnosis from osteopenia or normal to osteoporosis in 47 patients (26.1%).

**Conclusions:** Forearm DXA is recommended and used in our unit for patients with hyperparathyroidism. It is also helpful in the evaluation of BMD if patients in who spinal imaging is not possible. There was a significant difference in those identified with T-scores in the osteoporotic range on forearm DXA compared with AP Spine DXA. Therefore, its use may be considered in patients undergoing evaluation for osteoporosis and the result, where available, considered in the evaluation of fracture risk and treatment thresholds.

## P920

## INCIDENCE OF OSTEOPOROSIS IN WOMEN WITH RHEUMATOID ARTHRITIS RELATED TO ACTIVITY OF THE DISEASE

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**Objective:** Osteoporosis, a condition with a great socio-economic impact, is a systemic skeletal disease characterized by reduced bone mass and microarchitectural damage to bone tissue resulting in increased bone fragility and, implicitly, fracture risk. It is known to be common in patients with rheumatoid arthritis. This study follows the evaluation of osteoporosis in women with rheumatoid arthritis depending on postmenopuasal status, disability and activity of the disease.

**Methods:** We analyzed a group of 47 female patients diagnosed with rheumatoid arthritis who fulfills the 2010 revised criteria of ACR/EULAR. The BMD measurements were performed using DXA in the hip (total hip) or in the lumbar spine. Patients are aged between 40-70 y. We excluded from this study patients who received glucocorticoid therapy.

**Results:** Of the 47 patients, 9 of these (19.14%) had a DAS28CRP of <2.69 (disease remission), 5 (55.55%) aged over 50 and 4 (44.44%) of these under the age of 50. 60% of those over 50 years old had a T-score < -2.5 SD and the remaining 40% had osteopenia (T-score < -1 > -2.5SD) or normal BMD. Of those under the age of 50 years 1 (20%) had a T-score -2.7 SD and the remaining 3 (80%) had a T-score value between 0.4 -1 SD. Related to low disease activity, of all patients, 13 (27.65%) had a DAS28CRP >2.6 <3.0 and

of those, 8 (61.53%) were over 50 y of age, 7 (87.5%) with a T-score ranging from 0.8 SD to -2 SD and one patient (12.5%) with T-score – 2.5 SD; 5 (38.41%) under 50 y of age, all with a T-score > - 2.4 SD. Moderate disease activity was found at 16 patients (34.04%) who had a DAS28CRP value of between 3.1 and 4.0. 9 were under 50 years old and T-score < -2.5 SD – 55.5%, higher than -2.4 SD – 44.4%, and 7 were over 50 years old with T-score < -2.5 SD percent of 71.4% and >– 2.5 SD percent of 28.57%. 9 of the 47 patients(19%) had a DAS28CRP > 5 value (high disease activity) and 6 of them (67%)were aged over 50 y, 4(67%) of which had a T-score <-2.5 SD and 3 (33%) aged under 50 years had a T-score > -2 SD. 57.4% of female patients which we analyzed had post-menopausal status and 22.2% of them were diagnosed with osteoporosis.

**Conclusions:** Osteoporosis is a disease commonly seen in postmenopausal women with rheumatoid arthritis, and is also influenced by increased activity of the disease.

## P921
## SEASONALLY DEPENDENT DECREASE OF THE NUMBER OF FRACTURES IN POLAND IN THE YEARS 2010-2015

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**Objective:** Falls are the main risk factors of extravertebral fractures. The risk of slip and fall injuries is highest in winter. However, the number of cold and snowy days decreases with the climate changes. The study aimed to examine trends in fracture incidence in the last years and their correlation with temperature and number of snowy days.

**Methods:** A database of the National Health Fund, covering almost all fractures in Poland in the years between 2010-2015, was analyzed. Only patients older than 50 y were included.

**Results:** In the examined period there was a significant decrease of the yearly incidence of the forearm (from 71907 to 54169) and femur (from 27291 to 25002) fractures that was dependent mainly on the decrease during winter months (Figure 1). From the other side a statistically significant increase of incidence of the humerus and lumbar spine fractures, whereas the incidence of thoracic spine fractures was stable. The differences in the incidence of the latter three types of fractures were not seasonally dependent.

Figure 1. Number of fractures in November-March and April-October

The number of fractures was related to the weather. Table 1 shows Pearson's correlation coefficients between weather variables (based on meteorological station in Warsaw) and number of fractures (for period November-March).

Table 1. Pearson's correlation coefficients between weather variables and number of fractures.

| | humerus | femur | lumbar spine/vertebra | thoracic spine/vertebra | forearm |
|---|---|---|---|---|---|
| Mean temperature in December | 0.389 | -0.838* | 0.599 | 0.158 | -0.813* |
| 6789 Mean temperature in January | 0.311 | -0.870* | 0.495 | 0.096 | -0.888* |
| Mean temperature in February | 0.512 | -0.429 | 0.678 | 0.401 | -0.357 |
| Number of days with snow (per year) | -0.176 | 0.698 | -0.544 | -0.131 | 0.823* |
| Mean annual temperature | 0.554 | -0.949* | 0.829* | 0.332 | -0.930* |

**Conclusion:** Even in a short-time observation period (2010-2015) a climate-dependent decrease of the incidence of forearm and femur fractures can be observed

## P922
## BONE MINERAL DENSITY IN MEN WITH CRURIS FRACTURE

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**Objective:** Today osteoporosis is one of the biggest health problems of civilisation. It has a significant role in the etiology of fractures in elder population. Osteoporosis in men, although of significantly lower frequency, in comparison to women, is not only a growing health but also a socioeconomic problem. Our aim was to establish the frequency of osteoporosis in men who had cruris fracture.

**Methods:** 456 male patients were examined. Out of them, 256 were in the investigated group (IG), they were the patients who had cruris fracture, while 200 out of them were without

fracture and they were included in the control group (CG). Measuring of BMD was performed on the DXA Hologic apparatus, on both lumbar vertebra L1-L4 and on the left hip.
**Results:** Average BMD value on the lumbar spine in the investigated group was 0.845±0.12 g/cm$^2$ (T-score -1.8±0.89), and on the hip 0.801±0.112 g/cm$^2$ (T-score -1.9±0.82). Average BMD value on the lumbar spine in the control group was 0.965±0.121 g/cm$^2$ (T-score -1.23±0.91) and on the hip it was 0.824±0.145 g/cm$^2$ (T-score -1.37±0.82). Statistically significant difference was not found between absolute values of BMD as on the lumbar spine ($p>0.01$), as on the hip ($p>0.5$), between the investigated and control group. There is no statistically significant difference between average T-score values on the lumbar spine or on the hip in the investigated and control group.
**Conclusion:** Cruris fracture in men are not associated with the presence of osteoporosis.

## P923
## PREDICTORS OF POOR RESPONSE TO TNFα INHIBITORS IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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**Objective:** TNFα inhibitors represent a major advance in the treatment of certain refractory forms of ankylosing spondylitis (AS). Unfortunately, some patients have failures despite these therapies, apart from their undesirable effects and cost, which must be taken into account. Defining immediately patients likely to be good or bad responders would be of great help. The objective of our work was to try to assess the failure rate of these treatments but also to identify possible predictors of nonresponse to anti-TNFα in an Algerian population of AS.
**Method:** It is a prospective study of a cohort of AS meeting New York criteria, recruited between June 2009 and June 2017 subjected to a treatment with anti-TNFα with evaluation before and after 6 months of treatment, we have evaluated the demographic, clinical, biological data of the sample.
**Results:** We selected 74 patients for the analysis (etanercept=35, adalimumab=31, infliximab=8), the mean age is 34.6 y ±9.6, the sex ratio is 3.62. The mean duration of the disease is 12.1 y ±8.2, the mean duration of treatment is 33.9 months ±21.1. After 6 months of treatment we noted 77% of good responders having completed a BASDAI 50, against 23% nonresponders. Factors associated with poor response to TNFα antagonists were smoking (p=0.025) and high BMI (p=0.0001).
**Conclusion:** In our study more than ¾ of patients still respond well to anti-TNFα after 6 months of treatment against 23% who admit a failure, the elements in favor of a bad response to anti- TNFα are patients who smoke and those with a high BMI. This work is expected to be continued on a larger sample and in the longer term to better understand the predictors of nonresponse to these molecules.

## P924
## WALKING ABILITY BY 6 MONTHS POSTFRACTURE DETERMINES ONE-YEAR MORTALITY OF FRACTURES OF THE PROXIMAL FEMUR: A STUDY FROM A PORTUGUESE HOSPITAL CENTER

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**Objective:** Fragility fractures of the proximal femur (FFPF) are associated with significant morbidity, mortality, loss of independence, and financial burden. The first year after a hip fracture appears to be the most critical time. The aim of the present study was the determination of factors associated with greater mortality after a FFPF in a Portuguese hospital center.
**Methods:** Retrospective study comprising patients admitted to Centro Hospitalar Universitário de São João with FFPF from 2015 to 2017. Data were collected from electronic medical records. Kaplan-Meier analysis with log-rank test was calculated to compare the differences of mean survival time. A Cox proportional-hazard models for survival time was performed to determine factors that were associated with 1-y survival. The studied factors were the age, gender, type of fracture, type of surgery, Charlson comorbidity index (CCI), length of stay in orthopedic ward, previous walking ability and walking ability by 6 month post fracture.
**Results:** Data from 522 patients were used for analysis. The mean age was 83±7.6 years old and 416 patients were women. The mean length of stay was 21.0 d (interquartile range of 17 d). Around 4.8%, 13.0% and 18.4% died, respectively, within 1, 6 and 12 month after the fracture. The mean survival time was significantly lower for greater age (p=0.009), for femoral neck fracture (p=0.006), for surgery with arthroplasty (p=0.01), for greater length of stay (p=0.008) and for patients unable to walk by 6 month post fracture (p=0.004). The hazard ratio (HR) of mortality were significantly higher for surgery with arthroplasty (HR: 3.4; p=0.003) and inability of walk by 6 month post-fracture (HR: 3.1; p=0.009).
**Conclusion:** The mortality at one year in our medical center is in accordance with the literature. It is known that immobilization during inpatient hospital is associated with sarcopenia, loss of strength and function. This can lead to inability to walk leading to further increase in likelihood of death as demonstrated. Unfortunately, those patients were not integrated earlier in multidisciplinary rehabilitation/geriatric facilities which, in part, may negatively influence the functional and vital prognosis in FFPF.

## P925
## DETECTION OF SUBLESIONAL OSTEOPOROSIS IN PATIENTS AT RISK

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We performed a prospective study on 138 patients hospitalized in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, 95 men, diagnosed with tetra, para or hemiparesis due to vertebro-medullary trauma (51.44%), stroke (18.11%), craniocerebral trauma (5.07%), tumors, cerebral abscess, encephalitis a.o. (25.36%). Their mean age was 45.30 . Mean age in the group with vertebromedullary trauma was 39.1 y, 58.8 y in the group with stroke, 30.42 y in patients with craniocerebral trauma and 47.82 y in the others. Osteoporosis was detected using DXA investigation in 77.53% cases. Osteoporosis was present in 77.46% of patients with vertebromedullary trauma, 76% of those with stroke, 85.71% of cases with craniocerebral trauma and 77.14% in the remaining cases. According to ASIA classification 35.21% of patients with vertebromedullary trauma had ASIA-A impairment, 26.76% ASIA-B, 22.53% ASIA-C and 12.67% had ASIA–D. Osteoporosis was present in 76% of cases with ASIA-A, 94.73% patients with B, 68.75% with C and 66.6% with D. Quantification of spasticity using the modified Aschwort scale showed that 73.23% of the cases had spasticity. Out of these 14.08% had grade 1, 32.39% had grade 2, 18.3% had 3 and 8.45% had 4. Osteoporosis was present in 76.68% of cases with grade 0, 70% patients with 1, 73.91% with 2, 92.4% with grade 3 and 66.6% with 4. The mean duration from the moment of the motor deficit causal event until DXA investigation was 33.7 months for vertebromedullary trauma, 33.43 months for stroke, 60 months for craniocerebral trauma, 26.7 months for other etiologies. Within 24 months from the causal event, osteoporosis was present in 71.87% of cases, mean age 45.47 y, distributed as follows: 60% of patients with vertebromedullary trauma, mean age 48.11 y; 81.81% of cases with stroke, mean age 50.77 y; 14.28% of those with craniocerebral trauma, mean age 34 y and 80% of patients with other etiologies, mean age 49.

**Conclusion:** Bone loss is mainly due to reduced mobility and traction forces on the bone, but also to other complex processes. Sublesional osteoporosis detection is important because bone loss is partially reversible, thus initiation of antiosteoporotic therapy is beneficial.

## P926
## ANALYSIS OF BONE MASS MEASUREMENT REQUESTS BY ALGERIAN PHYSICIANS: ARE THEY COMPLYING WITH THE INDICATIONS OF THE INTERNATIONAL SOCIETY OF CLINICAL DENSITOMETRY (ISCD)?

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**Objective:** Bone strength and the risk of fracture depend on bone mineral content or BMD. DXA is the gold standard and key examination for measuring BMD. Its indications are clearly known. This exam is not reimbursed by Algerian social insurance. Indeed, measuring BMD is helpful in some people with risk factors of osteoporosis. The ISCD has produced some indications for the measure of bone density. We also wanted to appreciate the profile of BMD prescriptions of Algerian physicians. Are they meet the ISCD recommendations?

**Methods:** It is a descriptive study of a survey in different municipalities of Algiers, we analysed all the prescriptions for BMD measurement during 6 months from December 2017 to May 2018, with assessment of complete patient and physician profile. we also examined the various indications justified by the requests. We appreciated whether or not they matched the indications of BMD measurement according to the ISCD.

**Results:** Altogether 551 requests were received, of which 62% came from rheumatologists (8/10 of them from the private sector), 16% were oncologists and 12% were general practitioners; most of the prescriptions concerned women of menopausal age. In 1/5 the cases the requests were not meeting indications of BMD measurement according to the ISCD (2 of 3 were general practitioners).

**Conclusion:** The BMD measurement prescriptions come from the rheumatologists in 2/3 of the cases and remain insufficient from the general practitioners, in most cases their requests are not complying with the indications of the ISCD. Indications to men are exceptional.

## P927
## PATIENT AND SERVICE-LEVEL PREDICTORS OF BONE TREATMENT RECOMMENDATION POST-FRACTURE: RESULTS FROM THE UK NATIONAL FRACTURE LIAISON SERVICE (FLS) DATABASE

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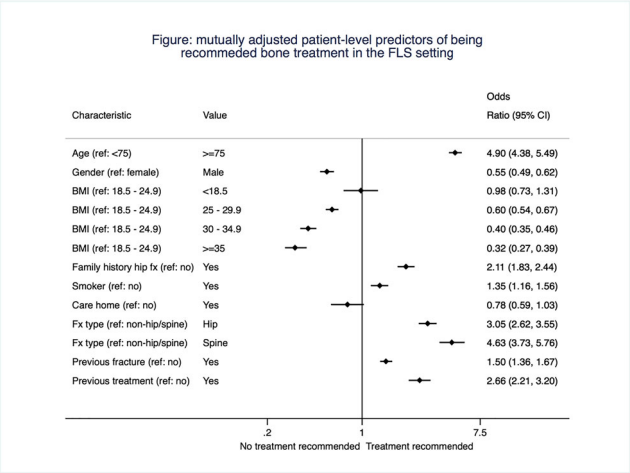
**Objective:** To describe antiosteoporosis treatment recommendations postfracture and identify patient and organisational predictors of: decision to treat (including oral bisphosphonate, parenteral therapy or clinical/GP referral for consideration of

treatment) vs. decision not to treat; and oral bisphosphonate vs. parenteral therapy recommendations.
**Methods:** Patients with fragility fracture diagnosed in England between 01/01/2017-31/12/2017 were identified from the Royal College of Physicians national FLS database. Patients diagnosed within centres achieving <50% case finding or with ≥50% unknown/missing treatment information were excluded. Descriptive statistics outlined treatment recommendations, with stratification by FLS. Patient and FLS-level factors (highest nurse band; nurse & administrator whole time equivalent per 1000 admissions (</≥ median)) were identified by complete case analysis using multilevel multivariable logistic regression.
**Results:** Of 19,217 eligible patients (mean age 73 y; 77% female) from 15 FLS centres, 24% were recommended an oral bisphosphonate, 6% denosumab, 5% zoledronic acid, 25% were referred and 40% were neither referred nor recommended treatment. There was marked variation in these outcomes by FLS. Patient-level characteristics and odds ratios (OR) for appropriate treatment recommendation/referral are shown in the figure; adjustment for FLS-level factors (which were nonpredictive) did not attenuate these associations. Predictors of parenteral (vs. oral bisphosphonate) therapy were age ≥75 y (OR: 2.03 [95%CI: 1.64–2.51]), smoking (OR: 1.39 [0.99–1.95]), living in a residential home (OR: 2.81 [1.95–4.04]), hip (OR: 1.37 [1.10–1.71]) or spine (OR: 1.83 [1.34–2.50]) fracture, previous fracture (OR: 2.03 [1.66–2.48]) and previous bone treatment (OR: 2.86 [2.24–3.65]). At the FLS level, the number of full-time nurses per 1000 admissions (above and below median of 0.46 whole time equivalents) was also predictive of parenteral therapy (OR: 6.50 [1.16–36.48]).




**Conclusion:** Multiple factors are associated with treatment recommendations made postfracture, including greater intensity of nurse time. These results provide clinicians and service managers with insights towards standardising and improving services.
**Acknowledgments:** The Fracture Liaison Service Database is commissioned by the UK Healthcare Quality Improvement Partnership (HQIP)

## P928
## PHYSICAL PERFORMANCE IN OLDEST OLD COMMUNITY-LIVING DURING A 3- YEAR FOLLOW-UP: LOCOMOV PROJECT

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**Objective:** To evaluate the physical performance in the community-living elderly aged 80 y or more with or without locomotive syndrome (LS), comparing both groups.
**Methods:** This is an analysis of 3 years follow-up of the prospective cohort - LOCOMOV Project. The individuals were evaluated using the questionnaires related to LS diagnostic (geriatric locomotive function scale-25), basic and instrumental daily living activities (Katz and Lawton, respectively) and physical performance tests (4-meter gait speed - 4mGS, 5 times sit-to-stand test – 5xSST, two-step-test - TST and hand grip - HG). For the statistical analysis, the data collected was submitted to the following tests: McNemar, T-Student, chi-square, Wilcoxon and analysis of variance (ANOVA). The global significance level was set at 0.05 (5%).
**Results:** At baseline, there were 102 participants, but we considered the data from 87 individuals (missing data: 4 dropouts, 5 deaths and 6 participants who developed moderate to severe dementia). The mean age was 87.3 years. There were 24 male and 63 female; 48 individuals were LS carriers and 39 were not. We did not observe interactions between time and group for all variables. The participants with LS presented themselves evolutively worst in TST ($p<0.001$), as well as in 5xSST ($p<0.001$). Also, 4mGS and HG were worse ($p<0.001$ and $p<0.004$, respectively) in LS carriers. For basic activities of daily living, the decline was higher in those with LS than in those without it, 20.0% and 4.8%, respectively ($p=0.035$).
**Conclusion:** Those oldest old community-dwelling with LS, presented worse physical performance and also decline in functionality in the 3-y follow-up.

## P929
## TRABECULAR BONE SCORE IN ADDITION TO BONE MINERAL DENSITY IN FEMALE PATIENTS WITH PSORIATIC ARTHRITIS

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**Objectives:** In patients with psoriatic arthritis (PsA) the studies evaluating BMD using DXA provide inconsistent and conflicting results, and there are a limited number of studies that

evaluated bone microarchitecture. The aims of the study were to assess the bone microarchitecture by trabecular bone score (TBS) using DXA in addition to BMD in PsA patients and controls and to investigate the determinants of a low TBS among patients.

**Methods:** The study included 60 female PsA patients aged 61.85±8.43 (mean, SD) y and 107 age-matched female controls. Spine and hip BMD were assessed by DXA. TBS was calculated from the anteroposterior image of the spine BMD.

**Results:** The prevalence of osteoporosis (T-score ≤ -2.5) in PsA patients was similar to controls (23.3% and 21.5%, respectively). However, a significantly higher proportion of controls had a T-score between -2.4 and -1.0, compared to patients (61.7% vs. 43.3%, p=0.032). There were no significant between-group differences in TBS and BMD at the lumbar spine, while significantly higher BMD at the femoral neck was detected in patients (p=0.017). Patients had significantly higher weight (mean 77.13±13.45 kg) and higher BMI (28.45±4.99 kg/m$^2$) compared to controls, all p<0.05. According to TBS results (1.36±0.09) the patients with a TBS in the lowest tertile (TBS ≤ 1.33, n=20) were compared to patients with a TBS value in the 2 upper tertiles (TBS > 1.34, n=40). In univariate analysis low TBS showed trends of association toward higher BMI, to higher prevalence of low T-score (< -1.0) and to a lower lumbar spine BMD, however the results did not reach significance. No association was observed between low TBS and age, duration of the disease, previous non-traumatic fractures, menopause duration, or use of GCs.

**Conclusions:** Our results show no significant differences in the prevalence of osteoporosis and in TBS values between PsA patients and controls. Surprisingly, we observed significantly higher femoral neck BMD in patients compared to controls, which might be explained by significantly higher weight and BMI among patients. We found no predictors of low TBS related to parameters of the disease.

## P930

## INFECTIONS WITH ANTI-TNFα: PROSPECTIVE STUDY OVER 12 YEARS

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**Objective:** Anti-TNFα has significantly improved the prognosis of some chronic inflammatory diseases (CID). Nevertheless, they carry with them a significant risk of opportunistic infections, imposing a rigorous surveillance and an adequate education of the patients. In a context of endemic tuberculosis, it is imperative to take the appropriate precautions to detect this kind of infection in rheumatisers under anti-TNFα. The aim of our work was to study the profile of infectious incidents in patients treated with anti-TNFα.

**Methods:** This is a prospective and descriptive study in patients treated with anti-TNFα over a 12-y period (2006-2018). We examined all infectious complications for each patient who received an anti-TNFα for with CID while assessing the level of severity, the type of infection and the risk factors that may be related to this type of incident.

**Results:** During the study period, 134 patients were identified, these patients were followed for ankylosing spondylitis (AS) for 58 cases, 36 for enteric rheumatism, 23 for psoriatic arthritis and 17 for rheumatoid arthritis. The mean age was 46.3 y (19-64 y), the mean age of the disease was 44.2 months (8-140). The molecules used were: infliximab, etanercept, adalimumab with a respective number n (%)=29 (21), 44 (33), 61 (46). Of the 134 patients evaluated, 71 were diagnosed and treated by a physician (in 47 patients), only 5 were serious: 2 cases of tuberculosis were reported (intestinal and ganglionic tuberculosis), 1 case of chickenpox of the adult, 1 case with perianal abscess, 1 case of erysipelas of the lower limb. The infection was bacterial, viral or mycotic [n (%)=38 (53), 61 (86), 7 (8)]. A large proportion of the patients were on conventional immunosuppressive therapy. The factors related to the occurrence of infectious incidents were use of corticosteroids p<0.0001, habitat in rural areas p=0.042.

**Conclusion:** More than a third of patients have infectious complications after TNFα treatment in our study sometimes with serious issue. Thus, with the emergence of these accidents, the physician has to be very vigilant when instituting this biotherapy, and secondly, a rigorous and prolonged monitoring of the patients.

## P931

## PREVALENCE OF FRACTURE RISK BY FRAX TOOL AMONGST ELDERLY INPATIENTS AT INCREASED RISK OF FALLS

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**Objective:** Elderly inpatients have a significant risk of falls and fracture. The Inpatient Falls Strategy[1] highlighted the need for screening all patients 65 y and above for fracture risk. The NICE has identified these patients at increased risk of falls[2]. The latest NOGG guidelines[3] recommends using FRAX Tool[4] which predicts the absolute 10-y risk of sustaining a major osteoporotic and hip fracture. Its value has not been well assessed in elderly inpatients. Our aim was to o determine prevalence of fracture risk in elderly in-patients at risk of falls by FRAX- tool and identify patients who need treatment.

**Methods**: Retrospective analysis of eligible inpatients aged 65-90 y at risk of falls (according to NICE CG 146)[2] over 3

weeks in January 2019. Data extracted from electronic patient records and history taking. The FRAX[4] Tool was applied to predict 10-y major osteoporotic and hip fracture risk. Data analysed by StatsDirect.

**Results:** 100 eligible patients were analysed. Mean age was 81.2±6.3 y and BMI 25.4±6.2 kg/m$^2$; 51% patients were female. 41 patients had previous fractures; 15% had history of parental hip fracture. 8 patients were current smokers, 9 consumed >3 units of alcohol. 20 were on glucocorticoids while 19 patients had secondary osteoporosis. The absolute 10-y risk of major osteoporosis and hip fracture, according to FRAX were 21.4±14.4 and 13.8±12.9 respectively. 35 patients needed bone protection: but only 16 patients were on treatment. Our study findings were similar to the Irish study[5] with absolute risk scores of 15±12 and 7.6±11 for osteoporotic and hip fracture respectively.

**Conclusions:** The 35% prevalence of elderly inpatients at risk fracture and falls calls for routine screening of this population by FRAX- tool and subsequent initiation of treatment. Our findings support the only available study on FRAX scoring in elderly patients.

**References:**

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## P932

## PREVALENCE OF SARCOPENIA IN INDIAN MEN AND WOMEN VARIES ACCORDING TO THE DEFINITION USED

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**Objective:** India has over one third of the world's population aged >60 , which is estimated to rise to over 38% by 2050 – equal to 494 million people. Prevention of sarcopenia is critical to ensure healthy independent ageing in India. The prevalence of sarcopenia in India is unknown, as is whether the existing definitions, mainly developed in Caucasian populations (FNIH and EWGSOP2), are vigorous in this population. Our aim was to identify whether: (1) existing definitions are able to determine the prevalence of sarcopenia in India; (2) either the lowest 20th percentile of an older population, or 2SDs below a young Indian reference population is a more robust criterion for predicting sarcopenia in this population.

**Methods:** Cohort studies across different regions of India were used to compare appendicular lean mass index (ALMI, kg/m$^2$), by DXA, and grip strength (GS, kg). The young Indian (YI) group (aged 20-35yrs) consisted of men (M) and women (W) (n=1070): from New Delhi Birth Cohort, Andhra Pradesh Children and Parents Study (APCAPS), Indian Migration Study (IMS) and the Pune Pregnancy Study; the older Indian (OI) population (>45 y) comprised 1764 participants from: APCAPS and IMS. Two SD below the mean of the YI, and the lowest 20$^{th}$ percentile of OI identified Indian specific cut-points for GS and ALMI. Receiver operating characteristic (ROC) analyses were used to determine the area under the curve, and sensitivity and specificity to discriminate between sarcopenic individuals who had low vs. normal GS across the 4 definitions.

**Results:**

| Developed cut-points | | | | | Prevalence of sarcopenia | | | |
|---|---|---|---|---|---|---|---|---|
| | | n | GS | ALMI | EWGSOP2 | FNIH | YI | OI |
| Men | YI | 602 | 15.4 | 6.0 | 35% | 42% | 8% | 8% |
| | OI | 1014 | 15.9 | 6.2 | | | | |
| Women | YI | 468 | 9.9 | 4.5 | 28% | 35% | 1% | 6% |
| | OI | 750 | 11.3 | 5.2 | | | | |

| GS | MEN | | | | WOMEN | | | |
|---|---|---|---|---|---|---|---|---|
| | Sensitivity (%) | Specificity (%) | AUC | OR (95%CI) | Sensitivity (%) | Specificity (%) | AUC | OR (95%CI) |
| EWGSOP2 | 68 | 69.1 | 0.686 | 4.8 (3.7, 6.2) | 78.6 | 47.5 | 0.630 | 3.3 (2.4, 4.7) |
| FNIH | 84.2 | 51.1 | 0.676 | 5.6 (4.1, 7.5) | 89.8 | 27.3 | 0.586 | 3.3 (2.1, 5.2) |
| Young Indian | 28.3 | 93.2 | 0.607 | 5.4 (3.7, 7.9) | 5.1 | 98 | 0.515 | 2.6 (0.8, 8.7) |
| Older Indian | 43.4 | 86.9 | 0.651 | 5.1 (3.6, 7.2) | 42.3 | 80.8 | 0.615 | 3.1 (2.0, 4.7) |

**Conclusion:** EWGSOP2 was most robust at detecting low GS, more so in men than women. The variation in the prevalence of sarcopenia depends on the definition used and highlights the importance of measuring functional capability across ethnic populations.

## P933

## EVALUATION OF LOW LEVEL LASER THERAPY IN THE TREATMENT OF COMPLEX REGIONAL PAIN SYNDROME AFTER ANKLE FRACTURE

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**Objective:** In complex regional pain syndrome (CRPS), sympathetic dysfunction in addition to being responsible for hyperthermia and pain, also increase demineralization of the bone. The aim of this study was to evaluate, the effects low level laser therapy (LLLT) in the treatment patients with CRPS type I after ankle fracture.
**Methods:** The prospective randomized study included 13 patients with unilateral CRPS type I after ankle fracture, that had been diagnosed clinically on the basis of the modified research diagnostic criteria defined by the Budapest consensus group. In all patients, radiographic findings were shown a localised demineralization of the bone in the affected extremity. Patients were treated with LLLT and kinesitherapy at the Clinic of Physical Medicine and Rehabilitation of the Clinical Center Nis (Serbia). Low level laser therapy (power of 70 mW, wavelength of 810nm, modulated mode frequency of 70 and 5000 Hz) was applied on eight points along joint line and painful zone of the affected area with 1.5 J/cm$^2$. The following parameters were assessed before and after the 20 therapeutic procedures had been applied: a) temperature asymmetry between the symmetrical regions of interest (ROIs) by using infrared thermography (Varioscan high resolution 3021) b) pain intensity. Temperature asymmetry was calculated as the temperature difference in maximal temperature values, between ROIs of unaffected and affected lower extremity ($\Delta T_{max}$). b) Intensity of pain was measured by visual analog scale (VAS).
**Results:** The quantitative analysis of the thermograms, before the applied therapy, was measured the mean $\Delta T_{max}$ 1.86 ±1.09°C, which after the applied therapy was statistically significant reduced to 0.81±1.01°C ($t$=4.891; $p$<0.001). Before the applied therapy was measured the mean VAS 6.23±1.09, which after the applied therapy was statistically significant reduced to 4.0±1.35 ($t$=9.667; $p$<0,001).
**Conclusion:** Low level laser therapy might be effective in the treatment of post-traumatic CRPS type I.

## P934
## IS OSTEOPOROSIS SELF-ASSESSMENT TOOL A GOOD SCREENING TOOL FOR ASIAN MALE OSTEOPOROSIS?

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**Objectives:** Validation and comparison of Osteoporosis Self-assessment Tool (OST) in Asian male races.

**Methods:** We collected all researches about OST in Asian men from Medline/PubMed. Finally, 4 articles were included and summarized in Table 1. The OST was calculated based on age and body weight using the following formula: [body weight (kg) – age (y)] × 0.2.
**Results:** In Table 1, the OST has acceptable sensitivity (64.0-87.3%), fair specificity (41.0-65.7%) and high negative predictive value (83.0-97.5%) in Asian male races. The high negative predictive value can screen out men with low risk of osteoporosis. The area under the receiver operating characteristic curve (AUC) over 0.7 with p<0.05 was noted in Chinese in Hong Kong, but the AUC was unknown in China. The screening tool is poor and not acceptable if its AUC is under 0.7.

Table 1. Validation of Osteoporosis Self-assessment Tool in Asian male races

| Ethnicity | Indonesia | Taiwan | Chinese in Hong Kong | China |
|---|---|---|---|---|
| Age | ≥50 y/o | | ≥65 y/o | ≥50 y/o |
| Osteoporosis Definition | WHO criteria: T-score ≤ -2.5 at any one site of femoral neck, total hip, or lumbar spine | | | |
| Total male subjects | 113 | 2290 | 1914 | 1488 |
| Cutoff value | 2 | -2 | -2 | -1 |
| AUC | 0.574 | 0.697 | 0.759 | NA |
| Sensitivity | 0.74 | 0.640 | 0.818 | 0.873 |
| Specificity | 0.41 | 0.657 | 0.562 | 0.562 |
| PPV | 0.28 | 0.269 | 0.225 | 0.183 |
| NPV | 0.83 | 0.902 | 0.952 | 0.975 |

NA: not available; AUC: area under the receiver operating characteristic curve;
PPV: positive predictive value; NPV: negative predictive value

**Conclusions:** OST may be a simple tool with fair sensitivity/specificity and high negative predictive value. And it also could be a suitable screening tool to identify Asian men at risk of osteoporosis, especially in Chinese in Hong Kong.

## P935
## STAGED SURGICAL TREATMENT FOR TUBERCULOUS ARTHRITIS

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**Objective:** To evaluate the results of total hip arthroplasty (THA) and total knee arthroplasty (TKA) in the staged surgical treatment of patients with tuberculous arthritis.
**Methods:** We analyzed the results of complex treatment of 153 patients (age range 18-79 years old) with tuberculous coxitis (117) and gonitis (36) in the period from 2016-2018. The first stage of the treatment after confirming the diagnosis was the antituberculosis

therapy for 1-2 months as a preoperative preparation. At the second stage the radical surgical debridement was performed. In 101 cases of coxitis and 34 cases of gonitis the operation was ended with implantation of an antibiotic-impregnated cement spacer. At the third stage (4-8 months) patients received antituberculosis therapy in accordance with an antibiotic sensitivity analysis. At the fourth stage patients underwent a complex clinic, instrumental (biopsy of the joint tissues) and laboratory examination. If there were no signs of activity of the tuberculosis THA or TKA was performed. The fifth stage was functional rehabilitation and the continuation of antituberculosis drug therapy for 4-6 months. Each patient gave responses to the Harris Hip Score (HHS) or the Knee Society Score (KSS) before total arthroplasty and a year later.

**Results:** The average results of HHS before and after the operation were 32.7±4.3 points and 88.7±6.4 points respectively (statistically significant difference, $p=0.001$). The average results of the KSS before and after the operation were 41.5 ±6.8 points and 82.1±7.3 points respectively (statistically significant difference, $p<0.05$). No tuberculous arthritis occurred during the observation period.

**Conclusion:** The staged surgical treatment with the inclusion of THA or TKA after radical surgical debridement with implantation of an antibiotic impregnated cement spacer with intensive antituberculosis therapy has high functional outcomes and significantly improves the quality of life in patients with tuberculous arthritis.

## P936
## CUTANEOUS ADVERSE EFFECTS WITH BIOLOGIC AGENTS

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**Objective:** Biologic agents (BA) are designed to treat chronic inflammatory diseases (CID), however, the adverse effects inherent with these drugs are more and more encountered . Among them are dermatological manifestations : infections, allergic reactions or even skin cancers, which sometimes require stopping treatment temporarily or permanently. The goal of this work consists to identify the cutaneous manifestations (CA) that have been reported to the most commonly used biologics in CID.

**Methods:** It is a prospective study in patients received in day hospital and treated with BA for CID during a period of 9 months (October 2017 - June 2018), we recorded all the data on CA after a complete dermatological examination, nor forgetting that we appreciated the phototype of the patients, the level of exposure to the sun and means of photoprotection .

**Results:** We collected the data of 68 patients under BA for the study (adalimumab=21, etanercept=17, tocilizumab=12, infliximab =7, rituximab=11 ) with a clear female predominance 59.4%, the mean age was 39 y. 37 (54%) had cutaneous manifestations. The main CA occurred with TNFα inhibitors 21/68 (30%), with more often skin infections. The other CA encountered were cutaneous rashes and allergic reactions, appearance of psoriasis or eczema and injection site reactions. we did not cross any skin cancer.

**Conclusion:** Cutaneous manifestations remain frequent and relatively benign with BA .This work confirms the importance of education and dermatological monitoring of patients treated with biologic drugs in the CID. This prospective study needs to be completed over a longer period especially to screen any skin cancer.

## P937
## STUDY REGARDING PAIN ASSESSMENT AND MANAGEMENT AFTER ROTATOR CUFF INJURIES COMBINING OSTEOARTHRITIS OF THE SHOULDER

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**Objective:** Rotator cuff injury is a common pathology in a rehabilitation service as it has a big impact in patient private, social and professional life. Pain and mobility restriction are important, difficult to bear and hard to treat. In order to find better and faster ways for our patients to recover and trying to build up specific rehabilitation protocols it is important to note a combined experience of a team for a longer time.

**Methods:** The study follows a yearlong experience in a rehabilitation clinic working to improve the clinical and functional aspects of the shoulder pain and limitations in patients after different types of rotator cuff injuries on an osteoarthritic field. An X-ray and ultrasound exam were needed for the selection of the patients. Being divided in recent and old, associating or not adhesive capsulitis, our in or day patients had a pain and functional assessment before and after a personalized rehabilitation program. We used the goniometer, the MRC scale, the SST scale and the NRS scale. The patients have had a complex program including physical and manual therapy with a proper immobilization and mobilization balance helped by electrotherapy (TENS, cryoultrasound, laser therapy, shockwave). Different types of NSAIDs associating capsaicin patches have also been used.

**Results:** The data show a pain improvement of almost 3 of 10 points, a muscle force improvement of approx. 1 of 5 points and a better range of motion (internal and external rotation, abduction) especially for the patients after a recent trauma.

**Conclusion:** Our results underline the importance of a well designed recovery program performed in a rehabilitation facility not very far from the time of injury.

## P938
## STRUCTURE OF PROXIMAL EPIPHYSEAL CARTILAGE OF THE TIBIA IN OLD RATS UNDER EFFECTS OF EXCESSIVE DIETARY CHOLESTEROL AND CORRECTION DRUGS AGAINST ITS ADVERSE EFFECTS ON BONE

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**Objectives:** Investigation of effects of excessive dietary cholesterol on structure of the proximal growth plate of the tibia in old female rats and considering efficacy of Osteocare, Calcemin, and Calcemin Advance as correction drugs against adverse effects of cholesterol on bone formation.
**Methods:** For the experiment purposes we selected 175 female rats with body weight of 330-345 grams. Animals of the group 1 received standard food, animals of the group 2 received 2.5% of pure cholesterol and 10% of lard as the replacement of removed carbohydrates. In the groups 3 through 5 animals on the same cholesterol diet received per os Osteocare, Calcemin, and Calcemin Advance in therapeutic dosage calculated for a rat basing on human dose. Animals were withdrawn from the experiment upon expiration of observation terms (the $7^{th}$, the $15^{th}$, the $30^{th}$, the $60^{th}$, the $90^{th}$, and the $180^{th}$ day). HE stained frontal sections of the proximal epiphyses of tibiae were photographed in light microscope for further morphometry.
**Results:** Cholesterol excess led to derangement of growth plate structure and thus functioning of it. Alterations became evident beginning from the $15^{th}$ day and progressed throughout the experiment. By the $180^{th}$ day, proliferation and osteogenic zones in the group 2 were narrower than those of the group 1 by 9.22% and 11.60%. Spongiosa amount and osteoblasts quantity decreased by 9.89% and 9.81%. Calcium drugs we used reduced adverse effects of cholesterol on growth plate – osteogenic zone width, spongiosa amount and osteoblasts quantity in the group 3 increased by 4.66%, 4.61%, and 5.18%, in the group 4 – by 6.88%, 5.87%, and 5.28% and in the group 5 – by 8.22%, 6.01%, and 6.53% (all in comparison with the group 2).
**Conclusions:** Dietary cholesterol excess produces marked adverse effects on bone formation. These effects grow with time in absence of treatment. Third generation calcium drugs reduce adverse effect of cholesterol on bone formation. Calcemin Advance appeared to be the most effective medication among those we considered.

## P939
## DIAGNOSING OSTEOPOROSIS IN HOSPITALISED PATIENTS: CAN WE IMPROVE?

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**Objective:** Osteoporosis (OP) patients may be hospitalised for different conditions connected with OP. Accurate history and examination, together with awareness of OP should lead to an accurate diagnosis and better management of OP in all hospital departments. The objectives of this study were to identify the hospital departments with the highest prevalence of OP patients; to identify the most frequent comorbidities, and to identify the most frequent symptoms in patients with OP as a principal diagnosis.
**Methods:** We conducted a retrospective 3 y (2014-2016) observational study using the Academic District Emergency Hospital of Sibiu database and records. Medical conditions were found using the diagnosis related groups (DRG). All records of patients with OP as a principal diagnosis were examined for presenting symptoms and signs.
**Results:** 2510 OP patients were admitted during 3 y. We found 2197 (87.5%) patients with no fracture mentioned in the diagnosis. Most of the patients were admitted in the Rehabilitation Department (832 – 33.14%), followed by the Endocrinology Dept. (30.13% - 378), Internal Medicine (11.6%-291) and Orthopedic surgery (198-7.88%). More than one-third of patients (35.18%) had postmenopause OP, while few cases (<5%) were diagnosed with secondary OP. Most frequent comorbidities were cardiovascular diseases, (43% hypertension and 26% coronary artery disease) and endocrine and metabolic diseases (40%). Musculoskeletal diseases were present in 37% of OP patients. Vertebral fractures were clinically identified (pain, vertebral tenderness, kyphosis) in about 65% cases.
**Conclusions:** Orthopedic surgeons, diabetologists, internal medicine and rehabilitation specialists, who are involved with OP patients should raise awareness and become more specific in diagnosing and managing or referring OP patients. Internal hospital protocols and common projects with Endocrinologists and Rheumatologists may lead to better hospitalized OP patients' outcome.
**Disclosures:** Liana Chicea received consultant fees from Abbvie, Zentiva, Pfizer, MSD Romania.

## P940
## CORRELATION BETWEEN BODY MASS INDEX AND RADIOLOGICAL STAGE OF KNEE OSTEOARTHRITIS: A SERIES OF 73 CASES

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**Objective:** Knee osteoarthritis is a common condition and a real public health problem. Its origin is multifactorial but the disease is strongly linked to age and weight. In this series, an attempt has been made to correlate the severity of the radiological stage of knee osteoarthritis with the BMI.
**Methods:** This is a prospective study that gathered 73 patients followed in our consultation of Rheumatology at Farhat

Hached university hospital in Sousse presenting mechanical gonalgia. All patients benefitted of x-rays radiography of both knees face and profile. Patients followed for chronic inflammatory rheumatism or microcrystalline arthropathy are excluded from this work.

**Results:** They were 91.8% women and 8.2% men with an average age of 61.75 y [42-85 y]. Patients had bilateral gonalgia in 75% of cases. The average BMI was 32.3 kg/m$^2$ [19-43 kg/m$^2$]. X-rays showed Kellgren-Lawrence stage 1 knee osteoarthritis in 12% of cases, stage 2 in 29.43% of cases, stage 3 in 30.79% of cases and stage 4 in 27.78% of cases. A positive but not statistically significant association was found between advanced stages of knee osteoarthritis (stage 3 and 4) and obesity (BMI> 30 kg/m$^2$) (p=0.06).

**Conclusion:** Overweight appears to be a major risk factor not only for the occurrence of knee osteoarthritis but also for the severity of its radiological progression. A wider study is still needed to better study this correlation.

## P941

## EFFECT OF AGE, WEIGHT AND CARTILAGE SCORE ON BIOMECHANICAL PROPERTIES OF THE PATELLAR TENDON IN SHEEP

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**Objective:** To assess the eventual correlation between biomechanical characteristics of healthy ovine patellar tendon and age, weight and cartilage score.

**Methods:** 40 matched ovine cadaveric stifles were dissected to isolate the patellar tendon, after scoring the gross cartilage appearance. After 10 preconditioning tests (to get fiber alignment), the biomechanical tests were performed: the uniaxial test was performed independently for each ligament on a standard 1 kN tensile testing machine (accuracy 0.3%). Load to failure, stiffness and modulus of elasticity were calculated for each specimen and correlated among age, weight and cartilage lesion of the specimen.

**Results:** The patellar ligament has a typical nonlinear behavior with a cutoff value at 150 N. We found no statistical difference in tendon stiffness between young and old specimens. However, we found a positive correlation (r=0.7) between the tendon stiffness and cartilage score (p<0.05) and between the tendon stiffness and the sheep weight (p<0.05). Repeatability was high for every limb, ensuring robustness of the results.

**Conclusion:** These biomechanical tests provide essential objective and quantitative information on the elastic properties of patellar tendon in sheep often used as animal model in research. Our study showed no correlation between tendon stiffness and age. In human, tendon stiffness changes with age. In opposition to our results, previous animal studies showed increase of tendon stiffness with age. We demonstrated a positive correlation between tendon stiffness and weight. In human, obesity is associated to higher tendon injury incidence. The current study demonstrated positive correlation between tendon stiffness and cartilage score. This correlation is known in human, in whom an association between osteoarthritis and tendinopathy has already been described. These results are reasonable because in specimen with heavy weight or degenerative disease, the muscle needs to apply more force for a certain activity and tendon stiffness has to be higher.

## P942

## ASSOCIATIONS BETWEEN CARDIAC WORKLOAD AND BONE MINERAL DENSITY IN GAMBIAN MEN AND WOMEN

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**Objective:** Eighty percent of global cardiovascular disease (CVD) mortality occurs in low-middle-income countries. Evidence shows an increased rate of fracture following major cardiovascular events and elevated blood pressure. This study aimed to investigate the associations between cardiac workload and bone outcomes in adult Gambians.

**Methods:** The Gambian Bone and Muscle Ageing Study recruited 249 women and 239 men ([mean±SD] 61.1±12.5 and 60.8 ±12.3 y). Blood pressure and heart rate were measured with the OMRON705IT. Rate pressure product (RPP), an indicator of cardiac workload, was calculated as heart rate*systolic blood pressure (bpm*mmHg). DXA was used to measure aBMD and bone mineral content (BMC) at the wholebody, total hip, femoral neck, lumbar spine and radius. Linear regressions explored the relationship between RPP and bone outcomes, adjusting for age, weight, height; including a sex-RPP interaction. Results are expressed as β-coefficients [95%CI] of percentage unit change in bone outcomes and sex-RPP interaction p-values (p-int).

**Results:** BMI was greater in women (22±4) than men (21±3), p=0.001; blood pressure differences were similar. With greater age, RPP was higher in women than men (p<0.0001). In unadjusted analyses, RPP was negatively associated with all bone outcomes in women but not in men. Following adjustments, every 1% increase in RPP was negatively associated in women with: wholebody aBMD (-0.08%[-0.12,-0.03], p-int=0.007), wholebody BMC (-0.12%[-0.19,-0.05], p-int=0.02), femoral neck BMC (0.19%[-0.31,-0.07], p-int

0.05), radius aBMD (-0.2%[-0.28,-0.11], p-int<0.0001) and radius BMC (-0.19%[-0.28,-0.10], p-int=0.008). No such associations were found in men.
**Conclusion:** There are negative associations between RPP and aBMD in Gambian women and not men. Sex-specific and timely osteoporosis and CVD prevention will help to reduce fracture risk.

## P943
## AN INVESTIGATION OF CHANGE IN MATERNAL VOLUMETRIC BONE MINERAL DENSITY (VBMD) AND BONE MICROARCHITECTURE AT THE DISTAL TIBIA AND RADIUS DURING PREGNANCY

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**Objectives:** To determine whether pregnancy induces changes in maternal vBMD and bone microarchitecture.
**Methods:** The study included healthy premenopausal Cambridge women (53 pregnant (P), 37 non-pregnant nonlactating (NPNL)) aged 30-45 y (mean 35.4±3.8 y). Single-slice pQCT (XCT 2000L) and HR-pQCT (XTremeCTI) scans at the distal tibia and radius were obtained twice (14-16 and 34-36 weeks pregnancy, similar scan interval for NPNL). Outcomes were pQCT total and trabecular vBMD; HR-pQCT total and trabecular vBMD, trabecular microarchitecture (number (Tb.N), thickness (Tb.Th), separation (Tb.Sp)), cortical vBMD, cortical thickness (Ct.Th), and cortical porosity (Ct.Po). Within-group changes were tested (t-tests vs. no change). Standardised residuals of between-visit change were computed and linear regression models with covariates of group, height, baseline weight, and age, parity, smoking history and previous contraception use were fitted. Model of best fit was selected by backwards stepwise regression. Results are presented as the difference P vs. NPNL expressed relative to SD of within individual change (Z-score±SEM), significance p<0.05.
**Results:** Significant P vs. NPNL baseline differences were only found in Tb.N (P lower) and Tb.Th (P higher). Within-group changes were found in both groups suggesting bone mobilisation/loss, though greater in P. No significant P vs. NPNL differences in change were detected at the radius. P vs. NPNL differences in pQCT total -0.65±0.22 and trabecular vBMD -0.50±0.23 were found at the distal tibia. Change in HR-pQCT trabecular vBMD did not differ between groups. P vs. NPNL significantly differed for Tb.N 0.47±0.23, Tb.Sp -0.54±0.24, total -0.49±0.24 and cortical vBMD -0.67±0.23, and Ct.Th -1.01±0.21 and Ct.Po 0.78 ±0.23.
**Conclusion:** Pregnancy-induced bone mineral mobilisation exceeding natural age-related change was observed through decreases in total (pQCT and HR-pQCT), trabecular (pQCT) and cortical (HR-pQCT) vBMD vs. NPNL. In the absence of a decrease in HRpQCT trabecular vBMD, changes in Tb.N and Tb.Sp may need to be considered in the context of cortical compartment change. No evidence of bone mineral mobilisation was found at the distal radius. The implications of these changes on future maternal skeletal health require further investigation.

## P944
## BONE QUALITY IN ELDERLY PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY

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**Objective:** Demonstrate the bone quality in patients with limited mobility caused by medium and severe chronic venous insufficiency.
**Methods:** An observational study of 64 patients, average age of 69, presenting chronic venous insufficiency, CEAP class ≥4.We observed musculoskeletal pain localization, level of joint mobility muscular strength, mineral bone density, registered through DXA and ADLs dependence, level of needed care. We identified comorbidities and their severity, and established a correlation between bone mass and present level of function.
**Results:** Associated with chronic venous insufficiency, 60 patients (86, 95%) presented arthralgia in the spinal cord area and supporting joints, especially knee and lumbar areas. Joint mobility was limited in both vertebral and weight bearing joints in all patients. Walking distance capacity is limited to below 500 m in most of the patients, due to joint pain and/or venous claudication. Muscular strength is low in stabilizing muscles of the supporting joints as well as in dorsal and lumbar paravertebral muscles. Comorbidities: HTA and coronary disease in 55 patients (79.71%), type 2 diabetes in 23 patients (33.33%), gastric ulcer in 3 patients (4.34%), overweight and obesity in 42 patients (60.86%). DXA indicated osteoporosis in 36 patients (52.17%), osteopenia in 19 patients (27.53%) and no modifications in 9 patients (13.04%). No endocrine conditions were identified. Significant care aid is needed in 41 cases.
**Conclusions:** Low BMD might be linked to multiple factors, limited motion and level of activity due to multiple and severe comorbidities or secondary to menopause, or even aspects of atherosclerosis. Appears a high risk of falling and fractures due to alteration of proprioception, limited joint mobility and low muscle strength in the stabilizing muscles of the weight bearing joints. Low bone density associated with atherosclerosis increase the risk of heart attack, stroke, pulmonary thromboembolism, thus significantly decreasing the life expectancy.

## P945
## BONE DISEASE AFTER LUNG TRANSPLANTATION: OSTEOPOROSIS AND FRACTURES

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**Objectives:** Post-transplantation bone disease is a major complication in most of patients, with lowered BMD, increased fracture risk and consequently, increased mortality and reduced quality of life. Many factors contribute to the pathogenesis of osteoporosis after organ transplantation, such as immunosuppressive medications, nutritional and lifestyle factors. This study aimed to assess BMD and incidence of fractures after lung transplantation.
**Methods:** This observational study analysed the medical records of 19 patients who underwent lung transplantation (male/female 9/10, aged 42.8±10.5 y). Demography, clinical parameters of lung disease, laboratory data, and osteoporosis risk factors were analysed. BMD of the lumbar spine and hip were measured by DXA (GE Lunar Prodigy, WI, USA) and evaluated by T-score.
**Results:** Osteoporosis (T-score <-2.5) was found in 20% the study population, and osteopenia (T–score from -1.0 to -2.5) in approximately 60%. Only 20% of our lung transplant patients presented normal bone mass density. In our study population the most affected bone was the lumbar spine. Patients with pulmonary hypertension and with lowest BMI had the highest decrease in BMD. Fractures were present in 15,8% of subjects (3/19) after the lung transplantation, and did not correlate with BMD or the diagnosis of osteoporosis.
**Conclusions:** Bone loss and bone fractures are common complications after lung transplantation. Therefore, early diagnosis and prevention of osteoporosis in lung transplant candidates should receive high priority.

## P946
## EFFICIENCY OF APPLICATION OF "HUBER" APPARATUS IN COMPLEX TREATMENT OF OSTEOPOROSIS

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**Objective:** To study the effectiveness of the use of the multifunctional apparatus "Huber" in the complex treatment of osteoporosis (OP).
**Methods:** 120 patients aged from 48 to 62 years were treated (mean age - 56.7±2.3 y) with OP. The study of BMD was performed using ultrasound densitometry (AOS-100NW, Aloka (Japan)). The functional state in the musculoskeletal system was assessed using the "Insight TM" biosignal recording and processing device. Depending on the method of treatment, the patients were divided into 3 groups: Group 1 (n=40) - standard osteotropic therapy and the "Huber" hardware complex were used; 2nd group (n=40) - standard osteotropic therapy and kinesitherapy were used; Group 3 (n=40) - only standard osteotropic therapy was performed. Treatment efficacy was assessed after 6 and 12 months.
**Results:** Initially, by the T-score of OSI, the groups were comparable, and it was: in the 1st group - -2.89±0.31 SD, ($p>0.05$), in the 2nd group - -2.73±0, 25 SD, ($p>0.05$), in the 3rd group - -2.71±0.21 SD, ($p>0.05$). After 6 months and 12 months therapy showed an increase in BMD in all groups, in the 1st group was higher ($p<0.05$) compared with the 2nd and 3rd groups. T-score of OSI in the 1st group was -1.84±0.2 SD and -1.14±0.12 SD, ($p<0.05$), in the 2nd group - -2.04±0, 18 SD and -1.39±0.17 SD, group 3 - -2.24±0.17 SD and -1.53 ±0.13 SD, respectively. The index of neurospinal function (NSF index) before treatment in all study groups was "problematic" and was in the 1st group - 63.4±2.23%, in the 2nd group - 64.3±2.19% in the 3rd group - 63.2±2.24% ($p>0.05$). After 6 months therapy in the 1st group of NSF index was 78.4±3.4%, in the 2nd group - 74.2±2.5%, which corresponded to the "average" mark, in the 3rd group of NSF index was 68,3±1.9% - "problematic". After 12 months NSF Index therapy of the 1st group amounted to 94.3±2.8%, in the 2nd group –85.1±3.2%, in the 3rd group - 75.9±2.3%. On the "Insight TM" scale, NSF index reached the values "excellent" only in patients of the 1st group, in the 2nd group it was at the level of "good", in the 3rd group - "averaged".
**Conclusions:** The use of multifunctional apparatus "Huber" in the complex therapy of OP contributes to a greater increase in BMD ($p<0.05$) and improvement of the functional state in the musculoskeletal system ($p<0.05$).

## P947
## PRIMARY HYPERPARATHYROIDISM IN SARAWAK: CLINICAL PROFILE AND COMPLICATION BURDEN

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**Objective:** Although primary hyperparathyroidism (PHPT) is increasingly reported to present as asymptomatic hypercalcemia, symptomatic disease is still common in developing country. Described herein the clinical profile and complication burden of PHPT in a single tertiary referral centre in Malaysia.
**Method:** A retrospective review of medical records of patients with PHPT, in Sarawak General Hospital from May 2005 to January 2018.
**Results:** 34 patients were identified. Mean age at diagnosis was 54.7±14 y. 61.6%, were women. There were 41.2% Chinese,

26.5% Malay and 20.6% Sarawak natives. Mean serum calcium was 3.13 mmol/L (range: 2.48-4.85 mmol/L). 41% had elevated alkaline phosphatase level and 40.9% had serum creatinine >100 umol/L. 26.5% had asymptomatic hypercalcaemia but classical complication was still prevalent. 47.1% of patients had nephrolithiasis, 35.3% had peptic ulcer disease and 4 patients (11.7%) had mental changes. For patients 60 y and above (n=14), three patients presented with fracture; 5 of the remaining 11 patients showed osteoporosis on BMD. The cohort also showed high cardiovascular burden with 64.7% having hypertension; 14.7% and 11.8% suffered from stroke and ischemic heart disease respectively. Two patients died, secondary to hypercalcemia crisis before parathyroidectomy could be performed due to delay in presentation and diagnosis. Both recorded very high calcium level above 4.50 mmol/L.

**Conclusion:** PHPT is still associated with high morbidity and mortality in our setting where serum calcium is not routinely measured especially in the rural areas. Greater awareness and better screening strategies seems warranted to improve outcome.

## P948
## ROWELL SYNDROME

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**Objective:** We have a case report of a young woman presented to Dermatology Department for cutaneous lesions of erythema multiforme associated with arthralgias of small joints of hands, myalgias, no signs of acute inflammation. A young woman with musculoskeletal symptoms and cutaneous lesions should be checked for collagenosis. Rowell syndrome is characterized by presentation of lupus erythematosus with erythema multiforme-like lesions (with absence of any known precipitating factors) associated with antinuclear, anti-La (SS-B)/anti-Ro (SS-A) antibodies and rheumatoid factor (RF) positivity. It is a rare presentation considered to be more common among females.

**Methods:** A woman aged 44 years old presented for typical concentric "target" lesions localized on the acral extensor surfaces of the extremities symmetrical, abdomen and back, onset 3 days ago. Dermatological diagnosis is erythema multiforme. Etiology of erythema multiforme is very large: infectious agents, medications, other etiology factors as hormonal, malignancies; about 50% of cases are idiopathic.

**Results:** In our case no mycoplasma species, no viral infections as herpes simplex type 1or 2, adenovirus, coxsackievirus B5, cytomegalovirus, echoviruses, enterovirus, Epstein-Barr, hepatitis A/B/C viruses was detected. Throat culture for group A streptococcal infection – negative, antistreptolysin O antibodies– negative exclude streptococcal infection, acute rheumatic fever respectively; X-rays for small joints of hands is negative for acute rheumatoid osteoarthritis. No medication intake as anticonvulsants as well as immunologic disorders, malignancies, hormonal diseases or therapy was involved. Antinuclear antibodies, anti-La, anti-Ro, antibodies are positive, confirming collagenosis: subacute lupus erythematous; positive rheumatoid factor is a major criteria besides the other ones named for Rowell syndrome. Rheumatoid factor is the autoantibody that was first found in rheumatoid arthritis but can also indicate the occurrence of autoimmune activity unrelated to rheumatoid arthritis.

**Conclusions:** We underline the importance of immunological tests in young females with dermatological manifestations of erythema multiforme-like lesions associated with arthralgias and myalgias as first sign for lupus erythematosus a severe disease which requires special attention and monitoring. Less than 100 cases of Rowell syndrome have been described in literature.

## P949
## PERSISTENCE REGARDING OSTEOPOROSIS TREATMENT IN SECONDARY PREVENTION OF OSTEOPOROTIC FRACTURES IN REHABILITATION CONSULTATION

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**Objective:** To determine persistence to osteoporosis pharmacotherapy after osteoporotic fracture.

**Methods:** Retrospective observational study of patients treated in a rehabilitation consultation from March 2014 to December 2017. The pharmacy dispensaries of the treatment prescribed in a Rehabilitation consultation were evaluated monthly, according to recommendations of SEIOM (Spanish Society of Bone Research) and patient preferences. Persistence was defined as continuation of treatment without a >30-d gap in prescription refills.

**Results:** 53 patients (82.6% women). Mean age, 68 (±9.12 y). Derivatives from Traumatology (52.2%), Primary Care and Rheumatology (13% respectively). The most frequent reason for consultation was fracture (52.2%). 39.1% of patients had secondary osteoporosis and 47.8% had previous fracture. 30.4% had previously received pharmacological treatment of osteoporosis. Pharmacological treatment were prescribed: oral bisphosphonates 39.1%, teriparatide 39.1%, denosumab 21.8%. As a complementary treatment: 43.5% were prescribed cholecalciferol and 30.4% cholecalciferol + calcium. In 30.4% of the patients it was necessary to change medication mainly due to side effects or difficulty in administering the drug. The average treatment time was 29.78 months (±14.44). 75.62% persisted with osteoporosis pharmacotherapy regimen and 65.62% with complementary treatment. Treatment with teriparatide presented the highest persistence rate (96.78%). Of 21 patients prescribed oral bisphosphonates, 72.37%

persisted with treatment; and of 12 patients prescribed denosumab, 68.81% persisted with treatment.
**Conclusion:** Persistence among patients attending our rehabilitation consultation was higher than that reported in the literature. This could be due to the fact that it includes patients with the intention of secondary prevention, sensitized with the complications of osteoporotic fractures and with outpatient follow-up.

## P950
## THE UTILITY OF AN ONLINE VIRTUAL CONSULTATION IN A FRACTURE LIAISON SERVICE

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In October 2017, a fracture liaison service (FLS) was set up by the Rheumatology Service of the Hospital Universitario de Canarias, which was accredited by the IOF (International Osteoporosis Foundation, Capture the Fracture Programme) in 2018. One of the essential aspects of an FLS is to establish case detection systems for patients with fractures. In our unit we have a virtual online consultation for Primary Care and the rest of the specialties of our reference area. Family doctors and other specialists generate a virtual appointment with the rheumatologist, who accesses the patient's entire clinical history and assesses the case. According to their assessment, there are three possibilities for action:

1. Resolution of the remote inter-consultation from FLS, proposing action guidelines, advising or establishing treatments.
2. Appointment at FLS. In order to try to ensure that the majority of patients who come to the consultation receive high resolution care, the help of the family doctor is requested in order to request complementary tests to help in the diagnosis and decision making process.
3. Direct communication between both professionals to exchange opinions and doubts.

The objective of this study is to analyze the usefulness of the virtual online consultation in our FLS unit.
**Methods:** A descriptive study that retrospectively reviews the virtual appointments of patients consulted for possible fracture due to fragility performed from January 15, 2018 to January 15, 2019. We analyzed the profile of the patients (age, sex), the specialist who consults, the type of fractures, whether it is the first fracture or has other previous fractures, whether it had previous diagnosis and/or treatment for osteoporosis, and the need or not for face-to-face visit.

**Results:** 113 virtual online consultations were performed on patients with possible fragility fracture from January 15, 2018 to January 15, 2019. 88% were women and the mean age was 74 y. The attached table summarizes the analysis of the data.

| | | |
|---|---|---|
| Doctor making the consultation (%) | Primary Care Physician | 67 |
| | Traumatologist | 21 |
| | Neurosurgeon | 10 |
| | Others: pulmonologist, hematologist, rehab, endocrinologist. Digestologist, | 2 |
| Fracture type% | Colles | 8 |
| | Vertebra | 71 |
| | Femur | 18 |
| | Other | 3 |
| ¿Previous diagnosis of osteoporosis? (%) | yes | 26 |
| | No | 74 |
| ¿pre-treatment for osteoporosis? (%) | yes | 28 |
| | No | 72 |
| ¿Other fragility fractures? (%) | yes | 28 |
| | No | 72 |
| Consultation decision (%) | Resolution of the remote interconsultation | 17 |
| | Appointment at FLS | 70 |
| | Exchange of doubts | 13 |

**Conclusion:** According to the results of our study, in a Fracture Coordination Unit (FLS), virtual online consultation with primary care and other specialties of the reference area is useful in the recruitment of patients with fragility fractures; it resolves one out of every four assessments, avoiding unnecessary appointments in the Unit; it allows patients who are cited to receive high resolution care by previously coordinating with; their doctor the necessary complementary tests; and it allows good communication to exchange opinions or doubts.

## P951
## BACK PAIN IN PREGNANCY OR IN THE POSTPARTUM PERIOD

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Pregnancy- and lactation-associated osteoporosis (PLO) is a rare syndrome affecting women during late pregnancy and the early postpartum period, which can lead to vertebral fractures in women of reproductive age. It is possible that there is underdiagnosis as a result of the overlapping symptomatology with the frequent aches affecting normal pregnancies. There are no established diagnostic criteria for PLO. However, a

diagnosis can be easily obtained by an accurate medical interview, physical examination, imaging studies, and laboratory data, including BMD measurement after childbirth. This disease should be suspected when a woman presents with severe back pain in the late stages of pregnancy or the early postpartum period. An accurate and prompt diagnosis helps with appropriate treatment and prevents the progression of the disease. Clinical judgment must be used to balance the potential benefit and risks of treatment that is being considered. Due to the low incidence, no treatment strategy has been yet established. Bisphosphonates (BPs) have been used, but these are known to have a strong binding affinity to bone, and the accumulated BPs are released after treatment. The fetus of a subsequent pregnancy may be exposed to BPs even long after the discontinuation of therapy, and the potential risk is unclear. There have been some reports of PLO treated with teriparatide. It has also been reported that switching from teriparatide to denosumab leads to better therapeutic effects in postmenopausal patients. The suggested treatment strategy includes optimize calcium and vitamin D intake, load reduction and analgesia. Cessation of lactation seems to be the major classical treatment in the reports. Women who present with back pain in late pregnancy or the post-partum period should always be evaluated for pregnancy-related osteoporosis. Traditional risk factors associated with osteoporosis should be assessed as they may be contributory, and other differential diagnoses (such as na underlying genetic disorder) should be considered. The use of bisphosphonates to treat these patients needs to be carefully considered, balancing the intended benefits of preventing subsequent fractures and disability against the potential risks of side effects and harm to future pregnancies.

## P952
## COGNITIVE DYSFUNCTION RESPONSIBLE FOR LOCOMOTOR DECONDITIONING

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**Objective:** To identify the causes of locomotor deconditioning in an elderly patient without life threatening illnesses.
**Methods:** We present the case of a 74 years old female patient, with musculoskeletal pain and consecutive dysfunction with care aid need. She was in negative mood. We followed the clinical evaluation protocol, starting with medical history, physical examination and laboratory diagnostic tests and imaging tests. For diagnostic purpose we considered multidisciplinary evaluations (psychiatrically and neurological exam) as well as psychological exam to identify the level of anxiety, depression and cognitive function.
**Results:** Subjective complaints: low back pain and right knee pain, alteration of posture and walk, vertigo and fear of falling. Objective findings: dorsolumbar scoliosis, lumbar hyperlordosis, lumbar paravertebral muscle contracture, Schober +2 cm, with no radicular pain, limited right hip and right knee mobility. Also, difficulty in maintaining standing position and limping while walking. Imaging tests findings: spinal compression L2-L3, osteoporosis, mild right hip osteoarthritis and mild bilateral knee osteoarthritis, spondylarthrosis. Clinical exam and imaging evaluation for the vertigo syndrome and anxiety revealed vertebrobasilar circulatory insufficiency, cerebral atrophy, anxiety disorder, depression and mild cognitive dysfunction. DXA scan – osteopenia.
**Conclusions:** With a psychological background of anxiety and depression and the installation of cognitive dysfunction, the patient lost the capacity to manage locomotor pain symptoms, reaching the need for care assistance. Elderly patients would benefit from complex psychological, emotional and cognitive evaluations and established rehabilitation treatments that could slow down the complex functional and psychological deterioration.

## P953
## IMPACT OF OSTEOPENIA IN FRACTURE RISK AND IN RISK ASSESSMENT CALCULATED BY FRAX

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**Objective:** It is widely accepted that the majority of low trauma fractures occur in patients with BMD better than -2.5 T-score. However, only a few data are available concerning the fracture risk caused directly by osteopenia. Aims of the study: 1, Assessing the frequency of osteopenia among patients referred for bone densitometry with suspected osteoporosis. 2, Estimating for how much of fractures occur in charge of osteopenia. 3, Calculating FRAX probabilities in osteopenic patients compared to the osteoporotic group.
**Methods:** Data of 11807 women were analyzed who have been referred for bone densitometry in 2008-2014. 2986 patients (26%) had previous fracture. BMD was measured by a Prodigy densitometer (GE Lunar, WI, USA) at lumbar spine, hip and forearm. Osteopenia and osteoporosis were categorized according to the T-scores. Fracture probabilities were calculated using the Hungarian FRAX model. Data analysis was done by SPSS.
**Results:** Normal BMD was found in 18.3% of the patients while in 46% osteopenia and in 36% osteoporosis was detected, with fractures in 14.8, 22.9 and 35.7% of cases, respectively. Only 49.1% of previous fractures occurred in osteoporotic patients, however, 10.4% of fractured patients had normal density and 40.5% had osteopenia. The FRAX

probabilities for hip and major fractures increased step-by-step in groups of normal BMD, osteopenia in one bone, osteopenia in all three bones, osteoporosis in one bone and osteoporosis in all three bones ($p<0.0001$ among all groups). Compared to normal bone density, osteopenia increased the fracture risk of hip by 6-fold and of major fractures by 2-fold ($p<0.0001$). Osteoporosis resulted in a 4-fold hip fracture risk and 2-fold major fracture risk than osteopenia did ($p<0.0001$). The major fracture probability in patients with osteopenia and previous fracture was 12.34% (CI: 11.82-12.85), what is more than that of osteoporotic patients without previous fracture: 10.69% (CI: 10.46-10.92), $p<0.001$.

**Conclusion:** Osteopenia seems to be responsible for a similar or greater fracture risk than osteoporosis, so intervention and reimbursement should be fracture risk based rather than BMD. Osteopenia needs much more interest in the future.

## P954

## PRO-INFLAMMATORY EFFECTS OF ENDOGENOUS CALCITONIN GENE-RELATED PEPTIDE IN ACUTE RHEUMATOID ARTHRITIS

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**Objective:** 1% of today's population suffer from rheumatoid arthritis (RA), the most common inflammatory joint disease worldwide with a quarter of patients requiring a total joint arthroplasty (TJA) during their life. An imbalance of bone formation and bone resorption is in part responsible for bone erosions, subsequent joint deformities, and chronic pain in RA. Compromised bone quality is a fundamental surgical challenge during TJA in patients with RA, accompanied by an increased risk of periprosthetic fractures and infections. To battle these clinical challenges, we studied the role of calcitonin gene-related peptide (CGRP), a member of the calcitonin family of peptides, in experimental RA. We were previously able to show an osteoanabolic effect of CGRP in healthy bone metabolism. Here we report for the first time, the pro-inflammatory effects of endogenous CGRP signaling in an *in vivo* mouse model of RA.

**Methods:** Collagen antibody-induced arthritis (CAIA) was induced in global CGRP-deficient mice (n=14) and wildtype (WT) littermates (n=13). Controls were treated with PBS accordingly (n=8 CGRP-deficient and n=8 WT mice). Arthritis was monitored over a time course of 10 d. Daily clinical assessments and measurements of ankle swelling were performed. On day 10, samples were harvested and stored for further histological, radiological and molecular analysis.

**Results:** Disease manifestation peaked between day seven and nine in all mice receiving the collagen antibody cocktail. Arthritis was significantly less pronounced in CGRP-deficient mice compared to WT littermates, indicated by a lower semi-quantitative arthritis score with reduced swelling and redness for all paws. Congruently, ankle size of CGRP-deficient mice was significantly smaller when compared to WT mice during the acute phase of arthritis.

**Conclusion:** Here we show for the first time, the pro-inflammatory effects of CGRP on the acute manifestation of RA in an experimental *in vivo* study. These findings point towards a pivotal role of endogenous CGRP, controlling inflammatory processes in RA. Our current histologic, radiologic and molecular analyses will allow to further decipher the role of CGRP in bone erosions and autoimmunity in RA. We aim to translate our findings to significantly increase bone quality in RA patients, eligible for TJA surgery.

## P955

## CALCIUM AND VITAMIN D INTAKE AMONG BRAZILIAN PREGNANT ADOLESCENTS

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**Objective:** To known the dietary calcium (Ca) and vitamin D (VitD) intake by pregnant adolescents and the association with sociodemographic factors and perinatal outcomes.

**Methods:** Cohort study among primiparas under 19 years of age at the Women's Hospital (CAISM), University of Campinas (UNICAMP), Brazil. Sociodemographic variables, obstetric history and anthropometric measures were collected. To calculate dietary Ca and VitD intake, a 24-h dietary recall (24HRec) was applied in three moments during pregnancy and one at postpartum visit. All 24HRec was analyzed by the program Nutrition Data System for Research (NDSR)® in order to provide the intake of Ca and VitD. Chi-square test and Fisher's exact test were used to analyze continuous variables.

**Results:** 150 adolescents were included. Mean age±SD was 15.4±1.3 y, 55.9% (81) were white and 83.8% (124), live with partners. Mean±SD self-reported prepregnancy weight was 55.9±11.0 kg, with a prevalence of overweight and obesity of 17.3%. Mean±SD intake of Ca was 659.9±335 mg, (minimum 179.2 and maximum of 2017.4 mg). The mean±SD intake of Vit D was 4.1±1.3 μg (minimum 0.04 and maximum 12.5 μg). Only 4% adolescents presented Ca intake above the recommendation (1300 mg) and 24.7% presented VitD intake above the recommendation (5 μg). Ca and/or VitD supplementation was not observed among pregnant adolescents, however, the intake of multivitamins was observed in 6% adolescents. Cesarean section rate was 36.9%. Among newborns, 9.7% presented gestational age under of 37 weeks and

9.7% weighed <2500 g at birth. No statistical significance association were found between Ca/VitD intake and sociodemographic factors, anthropometric measures and perinatal outcomes.
**Conclusion:** Ca and VitD daily intake among pregnant adolescents were low. Adolescents should be advised to adjust the intake of Ca and VitD through diet, once these nutrients are related to the development of bones, and a low intake of these nutrients during pregnancy could be related with osteoporosis in the adulthood. Therefore, the use of multivitamins requires careful assessment, because formulas may not provide adequate intake for pregnant adolescents.

## P956
## DEVELOPMENT AND VALIDATION OF THE TOOL FOR ASSESSING SOCIAL PARTICIPATION IN THE ELDERLY (IAPSI): LOCOMOV PROJECT

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**Objectives:** To develop and validate a tool for assessing social participation of the elderly (IAPSI) and verify whether there is a correlation with locomotive syndrome (SLo).
**Methods:** We first based theoretical foundation to conceptualize social participation (SP). In order to select the items with best potential to represent SP, questions exalting psychological perspectives and the satisfaction with SP were selected. The instrument's content validity were examined. Items were analyzed by a committee of gerontologists experts (specialists in Nursing, Social Assistance, Psychology, Psychiatry and Geriatrics). Criterion validity was examined between IAPSI and WHO Quality of Life instruments (WHOQOL-bref and WHOQOL-old social participation domain). Additionally, we analyzed sociodemographic data, functionality (Katz and Lawton), comorbidities, self-perception of life and locomotion (25-question Geriatric Locomotive Function Scale, Brazilian validated version – (GLFS 25P)). The psychometric properties of IAPSI were studied in community-dwelling elderlies of the Locomov Project, a longitudinal cohort focused on locomotion of old individuals in Brazil. Internal consistency was confirmed by Cronbach's $\alpha$. Pearson correlation coefficient was analyzed between the IAPSI and WHOQOL-bref and WHOQOL-old (SP domain). The significance level was set at $p<0.05$. The final tool contained 6 items distributed into 5 domains: domestic life, community life, interpersonal relation, recreation, time spent.
**Results:** 102 elderlies were analyzed, mean age 87.29 y. The Cronbach's reliability coefficient was 0.63. Pearson's correlation coefficient between IAPSI and WHOQOL-bref and WHOQOL-old (SP domain) was 0.54 and 0.64 respectively ($p<0.001$), showing excellent concurrent validity of IAPSI. The association between IAPSI and SLo was significant ($p=0.0321$).
**Conclusion:** The IAPSI offers a valid and reliable instrument for assessing SP of elderly. In this study, the SLo was associated with lower scores in social participation.

## P957
## CONSEQUENCES OF CHRONIC VENOUS DISEASE ON LOWER LIMBS FUNCTION

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**Objectives:** To investigate the lower limbs joint pain, the lower limbs kinematics in patients with chronic venous disease.
**Methods:** A prospective studies of 14 in patients with chronic venous disease and lower limbs joint pain and dysfunction. Venous disease was classified according to the CEAP classification (International Consensus Committee reporting standards on venous disease). Lower limbs joints ware evaluated for pain (visual analogue scale, VAS 0-10), for range of motion - goniometry, muscle forces (0-5 scale), function WOMAC score, the gait, body alignment.
**Results:** Most of patients with moderate or severe chronic venous disease. Joint pain was mostly present at ankle and knee level with mean VAS of 6.2. Other site of pain, low back in most of the patients. Body alignment hyperlordosis, genu valgum and pronated feet in most of the patients. Joints ROM: limited ankle movements, particularly dorsiflexion, limited patella movements and limited knee flexion in 8 patients, limited spine movement in most of the patients. Muscle imbalances particularly lower crossed syndrome was presents in 12 patients (85.75%). Muscle insufficiency in hip and knee stabilizers. Alteration of the gait in most of the patients particularly to the heel strike and mid swing. Because of joints pain we couldn't perform balance testing.
**Conclusions:** Calf muscle pump dysfunction is responsible for sustained elevation of venous pressure at the ankle and is correlated with limited range of movement of the ankle joint, particularly dorsiflexion. Knee pain and dysfunction might be secondary to ankle dysfunction. Foot pronation might be the consequence to intrinsic foot muscle hypotrophy, secondary to ankle pain and dysfunction. For limiting joint pain and dysfunction appears the importance of regular kinetic training in early stages of chronic venous insufficiency.

## P958
## CALCIUM AND VITAMIN D INTAKE IN BRAZILIAN PREGNANT WOMEN

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**Objective:** Investigate the intake of calcium (Ca) and vitamin D (VitD) during the third trimester of gestation among Brazilian pregnant women.
**Methods:** Cross-section study conducted with 49 adult pregnant women from Woman´s Hospital (CAISM), University of Campinas (UNICAMP), during the third trimester of high-risk pregnancy. Ca and Vit. D intake by food were investigated through three 24-h dietary recall. The food data were transformed from domestic measures to grams or milliliters and then analyzed through the program Nutrition Data System for Research (NDSR)® in order to provide the quantity of Ca and VitD. Sociodemographic factors and obstetric history were collected from medical record. Descriptive statistics analysis were performed.
**Results:** Mean±SD gestation age was 32.27±1.84 weeks and the mean±SD age of women was 30±6 y. The majority of women were nonwhite (57.2%), live with partner (91.8%) and were multiparous (83.7%). The mean ±SD Ca and vitD intake was 700.7±319.5 mg and 5.2 ±4.5 μg, respectively. The lowest quartile of Ca intake was 354.7 mg and the highest quartile 1510.9 mg, however only 2 pregnant women presented calcium intake above the recommendation of 1500 mg/d. The lowest quartile of vit. D intake was 2.2 μg and the highest quartile 31.6 μg. VitD intake above the recommendation (15 μg/d) was showed by 75.5% of pregnant women.
**Conclusion:** The intake of Ca is less adequate than VitD among adult pregnant women. Pregnant women should be advised to adjust the intake of Ca through food or specific supplementation. Low intake of these nutrients during pregnancy could be related with osteoporosis and bone fractures in the future.

## P959
## CLIMACTERIC AND LOW BACK PAIN: WHAT CAN GYNECOLOGISTS DO ABOUT IT?

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Low back pain (LBP) affects large numbers of women, especially those aged 45-60. Postmenopausal women shows accelerated disc degeneration due to estrogen deficiency, resulting in narrower intervertebral disc space, increased prevalence of spondylolisthesis, and increased prevalence of facet joint osteoarthritis and higher osteoporosis related spine fracture rate. Vertebral compression fractures (VCFs) are the most common complication of osteoporosis. The higher LBP prevalence in women is due to many factors: perimenopausal abdominal weight gain, genetics, estrogen deficiency, smoking, history of fragility fractures, previous falls, parental history of fragility fractures, premature menopause, sarcopenia, poor neuromuscular function, malnutrition, alcohol intake and medications that promote bone loss.
**Clinical presentation:** More than two-thirds of patients with VCFs are asymptomatic. Symptomatic patients may present with back pain and fracture demonstrated on radiography. Patients with an acute fracture may report abrupt onset of pain with position changes. Physical examination findings are often normal, but may demonstrate kyphosis and midline spine tenderness. Chronic VCF may present with loss of height in addition to kyphosis. Compression fractures are typically diagnosed by lateral radiography of the vertebral spine, with or without anteroposterior views. Radiographic criteria for VCFs include a decrease in vertebral body height of at least 20% or a 4-mm reduction from baseline height. MRI can help distinguish benign from malignant fractures and determine the timing of the fracture (edema). MRI or computed tomography should be considered in patients who do not improve with conservative care and in those with progressive symptoms.
**Conclusion:** Goals of treatment include pain relief, restoration of function, and prevention of future fractures. Gynecologists must access benefits and risks of hormone replacement therapy in order to prevents early postmenopausal bone loss and augments bone mass in late postmenopause. This measure may also be protective for recurring LBP. Additionally, gynecologists can encourage weight-bearing and muscle-strengthening exercise, smoking cessation, and adequate intake of calcium and vitamin D. Consider reassess imaging if patients have no improvement after 6 weeks.

## P960
## IMPACT OF MUSCLE MASS ON THE BONE RESORPTION MARKERS URINE NTX AND PLASMA CTX

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**Objectives:** Bone turnover marker (BTM) levels in blood and urine are thought to reflect bone turnover rate. Whilst BTM in blood is reported as an absolute value, spot urine BTM levels are reported as a ratio to creatinine concentration to correct for the impact of hydration on their urine concentration. However, when renal function is normal, creatinine concentrations in serum and in urine are impacted significantly by muscle mass since it is a catabolic product of muscle. Therefore, we sought to examine the impact of muscle mass on urine creatinine concentration and urine NTX/creatinine ratio using plasma CTX as control.

**Methods:** We studied plasma CTX and urine NTX/creatinine ratio measured in 975 consecutive patients over 50 y of age with normal renal function (glomerular filtration rate >60 mL/min/1.73m$^2$) in our laboratory. Of these, 798 were females and 177 males. The association of serum and urine creatinine was assessed by Spearman correlation. Relationships between plasma CTX and urine NTX/creatinine respectively with quintiles of serum creatinine were studied by Kruskal-Wallace test. P-values <0.05 were considered significant. Statistics were performed on MedCalc, version 18.10.
**Results:** Plasma CTX ranged from 40 ng/L to 1669 ng/L and there was no difference in median CTX between the serum creatinine quintiles (p=0.65). Urine and serum creatinine concentrations were significantly associated (p<0.001). NTX/Cr ranged from 3 nmol BCE/mmol Cr to 375 nmol BCE/mmol Cr. There were significant differences in NTX/Cr between quintiles of serum creatinine (p<0.001). In post hoc testing, the median NTX/Cr in serum creatinine quintile 1 (35 nmol BCE/mmol Cr) was higher than that in quintiles 3-5 (medians of 28, 29 and 29 nmol BCE/mmol Cr respectively); NTX/Cr in quintile 2 (median 21 nmol BCE/mmol Cr) was significantly greater than that in quintiles 4 and 5.
**Conclusions:** A low serum creatinine (<66 umol/L in our study) is associated with lower urine creatinine excretion and may lead to a significant increase in the calculated urine NTX/creatinine ratio. Urine NTX results should be treated with caution in patients with low muscle mass.

## P961
## DYSPNEA IN SYSTEMIC SCLEROSIS: SARCOPENIA IS MORE RELEVANT THAN INTERSTITIAL LUNG DISEASE

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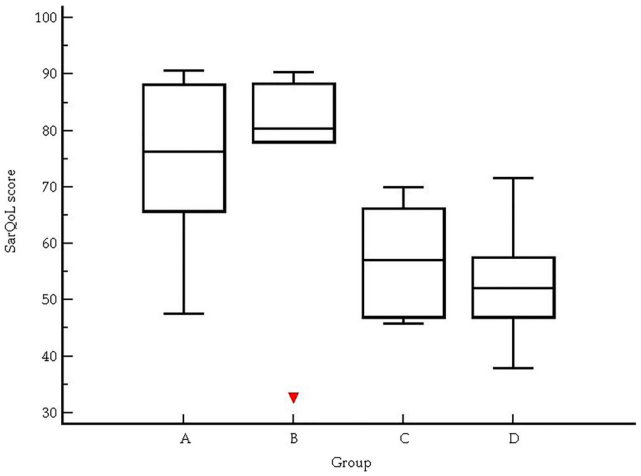
**Objectives:** Systemic sclerosis (SSc) is an autoimmune disease characterized by both visceral and muscle impairment. Dyspnea (DYS) is the most important symptom related to SSc interstitial lung disease (ILD), but it is not correlated with its extension nor severity. The main aim of this study is to investigate if sarcopenia has a pivotal role in dyspnea onset of patients affected by SSc.
**Methods:** We enrolled consecutive SSc patients who underwent a chest computed tomography (CT) and completed the SarQoL questionnaire (1) within 3 months. Clinical data and dyspnea presence at the time of CT were recorded. Patients were clustered in four groups according to the presence/absence of ILD and DYS: A) no ILD and DYS; B) only ILD; C) only DYS; D) both DYS and ILD. The Kruskall-Wallis test assessed the differences of SarQoL score distributions between the above mentioned subgroups. A logarithmic regression stepwise analysis assessed the association of dyspnea with SarQoL score, disease duration, age, sex, autoimmune profile and presence/absence of ILD. A p-value <0.05 was considered statistically significant.
**Results:** 41 SSc patients were divided in four subgroup. SarQoL scores in patients without dyspnea (groups B and C) were higher than in groups B and D (respectively 76.3, 80.5, 57.0, and 52.1; p=0.003) (see Figure). In the multivariate logistic regression analysis, only SarQoL score was significant when tested with dyspnea (OR 0.90, CI 95%: 0.84-0.96; p=0.001).




**Conclusions:** The observed data support the hypothesis that sarcopenia is the main reason why a SSc-ILD patient has dyspnoea. Moreover, sarcopenia appears to be related to dyspnea even in patients without ILD.
**Reference:** (1) Beaudart C et al. Age Ageing 2015;44:960

## P962
## A DESCRIPTIVE ANALYSIS OF A CARE SERVICE FOR OSTEOPOROTIC PATIENTS IN BRAZIL

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**Objectives:** To describe a population of osteoporotic patients referred to an outpatient during a four year period.
**Method:** This study is a descriptive and observational analysis of patients referred to an outpatient called Health of Bones in São Paulo/Brazil from 2015-2018. The service began in January 2015 with the objective of diagnosing, treating and accompanying patients with osteoporosis or at high risk of fracture. All patients were followed up by a physician and a gerontologist. In 2017 the service became a FLS (fracture liaison service) with the objective of capturing all the fractures treated in a referred hospital or those diagnosed in other specialties clinics. The data were summarized through descriptive statistics. For numerical variables we used mean and standard deviation and for categorical data, absolute and relative frequencies.

**Results:** From January 2015 to September 2018 10,693 patients were evaluated, being 92% women, with mean age of 75 years old (from 41-103 years old; SD: 9.5), 9799 people had a diagnosis of osteoporosis (91.6%) being mostly primary osteoporosis (22.1% with secondary osteoporosis). The majority was eutrophics, 21.9% had low and 19.9% high BMI. Few patients had vitamin D levels below 30 ng/ml (38.3% in 2015 vs. 19.3% in 2018). Related to fractures, we evaluated along the 4-y period 5016 patients with fractures (i.e., 47% of our population had a fragility fracture (FF)). In 2015, 32.5% had a diagnosis of at least one fracture, 40.9% in 2016, 43.2% in 2017 and 79.1% in 2018. From all fractures, 37% were vertebral fracture, 36% hip fracture and 48% other fragility fractures and most of them had only one FF (65%, n=3250). All patients with osteoporosis were instructed to start treatment: 72% with oral bisphosphonate, 17% with denosumab, 3.7% with zoledronate 3.7% with raloxifene and 2.2% with teriparatide.

**Conclusion:** The population on this 4-y period was predominantly women, elderly, with primary osteoporosis. After implementing measures for capturing the fractures, we were able to increase the reference of fractured patients after the first fracture episode and to institute drug treatment. Treatment was predominantly with oral bisphosphonates.

## P963

## APPLYING OF NEXT-GENERATION SEQUENCE FOR PATIENTS WITH EARLY-ONSET CHRONIC NONBACTERIAL OSTEOMYELITIS FROM NORTH CAUCASIAN REGION OF RUSSIA

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**Objective:** Chronic nonbacterial osteomyelitis (CNO) is a heterogenic group of immune-mediated inflammatory bone diseases with unclear pathogenesis. At present, only a few genes associated with this condition have identified. The aim of the study was to evaluate the spectrum of mutations in genes associated with primary immunodeficiency syndromes (PIDs) and autoinflammatory diseases (AIDs) in the cohort of patients with early onset CNO from North Caucasus (Dagestan and Chechnya).

**Methods:** We selected a subgroup of the CNO patients (n=22) having the following features: 1) early disease onset (<5 y); 2) all children were initially diagnosed as having tuberculosis (TB) due to bone morphology findings (granulomatous, e.g., tuberculosis-like inflammation), but had a negative TB culture test; 3) initial treatment with a combination of 3-4 anti-MBT drugs during 1-2 y was ineffective, and the patient continued to develop new inflammatory bone foci; 4) patients had very severe clinical and radiological signs of disease; 5) all patients were from areas with traditionally high prevalence of consanguinity. Targeted next generation sequencing analysis of 302 genes related to PIDs and AIDs was performed.

**Results:** Rare variants of PID genes were detected in 7/22 (32%) patients. Mutations affecting the genes previously associated with CNO were found only in two patients: one of them carried heterozygous variant IL1RN c.170G>T (p.C57F) and another had IL1RN c.512T>C (p.V171A). No mutation of LPIN2 was revealed. Other detected variants included one pathogenic MEFV p.M694V mutation in the heterozygous state and a number of VUS in CD40LG, NLRP12, CR2, NLRP3, IL12B, PLCG2, SH3BP2, CARD14, IRF8, CASP10, and NFKB1A genes.

**Conclusion:** Mutations in known genes were detected only in a minor fraction of CNO patients from Dagestan and Chechnya.

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## P964

## ANALYSIS OF RISK FACTORS ASSOCIATED TO REFRACTURES IN AN OSTEOPOROTIC POPULATION

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**Objectives:** To predict the risk factors associated to refractures in an elderly fractured population using a logistic regression modeling approach.

**Methods:** This study is a longitudinal and observational analysis of a sample of patients referred to an outpatient called Health of Bones in São Paulo/Brazil during the year of 2015. We included the referred patients who had a previous fragility fracture and were adherent to the implemented treatment with physician and gerontologist. Retrospectively, we analyzed records to assess refractures during the first year of follow-up. We performed a multivariate logistic regression using the stepwise method. All the variables that had a p-value of 0.2 in the univariate analysis were included. The analysis was performed using Stata/IC 15.1.

**Results:** A sample of 263 patients were analyzed, most of them women (92%), with mean age of 80.5 years old (SD: 8.5). The majority (81%) had primary osteoporosis, mean vitamin D 32.1ng/ml (SD: 10.8), T-score lumbar spine -2.5 (SD: 1.5), femoral neck -2.5 (SD:0.81), total hip -2.3 (SD: -0.9). 50.9% were treating osteoporosis, 86.6% were with oral bisphosphonate. After physician first assessment, 100% received treatment, 64% oral bisphosphonate, 11.1% denosumab, 6.6% teriparatide and 4.5% zoledronate. In the univariate analysis,

age was statistically significant associated with refracture (p-value 0.03). The logistic model included age (OR 1.21, 95%CI 0.99-1.48), femoral neck T-score (OR 2.42, 95%CI 0.83-7.08), vitamin D (OR 0.96, 95%CI 0.86-1.08), number of gerontologist appointments (OR 0.37, 95%CI 0.09-1.49) and number of chronic previous fractures (OR 1.49, 95%CI 0.52-4.31). The model R squared was 0.3 and final p-value 0.04.

**Conclusion:** Despite the small sample, it seems that age alone is a risk factor for refracturing in an osteoporotic elderly female population. Vitamin D level, femoral neck T-score, number of gerontologist appointments and number of chronic previous fractures seems to contribute for it.

## P965
## MOOD DISORDERS AND ANTIDEPRESSANT USE ARE ASSOCIATED WITH TRABECULAR BONE SCORE IN WOMEN

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**Objective:** Mood disorders and antidepressants, in particular selective serotonin reuptake inhibitors (SSRIs) have been associated with lower BMD and increased fracture risk. This study aims to assess if trabecular bone score (TBS), a tool for indirectly assessing bone microarchitecture at the lumbar spine, is similarly associated with SSRIs, antidepressants, and current mood disorders.

**Methods:** This study included 682 women (aged 28-94 y) enrolled in the Geelong Osteoporosis Study. TBS was determined from lumbar spine DXA scans (Lunar Prodigy) using TBS iNsight software (Version 2.2). Current use of antidepressant medications was self-reported. Current mood disorder was determined using the Structured Clinical Interview for Diagnosis (SCID-I/NP). Multivariable linear regression models were used to assess associations between mood disorders, antidepressants and TBS, adjusting for potential covariates including age, height, weight and lifestyle factors (alcohol consumption, physical activity, smoking and other medication use).

**Results:** *60* women (9%) met criteria for a current mood disorder and 111 (16%) reported current antidepressant use, of which 84 (12%) were using an SSRI. Current mood disorder was associated with lower TBS, before (p=0.055) and after adjustments (p<0.001). Similarly, use of any antidepressant and SSRIs were associated with 5.42% and 5.13% lower TBS (both p<0.001), respectively, which persisted in the adjusted models. A combined model including current mood disorder and use of antidepressants found their effects on TBS to be independent (β=-0.048, p=0.009 and β=-0.038, p=0.008 respectively).

**Conclusion:** Both current mood disorder and antidepressant use were independently associated with lower TBS in a population-based sample of Australian women. This confirms the previous research showing negative effects on bone health, and presents new data indicating that bone microarchitecture, not just bone quantity, is affected.

## P966
## LEVELS OF ALBUMIN AND VITAMIN D IN PATIENTS WITH EPILEPSY

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**Objective:** Anticonvulsants have been described as causing low levels of vitamin D with a negative impact on bone health. There are few data that assess albumin levels and their relationship with vitamin D. Our aim was to evaluate the ratio of serum albumin and vitamin D levels in patients with anticonvulsant consumption.

**Methods:** A descriptive, cross-sectional study in outpatient of the University Hospital of Neiva with diagnosis of epilepsy and age >18 y. A sample of 90 patients was calculated, excluding those who had stage 3, 4, 5 chronic kidney disease, child Pugh grade A, B or C liver cirrhosis, neoplasms, pregnant or lactating. Vitamin D 25-OH, PTH, serum albumin and serum calcium were measured.

**Results:** 90 patients were studied. The median age was 36.5 y, 46.7% men and 53.3% women. The average vitamin D was 31.1ng/ml with a standard deviation of 10.0, 51.1% (n=46) had low levels of vitamin D, 38.8% with insufficiency (20-30 ng/dl) and 12, 2% with deficiency (<20 ng/dl). Patients with vitamin D deficiency had lower albumin levels and higher levels of PTH, being statistically significant, without alterations in BMI, serum calcium or corrected calcium. Table 1.

**Conclusions:** Chronic renal failure is related to low serum albumin levels and also urinary loss of vitamin D transporter protein affecting bone health. In our study we found a relationship between vitamin D deficiency and a lower serum albumin level without affecting the calcium level. It should be clarified if patients with low albumin levels associated with vitamin D deficiency present an early or greater bone involvement.

Table 1. Blood studies associated with vitamin D insufficiency and deficit in patients with anticonvulsant treatment.

| Data | Normal N=43 | Insufficiency N=35 | P | Deficit N=11 | p |
|---|---|---|---|---|---|
| Anthropometric | | | | | |
| BMI median (ranges) | 24.0 (19.7–35.3) | 24.1 (18.0–33.8) | 0.87 | 23.3 (21.6–33.2) | 0,68 |
| PTH pg/ml | | | | | |
| Median (ranges) | 43.3 (22.1–86.4) | 49.1 (18.4–132.7) | 0.21 | 103.9 (30.7–182.9) | <0,01 |
| Calcium serum mg/dl | | | | | |
| Mean (SD) | 9.2 (0.7) | 9.05 (0.5) | 0.33 | 8.9 (0.6) | 0,23 |
| Albumin serum g/dl | | | | | |
| Mean (SD) | 4.0 (0.4) | 3.9 (0.3) | 0.20 | 3.7 (0.3) | 0,02 |
| Corrected calcium mg/dl | | | | | |
| Mean (SD) | 9.2 (0.7) | 9.12 (0.5) | 0.68 | 9.1 (0.7) | 0,84 |

## P967

## THE REGULATORY MECHANISM SIRT-1 ON NFG EXPRESSION IN SYNOVIUM OF OSTEOARTHRITIS

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Nerve growth factor (NGF) is widely known pain mediator and the regulation of NGF with tanezumab has robust analgesic effect on knee osteoarthritis (OA) pain but, inflammation aggravate OA synovitis and get worse OA pain. Although the important function of IL-1ß on inducing NGF expression is well established, the regulatory mechanisms of NGF expression are poorly defined. SIRT1 has been shown to play a critical role in cellular inflammation. The present study investigated the role of SIRT1 as a regulator of NGF in inflammation of OA. Synoviocytes were isolated from knee synovium of OA patients. NGF mRNA were measured by qRT-PCR. NGF protein were detected by immunoblot. IL-1ß and NGF were detected in synovium of OA patinets by immunohistochemistry. Using immunohistochemistry, we examined the expressions of NGF and IL-1ß in synovial tissue sections from OA patients. NLRP inflammasome and IL-1ß were found abundantly expressed in OA tissues. IL-1ß stimulated the expression of NGF mRNA and protein in OA synoviocytes. SRT1720, a SIRT1 activator, increased SIRT1 activity in OA synoviocytes. Additionally, Pretreatment with SRT1720 suppressed IL-1ß- induced NGF mRNA and protein. Blocking SIRT1 activity by EX527 (an inhibitor of SIRT1) failed that SRT1720 reduces IL-1ß -induced NGF mRNA and protein. This study provides the showing that SIRT1 plays critical role in regulating NGF in synovium of OA, suggesting that SIRT1 may be a potential therapeutic target to reduce OA pain.

## P968

## DEVELOPMENT OF RAT MODEL OF NEUROLOGICAL HETEROTOPIC OSSIFICATION

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**Objectives:** Neurological heterotopic ossification (NHO) occurs in approximately 20% of traumatic brain injury (TBI) patients and is characterised by the formation of bone (up to 1.5 kg) in soft tissue. NHO typically forms in muscle and around joints, causing pain, nerve entrapment, soft tissue catabolism, and joint deformation. There are no predictive markers for NHO, therefor NHO can only be identified after the lesion has mineralised. Though the identification of predictive biomarkers would greatly improve the clinical management of this condition. The lack of biomarkers is in large part due to the challenges and limitations involved in studying this condition in humans, however, animal models allow for the control of these confounds. Here we aimed to develop a novel rat model of TBI-induced NHO that closely mirrors the injury mechanics and post-injury sequelae of NHO observed in humans and to identify plasma-based markers that predict the development of NHO.
**Methods:** 8-week-old male rats were given a moderate-severe TBI, induced via lateral fluid percussion injury, a femoral fracture and a muscle crush injury (n=12). Blood was collected at 2, 7, 21 and 42 d postinjury and analysed using reverse phase protein microarray (RPPM). Rats were euthanized at 6 weeks postinjury and the formation of NHO was assessed via microCT.
**Results:** MicroCT analysis revealed that six of 12 rats given a TBI, muscle injury and fracture went on to develop NHO, while the other six did not. Rats that developed NHO had significantly reduced plasma levels of IL-6 when compared to rats that did not develop.
**Conclusion:** In this study we have developed a novel rat model of NHO that features injury combinations NHO patients commonly present with. In addition, our finding that rats that went on to develop NHO had reduced circulating levels of IL-6, suggests that plasma levels of IL-6 may serve as a predictive biomarker of the formation of NHO.

## P969

## FREQUENCY OF SKULL BASE PATHOLOGY IN BELARUSIAN CHILDREN WITH OSTEOGENESIS IMPERFECTA

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**Objective:** To analyze the frequency of craniovertebral junction pathology (basilar impression/invagination, platybasia) in children with osteogenesis imperfecta (OI).
**Methods:** We analyzed the skull base morphology from lateral skull radiographs, obtained between the ages of 3-17 y in 31 bisphosphonate-treated (pamidronate) and 6 nontreated OI boys (22) and girls (15). They represented OI types I, III, IV. They were examined by a pediatrician, geneticist, radiologist, ophthalmologist, neurologist. Possible neurological symptoms typical for the skull base abnormalities (double vision, nystagmus, imbalance and incoordination, increased intracranial pressure, headache/neck pain, etc.) had been looked for in clinical examinations. We used the definitions and criteria established by O. Kovero et al. (2006) to classify the skull base abnormalities.
**Results:** We found that 62% (23/37) of patients had a normal craniovertebral junction structure, 38% (14/37) had the skull base abnormalities. Isolated platibasia occurred in 11 children, basilar invagination in - 1 child, combination of basilar

invagination with platibasia - in 1 child, combination of basilar impression with platibasia - in 1 child. Abnormalities were detected in 5 of 9 patients with severe OI, in 7 of 21 - with moderate OI, in 2 of 7 - with mild OI. They were revealed in 6 of 7 children with most severe OI type (III). The most severe types of abnormalities (basilar impression or invagination) were detected in patients with severe OI (and were not detected in mild OI). However, there were no significant differences in the frequency of abnormalities between patients with mild, moderate and severe OI, bisphosphonate treated and nontreated patients. All the examined patients did not reveal neurological symptoms typical for skull base abnormalities.
**Conclusion:** Skull base abnormalities are a frequent complication of OI in children. Their early detection is important for the subsequent patient management.

## P970
## MULTIDISCIPLINARY APPROACH OF GERIATRIC PATIENTS AFTER HIP TRAUMA

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**Objective:** To identify a model for multidisciplinary approach in hip trauma patients.
**Methods:** In the first part of our study, we performed a retrospective study, using the medical data of 55 patients, over 65 years old, which underwent a proximal femur fracture. We noted all associated chronic pathologies in four major categories: cardiovascular disease, neurological pathology, psychiatric disorders and others, and the number of interdisciplinary consultations they had. In the second part of our study, we included 32 medical doctors of from different fields. Were collected sociodemographic data and was applied a questionnaire that contained 3 simple yes/no questions, to evaluate their availability to work in a multidisciplinary team.
**Results:** 23.5% of the patients needed pre-intervention interdisciplinary consultation, out of which 12% needed cardiologic consult, 7% neurological evaluation, and 3.5% others. 91.7% of the patients have associated a cardiovascular disease, the most frequent disease being hypertension. Neurological comorbidities were present in 21% of the patients, including pathologies like history of stroke, hemiplegia, cerebral ischemia or different types of paresis. 10% of the patients had history of psychiatric pathology, including depression, anxiety, and other disorders. The results for the second part of the study, were 100% affirmative answers for the first two questions, while the last question revealed that only 70% of doctors would sacrifice their time to be part of such a multidisciplinary team. The doctors who would not participate in such teams were younger than 40 years old.
**Conclusions:** Multidisciplinary approach is vital not only in the successful reintegration of the elderly patient, but also in correct perioperative management, taking into consideration that the great majority associate complex chronic pathology. Regarding the age of the doctors, older doctors would sacrifice more of their time because they understand that such an approach would make a better outcome for the patients. If doctors would collaborate, the multidisciplinary team would work better, making the process easier and building professional relationships, which are proven to be more effective.

## P971
## BONE MINERAL DENSITY IS ASSOCIATED WITH OVARIAN VOLUME IN POSTMENOPAUSAL WOMEN

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**Objectives:** To evaluate the potential link between ovarian volume, anthropometric and demographic parameters as well as BMD and hormonal status in women after the menopausal transition.
**Methods:** This cross-sectional study included a total of 161 healthy postmenopausal women, retrieved from the Menopause Clinic of the 2nd Department of Obstetrics and Gynecology, Aretaieio Hospital, Athens, Greece. We evaluated anthropometric parameters, including body mass including BMI and waist to hip ratio (WHR). Sonographical assessment included estimation of the average ovarian volume for each participant. DXA was used to measure bone density in the femoral neck (FN) and the lumbar spine (LS).
**Results:** The average values of ovarian volume increased stepwise with increasing BMI quartiles (Q1:0.985±0.25, Q2: 1.11±0.29, Q3: 1.07±0.28, Q4: 1.19±0.38, p-value for linear trend 0.013). Moreover, the average ovarian volume correlated positively with BMI values (r=0.128, p-value=0.038), FN BMD (r=0.233, p-value=0.003), FN T-score (r=0.223, p-value=0.004) and FN Z-score (r=0.171, p-value=0.027). Multivariate analysis showed that FN BMD was predicted by ovarian volume, independently of age, menopausal age and BMI. Finally, ovarian volume was predicted by WHR (b-coefficient=0.157, p-value=0.047) and SHBG (b-coefficient=-0.160, p-value=0.042), independently of age and BMI.
**Conclusion:** The results of the present study indicate that the average ovarian volume was positively and independently associated with femoral BMD and adiposity indexes in postmenopausal women. Lower SHBG levels were associated with higher ovarian volume. Insulin resistance may mediate these results. The significance of these findings should be assessed in larger prospective studies.

## P972

## NECK PAIN: THE RELATIONSHIP BETWEEN CERVICAL SPINE MRI AND ELECTRODIAGNOSTIC FINDINGS USING SEVERITY GRADING SCORE

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**Objective:** In patients with neck pain, cervical spine MRI and electrodiagnostic (EDX) study are commonly performed examinations. Many researchers studied that cervical spine MRI and EDX study allows us to know useful information of cervical pain source. However, few studies have been preceded the relation of severity between EDX and MRI. This research is about the relationship of cervical spinal findings on EDX and MRI study in patients with neck pain.
**Method:** Authors retrospectively reviewed 50 patients with a neck pain who evaluated with both an EDX study and a cervical spine MRI within 1 month of each other. One radiologist assessed cervical MRI imaging and experienced physiatrists performed nerve conduction study and needle electromyography (NCV + EMG). We devised the '00 severity grading score' of EDX study and cervical spine MRI through comprehensive literature reviews. In addition, we investigated (1) correlation of total score of the MRI abnormalities with EDX findings, (2) correlation of each subscore of the EDX findings (NCV, abnormal spontaneous activity, motor unit potentials) with subscores of MRI findings. The correlations among the subscores analyzed by Pearson correlation coefficient.
**Results:** The total score of MRI abnormalities had strong correlation ($r=0.767$) with total score of EDX findings ($p<0.05$). The abnormal spontaneous activity showed higher correlation with total score of MRI abnormalities ($r=0.868$) than the findings of NCV ($r=0.452$), motor unit potentials ($r=0.785$) ($p<0.05$). The subscore of the MRI findings including bilateral involvement ($r=0.708$), cord compression (0.604) showed correlation with total scores of EDX findings ($p<0.05$). However, other subscores of MRI including multilevel disc herniation, unilateral root compression showed no correlation with total scores of EDX findings ($p>0.05$).
**Conclusion:** There were strong correlations between total score of EDX and cervical spine MRI findings. However, we must not ignore that each subscore of radiologic finding significantly not correlated with EDX scores. It showed that the severity of cervical spine MRI should not exaggerate the process of EDX findings.

## P973

## CALCIUM INTAKE IN BOGOTA, COLOMBIA: AN UPDATE

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**Objective:** Determine daily calcium intake in a random population of Bogota, Colombia.
**Methods:** Observational descriptive study of a transverse cohort with a prospective collection of information. The sample was obtained by convenience, of volunteers over 18 years old, in Bogota, Colombia who answered the calcium intake questionaire from the international osteocoporosis foundation, from different socioeconomic level given by the place of residency, between June and December 2018. People with calcium supplements were excluded.
**Results:** 450 volunteers participated. 296 (65.8%) were women. The median age was 34.5 (interquartile range IQR of 21-55) and 30 y (IQR 21-51) for women and males respectively. The mean calcium intake was 724.5 mg/d, 731.5 mg/d (IQR 533-1032 mg) for women, being 776 mg/d (IQR of 545-1107 mg), 629 mg/d (IQR of 489-838 mg) and 769 mg/d (IQR 568-1042 mg) in women age range of 18-30, 31-50 and over 50 y. The median calcium intake for men was 717.5 mg/d (IQR 536-1012), being 778 mg/d (IQR 570-1142 mg), 634.5 mg/d (IQR 396-891 mg) and 751 mg/d (IQR 497-892) for man of age range between 18-30, 30-50 and over 50 y respectively. The median calcium intake in lower socioeconomic level was 566 mg/d (IQR 426-916.5), 83% had a consumption lower than 1000 mg/d, 4.4% between 1000-1200 mg/d and 14.89% higher than 1200 mg/d. In the middle class, the intake was 715 mg/d (IQR 547-1033), 71.5% of the group with a lower consumption of 1000 mg, 13.59% consuming 1000-1200 mg and 14.89% consumed over 1200 mg/d. In the highest class the median was of 892 mg/d (IQR 668-1103 mg), 58.9% had a day intake lower than 1000 mg, 23.29% consumed between 1000-1200 mg and 17.8% over 1200 mg/d. The main cause of low intake in women and men was unawareness of requirements in 92.4% and 88.1%, followed by gastrointestinal intolerance. This was observed independently of the socioeconomic level and age.
**Conclusions:** The calcium intake of Colombia is 724.5 mg/d, the highest in South America considering the calcium map, however, it is still below the recommended requirements. Unawareness is the first cause independent of age and socioeconomic level. The highest income volunteers had a higher intake without differences by age or gender.

## P974

## CLINICAL AND DEMOGRAPHIC PROFILE OF PATIENTS CONSULTING FOR FRAGILITY FRACTURES IN A HOSPITAL IN COLOMBIA DURING THE YEARS 2015-2017: IMAGE OF THE COLOMBIAN HEALTH SYSTEM

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**Objectives:** To describe the clinical and demographic characteristics of patients with fragility fractures seen in our hospital. To describe the risk factors for fragility fractures. To inquire about the patient's knowledge about osteoporosis. To follow each case establishing whether after presenting the complication (fracture), the patient would receive an ambulatory treatment covered by the health insurance.
**Methods:** Cross-sectional descriptive study
**Results:** 111 patients mean age of 74.4 y (±11.3 ), 84 (75.6%) were women. All consulted for osteoporotic fracture. The most frequent type of fracture was hip (51.4%), followed by vertebra (23.4%), wrist (22.5%) and humerus (4.5%). 87.4% (n=97) had no personal history of fracture and only 1% had a history of frailty fracture in a first-degree relative. Risk factors: 7.2% (n=8) used glucocorticoids, 3.6% (n=4) antiepileptics and 3.6% (n=4), warfarin 21.6% (n=24) were smokers. 77.5% (n=86) had never previously undergone a densitometry despite the fact that, because of their age, they had indicated that this study had previously been performed. Knowledge of osteoporosis by patients: 49.5% (n=55) did not know that osteoporosis was present, 58.6% (n=65) did not know that fracture was the main complication of this disease and 62.2%=69) does not relate to fractures with osteoporosis. All patients were educated and sensitized about osteoporosis and the importance of diagnosis and treatment and they were given an order to perform densitometry at discharge, despite the above 24.3% (n=27) densitometry was performed in the next year of the fracture. As for treatment, 33.3% (n=37) received calcium plus vitamin D. Only 9.9% (n=11) received treatment for osteoporosis (7 patients with bisphosphonate and 4 with denosumab), none received teriparatide osteoformer therapy.
**Conclusions:** The present study demonstrates the lack of understanding by the Colombian patients about osteoporosis. Despite of clear indications described international guidelines, we have found a lack of densitometry measurements on our follow-up patients. More serious, only 10% of the patients received treatment for osteoporosis and none of them used an osteoformer therapy. This proves the suboptimal follow-up made by the health insurance companies of our country. Urgent educational and public health policies are needed.

## P975
## SOCIAL NETWORKS AS INFORMATION SOURCES FOR PATIENTS WITH OSTEOPOROSIS

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**Objective:** To establish quantitative and qualitative data on osteoporosis treatment published in social networks for Spanish speaking patients.
**Methods:** Facebook (FB) and YouTube (YT) accounts were created. A convenience sampling was performed in each network based on most viewed videos. Data were obtained during January 2019 using the terms “osteoporosis treatment”, only videos in Spanish were included. Two independent reviewers assessed the reliability of the information. Retrieved variables were: Time on the internet (TI, d), # views, # likes, # shared, duration (s).
**Results:** 50 videos were selected in each platform, only 36% (FB) and 54% (YT) presented reliable information. The most viewed video on FB was “*Tratamiento para dolores articulares*” (479.826 views), whereas on YT was “*Jugo verde para la osteoporosis, anemia y caida del cabello*” (2’426.582 views). Most videos offered treatment with unknown compounds, nonapproved by regulatory agencies, or natural therapies (sesame, vegetables, moringa, coconut oil, curcumin, etc.). 4 offered a cure, including stem cells. Dairy products and pH alterations were considered as the cause of osteoporosis in 2 videos, thus alkalizing diets were treatment options. Acupuncture was offered. Table 1 summarizes quantitative data. No differences were detected between reliable and false multimedia in FB, however the latter presented more views and likes in YT. No correlations between TI and # views were observed.
**Conclusions:** Social networks are an increasing source of health information for patients. False information on osteoporosis treatment is common and appears to be more frequently viewed, particularly on YT. Regulatory policies should be considered.

Table 1

| | Facebook | | | Youtube | | |
|---|---|---|---|---|---|---|
| | F (n=32) | R (n=18) | p[a] | F (n=23) | R (n=27) | p[a] |
| TI | 105 (26-250) | 143 (102-486) | 0.3746 | 1391 (906-2005) | 1871 (1267-2506) | 0.2131 |
| # Views | 642 (119-6499) | 382 (182-3720) | 0.9037 | 80825 (29796-266708) | 22491 (8736-68191) | 0.0031** |
| # Likes | 11 (3-139) | 19 (11-73) | 0.5435 | 2000 (395-4200) | 100 (37-806) | 0.0002** |
| # Shared | 7 (2-90) | 10 (1-57) | 0.8138 | - | - | - |
| # Duration | 169 (53-440) | 143 (104-288) | 0.8375 | 433 (211-1860) | 334 (197-478) | 0.1761 |

F False; R Reliable; [a] Mann-Whitney

## P976

## EFFECT OF TERIPARATIDE ON BONE MINERAL DENSITY AND BONE MARKERS IN REAL LIFE: ARGENTINE EXPERIENCE

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**Objective:** Evaluate the effect of teriparatide (TPTD) on MD and bone markers under clinical practice conditions in specialized centers.
**Methods:** Cross-sectional study of 257 postmenopausal women treated with TPTD for at least 12 months. We considered serum calcium, PTH, 25OHD, alkaline phosphatase (AP), bone AP (bAP), osteocalcin (BPG), C-terminal telopeptide (CTX) and urinary deoxypyridinoline (Dpyr). In addition, lumbar spine (LS), femoral neck (FN) and total hip (TH) BMD (g/cm$^2$) was evaluated by DXA (Lunar Prodigy). Data were expressed as mean±SD and were analyzed with Wilcoxon test vs. basal (*p<0.05 vs. basal).
**Results:** 257 patients who completed 12 months of treatment were included (100 completed 18 m and 76 completed 24 m). Main characteristics: age 68.6±10.1 y (range: 43-101), age of menopause 48.0±4.7 y, previous fractures: 54.1% (median of vertebral fractures 2 [range 1-9] and nonvertebral fractures 1 [range=1-5]), previous use of bisphosphonates (BP) 79% (6.0 ±3.6 y). Bone formation and bone resorption markers significantly increased from 6 m returning to basal values at 18 m (AP, bAP) or 24 m (Dpyr). CTX and BPG remained increased to 24 m. PTH decreased significantly at 6 m and returned to baseline values at 18 m, inverse to calcemia behavior. No changes in 25OHD were observed. There was a significant increase in LS BMD from 6 m (+6.2%*) with a maximum at 24 m (+13.0%*). FN and TH BMD showed a significant increase from 12 m (FN 12 m: +2.5%* and 24 m: +7.9%*; TH 12 m: +1%* and 24 m: +5.5%*). According to the previous use (n=203) of BP or not (n=54), a significant increase in LS BMD was found from 6 m to 24 m compared to basal in both groups (+13.4%* and +11.3%*, respectively) and no differences were observed in FN and TH BMD in these groups.
**Conclusions:** As reported in clinical studies, treatment of osteoporotic postmenopausal women with TPTD in routine clinical practice induced a significant increase in bone formation and resorption markers from 6 months onwards and an increase in BMD from 6-12 m with continuous gain up to 24 m. In addition, TPTD induced an increase in BMD regardless of the previous use of BP.

## P977

## PREDICTORS OF TENDENCY TO LOCOMOTIVE SYNDROME AMONG THE OLDEST OLD DURING A 3-YEAR FOLLOW-UP

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**Objective:** Identify the predictors for worse scores associated with locomotive syndrome (LS) in community-dwelling elderlies with 80 y or more.
**Methods:** This is a first analysis of a prospective cohort study - LOCOMOV Project, with a *3 y follow-up.* At baseline 102 people (mean age 87.2 y, 73.5% female) were evaluated using questionnaires related to LS diagnostic (GLFS 25-p), basic and instrumental daily living activities (Katz and Lawton, respectively), quality of life (WHOQOL-Bref), social participation (social dimension of WHOQOL-OLD) and physical performance tests (4m gait speed-GS4m, 5-sit and stand test - SS5x, two-step-test -TSS and hand grip-HG). The data collected were submitted to the t-Student test, variance analysis (ANOVA), Pearson correlation coefficient and multiple logistic regression (stepwise) for statistical analysis. The significance level was set at 0.05 (5%).
**Results:** During the period, we lost 4 patients, 5 died and we excluded 6 patients that developed dementia. Therefore, we analyzed data of 87 patients with a mean age of 87.3 y. Linear regression models showed significant predictors for worse values of GLFS25-p (adjusted $R^2$=29.9): (1) female (b=5.7, P=0.021); (2) osteoporosis (b=9.6, P<0.001); (3) osteoarthritis (b=4.2, P=0.018); (4) gait speed <0.8 m/s (b=7.2, P=0.001) and (5) increase IMC (b=0.9, P<0.001). In addition, individuals with LS also had a higher prevalence of chronic pain and worse quality of life in univariate analysis during the 3-y interval (P<0.001).

**Conclusion:** Our logistic model showed that oldest old community-dwelling women who has osteoporosis, osteoarthritis, worse gait speed or increase IMC are strongly associated with worse predictors of tendency to SL.

## P978
## USE AND IMPACT ON SOCIAL NETWORKS BY OSTEOPOROSIS JOURNALS

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**Objective:** To evaluate the presence, number of followers and activity of the osteoporosis journals in the main social networks.
**Methods:** The platform of scientific journals Scopus was consulted, selecting the journals located under the terms "osteoporosis" and "bone". The Scimago Journal Rank (SRJ) of the year 2017 was taken as an approximation to the impact of the magazine. The social networks Facebook, Twitter and YouTube were consulted, searching for the journals found in the Scopus search. Date of consultation: 01-20-2019.
**Results:** In SCOPUS, 7 journals were found with the search term "osteoporosis" and 21 journals with the term "bone", of which only 8 (28.5%) had an active account in at least one of the social networks consulted (Facebook, Twitter and YouTube). On Facebook, the most active journals with the largest number of followers were J Bone Joint Surg, Bone Joint J and Osteoporos Int. On Twitter, the journals with the most followers are Bone Joint J, Bone Joint Res and Osteoporos Int. The activity on Twitter, measured as number of twits, had the same behavior according to the number of followers. The magazines with YouTube channel are J Bone Joint Surg (2193 subscribers, 271 videos, most viewed video 40215 views), Osteoporos Int (387 subscribers, 210 videos, most viewed video 30485 views), and Bone Joint J (33 subscribers, 6 videos, most viewed video 1300 views).
**Conclusion:** In the era of the digital world, social networks have become a new form of interaction between scientific publications and their readers. In spite of the above, very few osteoporosis journals have an active account in social networks and journals with active accounts have low activity rates in the network. It opens an opportunity for osteoporosis journals to venture into social networks to improve their visibility and impact in the scientific world.

Table 1: Characterization of scientific journals in social networks of the osteoporosis area.

| Journal | SRJ | Facebook | Twitter | Twits |
|---|---|---|---|---|
| J Bone Joint Surg (Q1). USA | 2.72 | 18609 | NA | NA |
| Bone Joint J (Q1). UK | 2.04 | 10930 | 21213 | 1683 |
| Osteoporos Int (Q1). Germany | 1.52 | 9798 | 5260 | 2800 |
| Bone Joint Res (Q1). UK | 1.19 | 5871 | 10600 | 3866 |
| Bone Res (Q1). UK | 1.12 | NA | 1545 | 1834 |
| Arch Bone Joint Surg (Q2). Iran | 0.63 | 38 | NA | NA |
| J Osteoporos (Q3). USA | 0.64 | NA | 130 | 184 |
| Revista de Osteoporosis y Metabolismo Mineral (Q4). Spain | 0.12 | 2 | 11 | 2 |

SJR: Scimago Journal Rank. Facebook: Number of followers. Twitter: Number of followers. Twits: Number of twits reported on the platform. NA: Not applicable.

## P979
## REFERENCE VALUES FOR BODY COMPOSITION IN MEXICAN CHILDREN AND ADOLESCENTS

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**Objective:** The assessment of growth and development in children has been made by anthropometric measurements such as weight, height and BMI. Although very practical, BMI has the limitation to group the different compartments of body composition (BC) as the same, wrongly classifying subjects with high lean-mass (LM) as overweight/obese, or individuals with high fat-mass (FM) as healthy. The recognition of the importance of the different body components during childhood is being recognized lately since they can have an impact in the development of chronic diseases as osteoporosis, sarcopenia and others in the adulthood. Reference values for body composition must be developed in every population of children and adolescents in order to implement preventive or treatment strategies with a long term view. Our aim was to determine reference values of BC by DXA for healthy Mexican children and adolescents.
**Methods:** We carried a population based cross-sectional study in healthy Mexican children aged 5-20 years. We carried clinical history and examination, anthropometric measurements, blood sample for glucose and lipid profile; BC by DXA iDXA GE. We used descriptive statistics to report demographic and clinical data. We report BC by FM, LM, bone mineral content (BMC), FM index (FMI). We developed age- and gender-specific smoothed percentile curves for LM, FM and BMC by means of gamlss method, R statistics.
**Results:** We have assessed 1885 children and adolescents (990 males and 895 females). Nutritional status according

to BMI classified 64% of subjects as normal weight, 16% overweight, 15% obese, and 5% underweight. We excluded subjects with obese, underweight and metabolic alterations for the construction of the graphs; we included 1332 children/adolescents for the construction of the graphs. Noteworthy 8% of subjects classified by BMI as normal weight had fat percentage mean value (36%) similar than overweight group, similar in 15% of the adolescents. In 3% of children, and 5% of the adolescents classified as normal weight has mean fat percentage (41%) similar than obese group.

We present the smooth curves for total lean mass, by gender.

**Figure 1. Lean mass in female.**

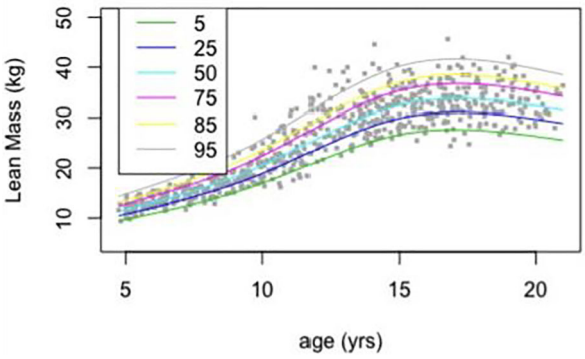



**Figure 2. Lean mass in male.**

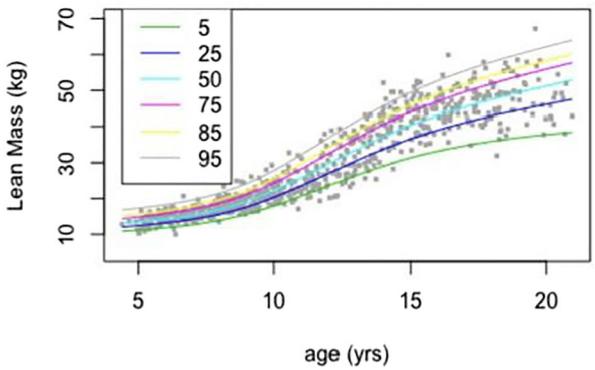



**Figure 3. Fat mass in female.**

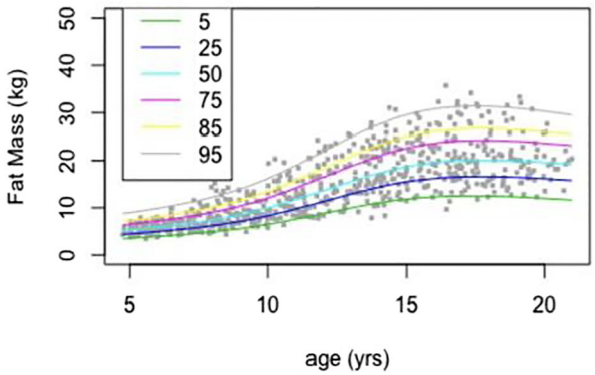
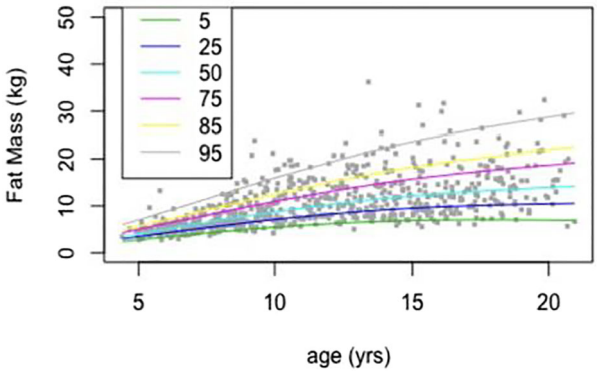



**Figure 4. Fat mass in male.**




**Conclusions:** Ethnic-specific reference values and risk cutoff points must be generated to improve health-status classification of children. We have developed such values for our population that will allow us to implement strategies of nutrition and physical activity in vulnerable groups.

**P980**

## OSTEOPOROSIS DIAGNOSIS KNOWLEDGE ASSESSMENT AND BONE DENSITOMETRY INTERPRETATIONS OF PHYSICIANS IN COLOMBIA

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**Objectives:** Assessment and description of knowledge and main concepts of osteoporosis and bone densitometry (DXA) interpretations of a physicians group in Colombia.

**Methods:** Cross-sectional descriptive study. Two professors from the Department of Rheumatology, both experts in osteoporosis designed a survey with 36 questions in four scopes of osteoporosis knowledge including: indications of DXA scan, readings of the bone densitometry, evaluation of images, the entire questions are based on clinical scenarios.

**Results:** 41 residents of the internal medicine program, answered the survey. 58.8% were woman, average age 27.7 years old (±2 y). The 90.3%, 80.2% and 76.8% defined properly T-score, Z-score and BMD, respectively, despite this applying those terms in clinical context the correct term for Z-score was found in 63.4% and BMD in 78.8%. The DXA analyze was 58.5% in osteopenia and 74.1% in osteoporosis accurately. The accepted meaning of severe osteoporosis was found in only 13.5% of the total population. There were 5 clinical cases representing examples in where DXA scan was indicated and 82.9% corrects, in contrast 4 cases with DXA scan not indicated and 65.2% answer correctly. Four images of femoral neck, two of them in right position and

two of them noninterpretable with the following correct answers 62.3% and 47.1% respectively. Same situation presenting lumbar spine 2 images right position with 74.2% right identified and 55.1% in noninterpretable images. The cutoff established to consider a physician to pass the test answering accurately at least 11 of the 18 clinical cases representing the 63.4% of the group, although only 24.9% choose poorly the correct segment in densitometry of the lumbar spine, femur and forearm. The 71.1% of the physicians recognize the vertebral fracture as the most prevalent in osteoporosis. In addition with a visual analogue scale from 0 to 100, evaluates the interest in osteoporosis the 55.2% indicate 80 or even higher interested, 32.8% between 50-80, and 12% <50.

**Conclusions:** Data exhibit low level of knowledge in osteoporosis diagnosis and assessment of densitometry in a physician group from Colombia.

## P981
## EFFICACY AND SAFETY OF DENOSUMAB IN HEMODIALYSIS PATIENTS

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**Objective:** The number of patients with end-stage renal disease (ESRD) undergoing hemodialysis is increasing worldwide. The age of these patients is also increasing because of improvements in long-term prognosis with hemodialysis. This has also led to an increasing number of hemodialysis patients with osteoporosis. Hemodialysis patients with osteoporosis experience degrading bone quality and decreasing bone mass. Compared to osteoporotic patients without renal dysfunction, hemodialysis patients with osteoporosis have an extremely high risk of fracture. A safe and effective treatment for osteoporosis in hemodialysis patients has not been established. Selective estrogen receptor modulators (SERMs) like denosumab (DMAB), as well as teriparatide (TPTD), provide options for treating osteoporosis in patients with ESRD. Although SERMs can be used safely in women, they have little effect on increasing BMD. Many hemodialysis patients have hyperparathyroidism, which is a contraindication for TPTD. DMAB is considered a safe and effective treatment for osteoporosis if hypocalcemia is strictly controlled. However, few studies have described the efficacy of DMAB administration in hemodialysis patients. Herein, we report the safety and efficacy of DMAB in hemodialysis patients with osteoporosis.

**Methods:** DMAB was administered to 25 patients (12 men, 13 women) with osteoporosis who were undergoing hemodialysis at our hospital. The mean patient age was 70.6±11.0 y. The average hemodialysis period at initial DMAB administration was 131.7 months and the average follow-up period was 13 months. An active vitamin D formulation was administered to all patients, and calcium carbonate supplements were also administered. Serum Ca values were evaluated at 1, 2, 3, 4, 6, and 8 weeks after initial administration and every 4 weeks thereafter. DMAB effects were assessed using BMD and bone metabolism markers (PINP and TRACP-5b, respectively) at 6 months after initial administration.

**Results:** BMD increased by 2.3% in the lumbar spine and 2.1% in the femoral neck at 6 months after DMAB administration. PINP levels decreased by 23.8% and TRACP-5b levels by 34.6% in the 6 months after initial administration. Serum Ca levels decreased in almost all patients, and the average rate of reduction compared to that at pre-DMAB administration was 16.8%. Serum Ca levels tended to decrease the most at 4–6 weeks after DMAB administration. No symptomatic hypocalcemia was observed.

**Conclusion:** We believe that among patients with ESRD and osteoporosis, DMAB should be the first choice for effective and safe osteoporosis treatment.

## P982
## BONE MASS IN WOMEN WITH PREMATURE OVARIAN INSUFFICIENCY: A COMPARATIVE STUDY BETWEEN ESTROPROGESTATIVE HORMONE THERAPY AND COMBINED ORAL CONTRACEPTIVES

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**Objective:** To evaluate the effect of combined oral contraceptive (COC) on BMD in women with premature ovarian insufficiency (POI).

**Methods:** A retrospective study of women with POI was carried out. Bone densitometry were analyzed at two or more moments (2±1-year interval). The difference between final and initial (delta) BMD values was calculated for lumbar spine (LS), total femur (TF) and femoral neck (FN). The women were divided into four groups: The COC group (ethinylestradiol 30 μg associated with levonorgestrel, continuously use), smaller dose group (conjugated estrogen (CE) 0.625 mg continuous plus medroxyprogesterone OR 17β-estradiol (E2) 1mg continuous plus norethisterone), higher dose group (CE 1.25 mg continuous plus medroxyprogesterone OR E2 2 mg continuous plus norethisterone), tibolone 2.5 mg group and group without HT (hormonal therapy). For the analysis of the effect of treatments over time, we used generalized estimating equations, with variables without normal distribution transformed into ranks.

**Results:** A total of 173 women with 210 delta densitometries were included. The mean (SD) age was 30.5 (9.27) y and the HT was started at 29.67 (9.46) y, BMI was 24.9 (5.02). The COC group presented improvement in BMD in LS and TF over time, similar to the high dose group. In LS, there was loss of BMD in the group without HT, lower dose and tibolone group.

For FN, BMD reduced in all groups. For TF, there was reduction in the lower dose group. Comparing the deltas between two densitometries, considering the COC Group as a reference, it was observed loss of BMD in LS in the group without HT ($p<0.001$), lower dose ($p<0.001$) and tibolone group ($p=0.026$). For TF, the reduction occurred in the group without HT ($p=0.014$), lower dose ($p<0.001$) and higher dose ($p=0.038$). For FN there was no difference between these groups.

**Conclusions:** For the BMD of POI women, continuous administration of COC was shown to be superior to the lowest dose HT, similar outcomes to that of higher dose of estrogen. Thus, COC can be considered as an alternative treatment for hormone replacement in women with POI.

## P983

## PLACENTAL GENE EXPRESSION OF VITAMIN D METABOLIC COMPONENTS AND CALCIUM TRANSPORTERS IN GESTATIONAL DIABETES AND PRE-ECLAMPSIA CASES

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**Objective:** Bone mass acquired during neonatal stage is an important determinant of risk of bone disease through the rest of life. Gestational diabetes (GDM) and pre-eclampsia (PE) represents the unrecognized risk factors for reduced bone mineral content in neonates. As vitamin D and calcium influence fetal bone development, our aim was to explore the components of vitamin D metabolism and calcium transport in the placenta of GDM and PE cases and its effect on neonatal bone mass determination.

**Methods:** The gene expression of the vitamin D metabolic components (CYP2R1, CYP27B1, CYP24A1 and VDR) and calcium transporters (TRPV5/6, CaBP-9k/28k, PMCA 1/2/3/4, IP3R1/2/3 and RyR1/2/3) and a marker of oxidative stress hOGG1 were quantified by real time PCR in placental samples of 63 women with GDM (n=21), PE (n=22), and healthy pregnancies (n=20). Serum calcium and 25(OH)D levels were estimated in maternal and cord blood samples collected immediately after delivery. Neonatal wholebody BMD, BMC and bone area were measured within 2 d postbirth using DXA.

**Results:** In this study, 52% subjects were vitamin D deficient. CYP2R1 and VDR mRNA expression were significantly down regulated in contrast to upregulation of CYP27B1 and CYP24A1 mRNA expressions in GDM and PE compared with healthy cases. Calcium transporters- TRPV5/6, CaBP-9K/28K, IP3R1/2/3, RyR1/2/3, PMCA1/2/3/4 were downregulated in GDM and PE placentas. The hOGG1 mRNA expression was upregulated in both GDM and PE groups. Gestational period affected CYP24A1, VDR and PMCA3 mRNA expression in all the cases. Further, CYP24A1, VDR and PMCA3 mRNA expression was correlated with BMD/BMC of neonates at birth in all the cases.

**Conclusion:** Oxidative stress may cause disrupted vitamin D homeostasis and calcium transport in the placenta of GDM and PE cases. Serum 25(OH)D reduction may be due to increased expression of CYP24A1 and reduced expression of VDR gene. In calcium transport pathway, ATP depletion affected PMCAs expression and subsequently CaBPs and TRPVs. Reduced BMD/BMC in the neonates of these cases may be as consequences of altered CYP24A1, VDR and PMCA3 mRNA expression.

## P984

## A RISK ASSESSMENT STUDY ON WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTISTS IN MANGALORE, INDIA

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**Objective:** Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations, which are of multifactorial in origin and of global concern due to industrialization. Dentists as one of the healthcare professionals are prone to develop these WMSDs. The study aims to determine the prevalence of WMSDs among dentists in Mangalore region and explores the various risk factors for the development of MSDs and WMSDs.

**Methods:** This proposed study is a cross-sectional study conducted among dentists of two randomly selected dental colleges of Mangalore, India. A structured questionnaire was used to collect the demographic information, occupational history, risk factors, and ergonomic awareness with job task details. Prevalidated standardized tools such as quick exposure check list, rapid entire body assessment score sheet, and Nordic Musculoskeletal Questionnaire were also used. Data were entered in MS Excel and analyzed through SPSS version 22.

**Results:** More than 92% of the participants reported pain and discomfort in at least one part of their body. The major affected body part is neck, followed by the lower back and wrist. More than half of the orthodontists and oral surgeons reported that their MSDs are work-related origin. Pearson's correlation test indicated that there is a positive correlation between the current exposure and risk ($r=0.613$). Multivariate regression analysis found that younger participants, male (OR=4.1), involved physical activity (OR=1.04), dentists not taught about ergonomics in their dental school (OR=1.69) or never attended any workshops (OR=1.38), who reported task involving sustained muscle contraction (OR=1.12) or task with repetitive movements (OR=1.11) are the major risk factors for the development of MSDs among the dentists.

**Conclusions:** This risk assessment study found that there is a high prevalence of MSDs and WMSDs among dentists. Ergonomic awareness and health promotion need to be integrated with the professional practice for dentists.

## P985

## POTENTIAL AUTOCRINE ROLE FOR SEROTONIN IN HUMAN OSTEOCLASTOGENESIS

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**Objectives:** Mood disorders and selective serotonin reuptake inhibitors are implicated in bone loss and fracture risk. Serotonin acts centrally to regulate mood, and peripherally to control gut and cardiovascular function. Additionally, a role for peripheral serotonin in bone homeostasis has been proposed. Transcription of genes for serotonin receptors and tryptophan hydroxylase (TPH1), a rate-limiting enzyme in serotonin biosynthesis, have been reported in both osteoblasts and osteoclasts (OC). This study investigated the transcription profile of serotonin receptor-2B (5-HTR2B) and TPH1 in human osteoclastogenesis and the impact of blocking serotonin biosynthesis using a chemical inhibitor of TPH1.
**Methods:** Human osteoclasts were generated from umbilical cord blood. CFU-GM–derived OC precursors were cultured in serotonin-depleted media containing RANKL and M-CSF for up to 21 days. Gene transcription of 5-HTR2B and TPH1 was assessed by real-time PCR. In addition, OC precursors were cultured on dentine slices in the presence of TPH1 inhibitor (LP533401-HCl); n=4 slices per treatment. Data from a representative experiment were analysed using one-way ANOVA and Tukey's Pairwise Comparisons.
**Results:** Multinucleated OCs were observed from day-6 of culture. Transcription of both 5-HTR2B and TPH1 peaked at day-14 (>7404-fold and >3.6-fold, respectively) and dropped to baseline levels by day-18. Co-treatment with LP533401-HCl dose-dependently decreased OC number and resorption, with maximum reductions of 59.7% (p=0.0001) and 40.9% (p=0.003), respectively, at 10 mM, whereas OC size dramatically increased (+135.4%; p=0.0001).
**Conclusion:** These data indicate that human OCs express serotonin receptor 2B and possess the ability to synthesise serotonin. The observed increase in OC fusion and reduction in resorption following chemical blockade of TPH1 point to a possible autocrine regulatory role for serotonin within the bone microenvironment.

## P986

## HIGH ANTIBODY TITERS TO CYCLIC CITRULLINATED VIMENTIN PROMOTE THE DEVELOPMENT OF PERIARTICULAR OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Evaluation of the effect of antibodies to cyclic citrullinated vimentin (anti-MCV) on the risk of osteoporosis in patients with rheumatoid arthritis (RA).
**Methods:** 57 RA patients were examined (mean age 50.5 ±10.1 y). The patients with the developed stage of the disease (47.4%) prevailed, the average activity (DAS28=3.2-5.1) of the pathological process (86%); with the second radiographic stage (42%) and functional class 2 (77%). Osteodensitometry was performed on a X-ray densitometer Lunar DPX, GE (USA). In accordance with the WHO recommendations, the assessment of the bone tissue of the proximal femur condition was carried out according to the T-criterion, the decrease of which from –1.0 to –2.5 was regarded as osteopenia, a value below –2.5 was considered as a diagnostic sign of osteoporosis. IgM-rheumatoid factor (IgM-RF) was determined using the latex agglutination method (normal up to 20 IU/ml) and antibodies to cyclic citrullinated vimentin (anti-MCV) (normal up to 20 U/ml) using ELISA test.
**Results:** 61.4% of RA patients were positive for anti-MCV. Rheumatoid factor (RF) was determined in the blood in 47.3% of patients with RA. A positive correlation was found between anti-MCV and disease activity (r=0.48), as well as a negative correlation between increased diagnostic anti-MCV titers and low T-criterion (r=– 0.673). In the subgroup of patients with RA with a high content of anti-MCV (with values >65 units/ml), a significantly more pronounced decrease in BMD was observed according to the results of the T-criterion (p=0.026) and high disease activity (p=0.047). Anti-MCV are able to induce the differentiation and activation of osteoclasts. It can lead to decrease in the mineral density of the periarticular bone and increase the risk of fractures in patients with RA. The average titers of anti-MCV (67.6±42.5 U/ml) in RA patients with osteopenia were lower than in the group of RA patients with osteoporosis (102.8±74.0 U/ml) (p=0.09). No significant relationship was found between the T-criterion and age, the presence of RF and the duration of RA (p>0.1).
**Conclusions:** All anti-MCV-positive patients with RA (especially with high antibody titers) should be examined for signs of osteoporosis.

## P987

## ASSOCIATION BETWEEN SEVERITY OF ANKLE FRACTURE, BMI AND OSTEOPOROSIS

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**Objective:** Ankle fractures are among the most prevalent fractures in patients over 50 y, and the prevalence is rising [1]. Ankle fractures have not been considered to be related to osteoporosis, however some studies suggest otherwise [2, 3]. Some studies observe that low energy ankle fractures predict future fractures at other sites. King et al [4] concluded that osteoporosis/osteopenia was not associated with severity of ankle fracture using the Weber classification. Our aim was to investigate if patients with ankle fracture are more likely to have osteoporosis than controls, and to see if the severity of ankle fracture is correlated to osteoporosis or BMI.

**Methods:** 105 consecutive patients over the age of 40 with acute ankle fracture involving the lateral malleolus were included in this case-control study. BMD of the hips and spine was measured and history of previous fracture, comorbidities, medication, physical activity, smoking habits, BMI and nutritional factors were registered.

**Results:**

Table 1

| | Ankle fracture | Weber A | Weber B | Weber C | Controls |
|---|---|---|---|---|---|
| N | 105 | 18 | 70 | 17 | 197 |
| Age mean | 57.1 (SD[1] 9.9) | 56.0 (SD 8.9) | 57.0 (SD 9.8) | 58.2 (SD 12.1) | 60.3 (SD 10.6) |
| Gender | | | | | |
| Female | 69.2% * | 55.0% ** | 75.7% | 58.8% * | 82.7% |
| Male | 30.8% | 45.0% | 24.3% | 41.2% | 17.3% |
| BMD[2] (DXA[3]) | | | | | |
| Osteoporosis[4] | 23.4% | 38.8% * | 22.8% | 5.8% | 22.3% |
| Osteopenia[5] | 47.7% | 44.4% | 34.2% | 41.1% | 51.8% |
| Normal BMD[6] | 29.9% | 16.6% | 42.8% | 52.9% | 25.9% |
| BMI[7] (kg/m$^2$) | | | | | |
| Mean | 28.6 (SD 4.9) * | 25.8 (SD 3.4) | 28.8 (SD 4.8) * | 30.7 (SD 5.7) * | 27.3 (SD 5.2) |
| Overweight[8] | 39.2% | 11.1% | 37.1% | 41.1% | 35.6% |
| Obesity[9] | 33.6% | 44.4% | 37.1% * | 47.0% * | 25.1% |

[1]Standard deviation [2]BMD [3] DXA of hips and spine
[4] T-score ≤ -2,5 [5]T-score -1.0 - -2.5 [6]T-score ≥ -1.0
[7]BMI body mass index
BMI categories according to The International Classification of adult overweight and obesity:
[8]BMI 25-29.55 [9]BMI ≥30.0
p values are presented as: * < 0.05 ** < 0.01

**Conclusions:** The prevalence of osteoporosis was 23.4% in patients with ankle fracture. The OR for ankle fracture was not significantly higher among those with osteoporosis (OR 1.5, p=0.3). Osteoporosis or osteopenia adjusted for age, gender and BMI was not a risk factor for increasing severity of the ankle fracture, but being overweight or obese significantly increased the risk of sustaining a more complex fracture (Weber B or C).

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## P988

## CLINICAL CASE OF A NONVISUAL GIANT PARATHYROID ADENOMA

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Solitary parathyroid adenomas are the leading cause of primary hyperparathyroidism in 0% to 85% of cases. The presentation of a parathyroid adenoma in a supernumerary gland is a challenge for the surgeon. The high sensitivity having different imaging techniques has been a key to locate preoperatively the pathological parathyroid gland. The purpose of this article is to present the diagnostic and therapeutic approach used for a 68-year-old female patient with non-visual ectopic location gland using MIBI scintigraphy with 99mTechnetium.

A 68-year-old female was admitted to our Centre with the diagnosis of primary hyperparathyroidism. The patient suffered from typical symptoms of hypercalcemia such as weakness, osteoporosis and recurrent nephrolithiasis. Primary hyperparathyroidism was confirmed based on the patient's biochemical profile, which showed increased levels of serum calcium ($Ca^{2+}$ 1.43 mmol/L (1.03-1.29), Ca 2.94 mmol/L (2.10-2.55)); the PTH level was 277 pg/mL (15-65). Ultrasonography revealed a nodule at the superior pole of the left lobe of the thyroid gland, 9x6x3 mm in size and a large nodule with cystic component at the inferior pole of the right lobe of the thyroid gland, 37x28x28 mm in size (that was diagnosed as thyroid nodule). MIBI scintigraphy with 99mTechnetium showed positivity at the superior pole of the left lobe of the thyroid gland. Intraoperatively, a superior left parathyroid adenoma was found and excised. Further, during revision at the lower pole of the right lobe on the spine, partly extending beyond the sternum was determined by a giant parathyroid adenoma, 55x35x30 mm in size, without connection with the thyroid gland. Additionally, levels of intact PTH were determined intraoperatively and a reduction was found, 20 min after the removal of the adenoma. After the excision, the levels of serum calcium and PTH were normalized. Histopathology: the tissue of the parathyroid gland with a usual histological structure and a parathyroid adenoma with cystic degeneration.

**Conclusion:** This is a rare case of a giant nonvisual ectopic location parathyroid adenoma. All of the ectopic location nodules with cystic degeneration should be fine-needle aspiration washout on PTH in primary hyperparathyroidism.

## P989

## EFFECTS OF EXERCISE WITH AND WITHOUT A MULTINUTRIENT FORTIFED DAIRY PRODUCT ON MARKERS OF BONE AND CARTILAGE METABOLISM IN SEDENTARY MIDDLE AGED WOMEN: SECONDARY ANALYSIS OF A 4-MONTH DOUBLE-BLIND, PLACEBO CONTROLLED, RANDOMIZED TRIAL

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**Objective:** To investigate the effects of exercise with and without a multinutrient fortified dairy product (FDP) on markers of bone turnover and cartilage metabolism in sedentary middle-aged women.
**Methods:** In this secondary analysis of a 4-month double-blind, placebo RCT, 244 sedentary women (45-65 y) participated in a multicomponent exercise (Ex) program including high-velocity resistance and challenging balance training 3 d/week with random allocation to twice daily low fat FDP (2x150 ml) with added protein, calcium, vitamin D and other micronutrients or an energy matched placebo. Bone turnover was assessed via plasma C-terminal crosslinking telopeptide of type I collagen (β-CTX) and plasma procollagen type I N-terminal peptide (PINP). Urinary levels of C-terminal crosslinked telopeptide type II collagen (CTX-II) were assessed as a marker of cartilage turnover. Serum intact PTH and serum 25-hydroxyvitamin D [25(OH)D] were also evaluated.
**Results:** A total of 216 women (89%) completed the study. Adherence was 90% and 92% for FDP and placebo, respectively, and 78-79% for Ex. Mean baseline calcium intake was 808 mg/d and serum 25(OH)D was 63 nmol/L in all women. After 4 months, mean serum 25(OH)D increased in FDP (+9 nmol/L) and decreased in placebo (-12 nmol/L) (interaction, $P<0.001$). There was also a significant between group difference for the change in serum PTH (11%, $P<0.01$), due to a decrease in placebo. For both β-CTx and PINP there was a significant net 16% and 17% reduction in FDP compared to placebo (interaction, both $P<0.001$). In contrast, there were no changes in urinary CTX-II in either group after 4 months.
**Conclusion:** Daily consumption of a multi-nutrient fortified dairy product with exercise training for 4 months was associated with a reduction in bone turnover markers, but no change in cartilage metabolism, in middle-aged sedentary women, when compared to exercise alone.
**Disclosures:** L.S. and C.G. are employees of Fonterra Co-operative Group Ltd. This study was funded by a Primary Growth Partnership grant via the Ministry of Primary Industries in New Zealand with Fonterra Co-operative Group Ltd.

## P990
## ABNORMAL BONE STRUCTURE, MECHANICAL PROPERTIES AND COMPOSITION ARE ASSOCIATED WITH IMPAIRED BONE QUALITY & QUANTITY IN PATIENTS OF T2DM COMPARE TO NONDIABETIC OSTEOPOROTIC INDIVIDUALS

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**Objective:** Individuals with T2DM are predisposed for increased bone fragility compared to nondiabetic individuals, despite comparable or higher areal BMD. Accumulation of advance glycation endproducts into the bone alters the intrinsic material properties and structural integrity of bone tissue and leads to impaired bone quality and composition. Our aim was to compare the bone quality (bone mechanical properties) and structural parameters in bone tissue of diabetic (DM) and nondiabetic (NDM) osteoporosis patients.
**Methods:** Trabecular bone quality, structure parameters and composition of NDM (n=30) and DM (n=15) individuals with osteoporosis are compared in patients undergoing total hip replacement surgery. Age, serum calcium, phosphorus, alkaline phosphatase, PTH, 25(OH)D and BMD are comparable between groups. Values are expressed in mean (SD).
**Results:** Structural parameters (μ-CT) shows the low values of BV/TV (NDM: 23.15±6.49; DM 18.23±5.89, p=0.019), Tb. Th (mm) (NDM: 0.173±0.028; DM 0.153±0.028, p=0.043) and Tb. N (1/mm) (NDM: 1.46±0.35; DM 1.16 ±0.27, p=0.007) in DM group compare to NDM group. However, there is significantly increase in Tb.Sp (mm) (NDM: 0.548±0.145; DM 0.773±0.306, p=0.029) and Structural Model Index (NDM: 0.95±1.57; DM 1.79±0.93, p=0.04) in DM individuals. Tissue mechanical properties shows significant reduction in modulus, yield stress and ultimate stress (NDM: 424.05±139.74; DM 265.45±114.92, p=0.018), (NDM: 6.68±3.20; DM 4.12±2.13, p=0.004) and (NDM: 8.54±3.88; DM 5.28±2.82, p=0.004) respectively in DM group. Nanoindentation finding suggest that modulus and hardness (NDM: 9.347±0.403; DM 8.001±0.482, p=0.04) and (NDM: 0.498±0.045; DM 0.297±0.029, p=0.01) are respectively reduced in DM group as compared to NDM. Mean mineral crystal size (PXRD) shows low mean crystal length (NDM: 22.195±0.343; DM 21.705±0.494, p=0.421) and increase in mean crystal width (NDM: 6.009±0.168; DM 7.225 ±0.307, p=0.003) in DM group. On macromolecular vibrations (FTIR) protein structure was comparable between groups; however protein content was significantly low in T2DM individuals.

**Conclusion:** The T2DM alters the bone ultrastructural arrangement, material properties, volume fraction and finally the overall bone strength. In this study, we have investigated the wide range of DM bone quality parameters and the possible mechanism is explored to understand the DM bone quality degradation.

## P991

## THREE YEARS PERSISTENCE WITH DENOSUMAB AS OSTEOPOROSIS THERAPY IN A LARGE HEALTHCARE ORGANIZATION IN ISRAEL

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**Objectives:** To assess the long term persistence for 12-36 months with denosumab in a large, unselected population using validated clinical patient data including dispenses.
**Methods:** This retrospective study utilized the computerized database of Maccabi healthcare services, a payer-provider insuring over 2 million individuals in Israel. Data were collected for new denosumab initiators from January 2012 to June 2016 with at least two dispenses, followed until December 31, 2017 for 12-36 months. We excluded patients with malignancies, chronic kidney disease, previous anabolic therapy and chronic glucocorticoid treatment. Discontinuation was defined as a gap of at least 3 months without filling a new prescription, and persistence ≥70% coverage. The comparison group was new oral bisphosphonates initiators during the same period.
**Results:** A total of 1277 eligible denosumab initiators were identified, 96% of which were women, with a mean age of 70.8±8.8 years old. Most of the patients (78%) had 2 y of follow-up, and 43% had three years**.** A total of 86.8% of them received a second denosumab injection in the first year, almost 2-fold compared with 48.2% persistence with oral bisphosphonates. After two years, denosumab persistence rates decreased to 64.4%, still significantly higher than oral bisphosphonates (39.6%). However, in the third year of follow-up denosumab persistence rates dropped to 38.4%, similar to oral bisphosphonates persistence with 32.7% in the third year.
**Conclusions:** In this real-world, population-based study, patients treated with denosumab exhibited excellent persistence in the first year, which dramatically deteriorated in the third year of follow-up. Further research is needed to explore the barriers for long term persistence with denosumab, and assistive tools may be in order to help physicians and patients in maintaining treatment continuity after the first and second years of treatment.
**Disclosures:** The study was funded by Medison pharma. The funders had no role in study design, data collection and analysis, or the preparation of this abstract.

## P992

## EFFECT OF DYSLIPIDEMIA ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH METABOLIC SYNDROME

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**Objective:** One of the important medical problems in postmenopausal women, along with cardiovascular diseases include osteoporosis, which contribute to a significant decrease in quality and life expectancy due to the development of complications: cardiovascular catastrophes in the first case and fractures in the other. The analysis of the literature reveals contradictory data on the relationship between the level of lipids and the bone tissue. The aim of this study was to determine relationship between serum level of lipids and BMD in postmenopausal women with obesity and (MS) metabolic syndrome.
**Methods:** 333 women aged 50-79 years old (mean duration of menopause period – 12.38±8.05 y) were examined and shared into three groups of 111 women in the same age (62.19±7.57 y) and height (1.60±0.04 sm): A - group included female without obesity (BMI ≤29.9 kg/m$^2$), B – women with obesity (BMI >29.9 kg/m$^2$) and **C** – female with MS (diagnosis according to IDF criteria, 2005). It was used DXA (Prodigy, GE Medical systems, Lunar, Madison, WI, USA, 2005) for measuring of lumbar spine (L1-L4), femoral neck, total body and forearm BMD and bone quality indexes (last according to Med-Imaps installation). Data were analyzed using Statistical Package 6.0.
**Results:** A significant higher BMD of all examined sites was found in women with obesity and MS ($p<0.001$) compared to A group ones. Analysis showed that waist circumference has significant negative correlation with HDL serum level and positive correlation with BMD of lumbar spine and femur. Significant negative association between waist circumference and cholesterol and LDL serum levels in female without obesity were present. It was established negative correlation between serum HDL level and BMD of lumbar spine (L1-L4) and ultradistal radius BMD. The TBS (L1-L4) indexes positively correlated with HDL level and negatively with triglycerides serum level in patients of **A** group.
**Conclusion:** Menopausal women with obesity and metabolic syndrome have a significantly higher BMD at all measured sites compared to females without obesity. There is a link between the state of BMD and lipid metabolism in the postmenopausal period, which is more pronounced in women without obesity.

## P993

## THE ROLE OF CORRECTION OF BIOMECHANICAL DISORDERS IN THE TREATMENT OF CERVICOGENIC HEADACHE

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**Objective:** Determine the effectiveness of training on the stabilometric platform in the correction of clinical signs of cervicogenic headache .
**Methods:** 64 patients with cervicogenic headache (CH) were examined. CH was diagnosed using criteria of ICHD-3 and the author's questionnaire developed by us for this research. The average age is 31.7±3.4 y. Patients are divided into two groups. The first group: pharmacotherapy+physiotherapy. The second group: pharmacotherapy+stabilometric platforms training. The clinical neurological examination was performed. Biomechanical parameters (biauricular, biacromial lines) were assessed by visual-optical analysis (VOA). Stabilometric parameters were studied: the statokinesiogram area, displacement of the center of pressure, energy spent.
**Results:** The method of correction of biomechanical disorders in CH based on the principle of biological feedback has been developed and tested. After treatment: 62.5% of patients relapse of CH occurred a month later after pharmacological treatment, 43.8% - after pharmacological treatment and treatment on the stabilometric platform ($p<0.05$). The parameter 'statokinesiogram area': the best dynamics of return to the norm of the second group was 105±10.2 $mm^2$, while in the first only 148±10.4 $mm^2$. The degree of displacement of the center of pressure in the first group decreased by 13.7%, in the second group by 46.3%. The parameter 'energy spent' demonstrated the same direction of the changes and made a decrease in the first group of 18.4%, while in the second group it was 29.6%. Analysis VOA showed a significant approximation of the degree of deviation of biauricular, biacromial lines to the norm o in the second group of participants.
**Conclusions:** The use of the biofeedback method on the stabilometric platform for the correction of biomechanical disorders improves the results of treatment of CH. Correcting the general biomechanics, we correct the biomechanics of the cervical spine.

## P994
## INCIDENT FRACTURES UNDER ORAL BISPHOSPHONATES TREATMENT IN A LARGE HEALTHCARE ORGANIZATION IN ISRAEL

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**Objectives:** To characterize and estimate the proportion of patients with incident fractures despite high adherence to oral bisphosphonates, in a real-world setting.
**Methods:** This retrospective study utilized the computerized database of Maccabi healthcare services, a payer-provider insuring over 2 million individuals in Israel. Data were collected from January 1998 to December 2017 for primary prevention patients treated with oral bisphosphonates with high adherence during at least 3 y. A fracture event was considered as under treatment if it occurred following at least 3 y of adherent treatment (≥70% coverage) with oral bisphosphonates and within one year after treatment cessation. We excluded patients with chronic kidney disease, previous anabolic therapy and chronic glucocorticoid treatment.
**Results:** Out of 27,009 primary prevention patients treated with oral bisphosphonates for at least 3 y with adherence ≥70%, 3105 (11.5%) sustained a first fracture under treatment. Among those patients with fracture, 95.3% were women, with a mean age of 72.1 years old (SD=9). Most of these patients had a nonhip nonvertebral fracture (53.5%), 26.2% vertebral, and 19.8% hip. Among patients with T-score measurements before this fracture under treatment (n=1347), 57.7% had osteopenia and 35.6% had osteoporosis.
**Conclusions:** Despite high adherence to oral bisphosphonates 11.5% of patients sustain incident fractures. Further studies are required to identify as early as possible which patients will benefit from alternate treatment to minimize their risk.
**Disclosures:** The study was funded by Medison pharma. The funders had no role in study design, data collection and analysis, or the preparation of this abstract.

## P995
## AGE EFFECTS OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS IN RHEUMATOID ARTHRITIS

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**Objective:** It is well known that age, glucocorticoid intake and activity of the rheumatoid process are the main factors affecting the state of bone tissue, bone metabolism and the rate of bone loss. The aim of the study is to determine the structural and functional state of bone tissue in patients of different ages suffering from rheumatoid arthritis, who have been taking glucocorotics for a long time.
**Methods:** There were 223 patients with rheumatoid arthritis who took glucocorticoids under observation. Patients were divided into groups according to their age: young (20-44 y) - 75 patients (33.6%), middle-aged (45-59 y) - 79 (35.4%), and elderly (60-74 y) - 69 (30.9%) patients. The drug of choice was prednisone. The receiving of glucocorticoids period ranged from 6 months to 23 y, with an average of 4.7±2.9 y. The dose varied for each patient from 2.5 mg/d to 40 mg/d depending on the degree of disease activity. To assess the impact of the time period of glucocorticoid therapy on the state of bone tissue, 237 patients with rheumatoid arthritis who did not take glucocorticoid were examined. Evaluation of bone tissue and the presence of osteoporosis was performed using DXA using a Hologic Discovery apparatus. The history of bone fractures was also evaluated. Spinal radiography was performed in lateral projection to visualize possible spinal deformities.

**Results:** Studies have proved significant changes in the state of bone tissue when taking glucocorticoids. The age of patients is an important factor in determining the rate of bone loss and the formation of glucocorticoid-induced osteoporosis. Systemic glucocorticoid therapy causes the development of osteoporosis and osteopenic syndrome in patients. Thus, the osteopenic syndrome was diagnosed in 45.74% of patients, and osteoporosis in 59.67% of patients who have continuously taken glucocorticoids for more than 1 y. The most significant changes in bone tissue were found in the age group of 20-44 y. Systemic administration of glucocorticoids led to the formation of osteoporosis in 45.2% of patients in that age group.

**Conclusion:** The young patients' bone tissue damage characteristics caused by systemic glucocorticoid therapy should be taken into account when planning preventive measures in case of long-term hormonal therapy.

## P996

## ASSOCIATION OF BONE METABOLISM GENE VARIANTS WITH BONE MINERAL DENSITY IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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**Objective:** Postmenopausal osteoporosis (PMO) is a common, multifactorial disease with a pronounced genetic predisposition. This skeletal disease is characterized by loss of BMD with increased susceptibility to fractures. The aim of this study was to evaluate the association of genes, involved in bone metabolism, with the BMD level in patients with PMO.

**Methods:** A total of 123 women with severe PMO (age 64.0 ±3.2, spine BMD 0.851±0.121 g/cm$^2$; femur neck BMD 0.762±0.134 g/cm$^2$) were genotyped for *SOST* (sclerostin, rs1234612), *PTH* (rs7125774), *MTHFR* (methylenetetrahydrofolate, rs1801131, rs1801133), *MTR* (methyltransferase, rs1805087), *MTRR* (methyltransferase reductase, rs1801394), *RANKL* (rs9594738, rs9594759) genes using PCR analysis. BMD was measured by DXA. Significance was assessed using $\chi^2$ test. The differences were considered significant at P<0.05.

**Results:** We found a statistically significant association of the average spine BMD level with *SOST, PTH, MTHFR* rs1801133, and *RANKL* rs9594759 genes (P<0.05) and analogical tendency for *MTRR* rs1801394 (P=0.059, Table 1). It is important that for rs1801133, the average spine BMD level in the careers of unfavorable homozygous variants was lower compared to alternative genotypes, heterozygotes had intermediate BMD level.

Table 1. The association study of bone metabolism markers with spine BMD level

| Gene variants | Genotype | n | Spine BMD, g/cm$^2$ | *P* | Model |
|---|---|---|---|---|---|
| rs1234612 | T/T | 61 | 0.823±0.022 | **0.049** | dominant |
| | C/T+C/C | 61 | 0.877±0.019 | | |
| rs7125774 | T/T | 55 | 0.816±0.023 | **0.03** | dominant |
| | C/T+C/C | 68 | 0.877±0.018 | | |
| rs1801133 | C/C | 53 | 0.883±0.019 | **0.044** | |
| | C/T | 58 | 0.839±0.022 | | |
| | T/T | 12 | 0.767±0.032 | | |
| rs1801394 | G/G+A/G | 78 | 0.916±0.035 | 0.059 | recessive |
| | A/A | 45 | 0.811±0.032 | | |
| rs9594759 | T/T | 68 | 0.814±0.021 | **0.049** | dominant |
| | C/T+C/C | 55 | 0.868±0.020 | | |

**Conclusion:** Our findings highlight the importance of gene polymorphisms analysis to reveal the genetic mechanisms, determining decrease of BMD and fracture risk. Complex screening of these markers can be used to implement personalized prevention, treatment and rehabilitation programs.

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## P997

## OSTEOPOROSIS (OP) DIAGNOSIS AND TREATMENT OF WOMEN AGED ≥70 YEARS IN PRIMARY CARE: RESULTS FROM A LARGE EUROPEAN CROSS-SECTIONAL STUDY

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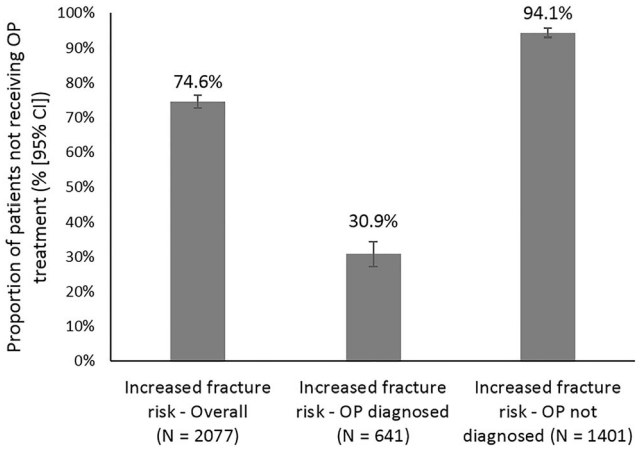
**Objective**: To assess patterns of real-world OP diagnosis and medical treatment in European primary care.

**Methods**: Eligible patients were community-dwelling women aged ≥70 who visited their primary care physician for any reason and provided consent. Patient demographics, treatment history and clinical risk factors were collected via self-reported questionnaires and medical records. The primary objective was to assess the proportion of women aged ≥70 y at increased risk of fragility fracture and not receiving OP medication. Increased risk of fragility fracture was defined as at least one of (1) history of fracture, (2) 10-y probability of both hip and major OP fracture above country-specific FRAX thresholds, (3) T-score ≤ -2.5.

**Results**: 3798 patients (median age 77 y) were enrolled between Mar-Oct 2018 from 8 countries (Belgium, France, Germany, Ireland, Poland, Slovakia, Switzerland, UK). Visits were mainly for existing conditions (follow-up for known disease 52.1%, medication refill 20.6%, new symptoms 21.7%). Prevalence of FRAX risk factors ranged from 1% (alcohol ≥3 units/d) to 32%

(prior fracture). 2077 women (54.7%, median age 80 y) were determined to be at increased fracture risk, but only 30.9% of these had a recorded diagnosis of OP. For the primary outcome, 74.6% (95%CI: 72.7-76.5%) of women at increased risk of fragility fracture were not receiving any OP medication; this treatment gap was much lower in those with a recorded diagnosis of OP than in those without a recorded diagnosis (Figure). A small proportion of patients who did not meet the definition of increased risk for fragility fracture were diagnosed with OP (9.5%).
**Conclusions**: This real-world study of OP management in European primary care found that three-quarters of women aged ≥70 y at increased risk of fragility fracture were medically untreated for OP. Insufficient OP diagnosis appears to be an important barrier to treatment; future strategies need to increase awareness and facilitate the diagnosis of increased fracture risk to improve primary care management of OP.

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## P998
## BURDEN OF FRAGILITY FRACTURES IN 6 EUROPEAN COUNTRIES

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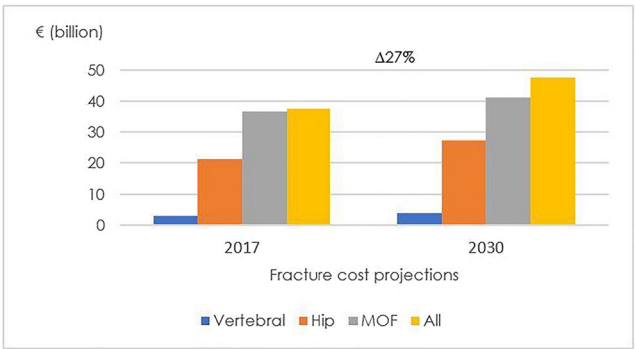
**Objectives**: To estimate current and projected societal burden related to fragility fracture in France, Germany, Italy, Spain, Sweden and the UK (EU6).
**Methods:** A previously published model used to estimate the burden of osteoporosis in Europe was updated to reflect the most recent data. The model estimates the annual burden-related fragility fractures where the health impact is measured using Quality Adjusted Life Years (QALYs). Fracture-related costs, risks and mortality after fracture in each country were retrieved from the literature. Quality of life values for the general population were combined with fracture-related disutility multipliers to estimate the total QALY loss in each country. Burden projections up to 2030 were based on projected demographic changes.
**Results:** The total monetary cost in EU6 was estimated at €37.5 billion in 2017 and projected to increase to €47.4 billion in year 2030. On a per capita basis, Sweden (€199) ranked first and the UK (€79) last. The total health burden in 2017 was estimated at 1.0 million QALYs and is expected to increase by 25.6% in the year 2030. On a per capita basis, Sweden had the largest burden (4.22 QALYs per 1 000) and France the lowest (2.11 per 1 000).
**Conclusions:** The societal burden related to fragility fractures is high and is expected to increase by more than 25% by 2030.

*Figure: Estimated annual fracture-related costs in EU6 (billion euro) by fracture site in 2017 and 2030*




## P999
## HEALTH LITERACY AND APPROPRIATE USE OF CALCIUM SUPPLEMENTS IN A POPULATION-BASED SAMPLE OF AUSTRALIAN WOMEN

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**Objectives:** Low health literacy is associated with inadequate dietary calcium in women. We investigated

associations between health literacy and appropriate use of calcium supplements in Australian women.

**Methods:** Data were utilised from women (n=652, median age 59.3 y [range 29-92 y]) participating in the Geelong Osteoporosis Study (GOS), a population-based cohort in south-eastern Australia. Health literacy was ascertained using the Health Literacy Questionnaire (HLQ), a multidimensional tool that generates scores across nine scales. Dietary calcium intake was ascertained using the Food Frequency Questionnaire, developed by the Victorian Cancer Council, and categorised as sufficient/insufficient using age specific estimated average requirements. Calcium supplementation was self-reported and defined as appropriate if used where dietary intake was insufficient or not used where dietary intake was sufficient. One-way analysis of variance (ANOVA) and Cohen's d effect sizes (ES [95%CI]) (categorised; small >0.2-0.5, moderate >0.5-0.8, large >0.8) were calculated for differences in mean HLQ scale scores between participants who did vs. did not self-report taking supplements.

**Results:** Among participants, 395 (60.6%) had insufficient dietary calcium but did not take a calcium supplement. A further 21 (3.2%) of women with adequate dietary intake also used calcium supplements. Women with inadequate dietary calcium who did not take supplements demonstrated lower mean scores for the HLQ scale 'Ability to find good health information' compared to other participants (mean 4.1 SD0.6 vs. mean 4.2 SD0.5; *p*-value <0.01). Small effect sizes were also observed for this scale (ES 0.20 [95%CI 0.04, 0.36]). No differences in HLQ scores were seen for the remaining scales or for women overusing calcium supplements.

**Conclusions:** These data suggest, for women with inadequate dietary calcium, targeted information regarding calcium supplementation needs to be made accessible.

## P1000

## STRONTIUM TREATMENT HAS SYNERGISTIC EFFECTS WITH PTH AS EVALUATED IN OVX RATS

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Most of the antifracture efficacy of strontium treatment is related to an improvement of bone material level properties. Strontium is also known to stimulate bone formation during skeletal growth and bone healing process. An obvious question is to understand if strontium could improve bone material level properties under PTH treatment and influence the PTH stimulating effect on bone formation.

The aims of this study are to evaluate whether the association of strontium with PTH can be synergistic influencing both bone tissue quality and the bone formation induced by PTH. OVX rats were treated with strontium ranelate (Strontium, 625 mg/kg day po) alone, with a stimulator of bone formation (PTH 8 μg/kg*day SC) with or without strontium ranelate. Five groups of 12 rats (SHAM, OVX, Strontium, PTH, PTH+Strontium) received treatments or respective vehicles for 8 weeks. At the end of the experiment, vertebrae and tibia were removed for biomechanics, microCT and nanoindentation testing. Values are mean±SEM. Significant of differences are evaluated by ANOVA (*vs. OVX, #vs. Strontium and °vs. PTH)

| | SHAM | OVX | Strontium | PTH | PTH+ Strontium |
|---|---|---|---|---|---|
| Bone strength (N) | 322.97 ±32.91*° | 240.03 ±14.93° | 254.91 ±15.03° | 405.70 ±20.55*# | 473.55 ±22.88*#° |
| Nano-hardness (mPa) | 389.45 ±12.9° | 369.57 ±15.72 | 400.67 ±12.48*° | 344.79 ±13.58# | 418.54 ±12.77*° |
| Trabecular thickness (mm) | 0.098 ±0.001*° | 0.090 ±0.002° | 0.097 ±0.002*° | 0.129 ±0.003*# | 0.135 ±0.002*#° |
| Cortical volume ($mm^3$) | 5.425 ±0.115° | 5.455 ±0.363° | 5.708 ±0.147° | 6.198 ±0.118*# | 6.591 ±0.199*#° |

PTH but not strontium, fully prevents the deleterious effect of OVX on bone strength; values obtained under PTH are significantly higher as compared to SHAM. Combined therapy with strontium resulted in a further significant increase of bone strength as compared with PTH treatment alone. The addition of strontium improved intrinsic bone tissue quality in PTH+Strontium treated rats and corrected the impaired intrinsic tissue quality observed under PTH treatment. Furthermore, the addition of strontium to PTH resulted in a significant increment of trabecular thickness and tibia cortical volume as compared to PTH alone; reflecting its positive influence on bone formation induced by PTH.

Together, these data suggest that strontium treatment maximizes the in vivo effect of PTH by improving the intrinsic bone tissue quality of the new formed bone and by a synergistic effect on bone formation.

## P1001

## SERUM IRISIN LEVEL FORECASTS OSTEOPOROTIC FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objectives:** It is known that increased irisin (IR) level is associated with in osteoporotic fractures in postmenopausal osteoporosis regardless of BMD. IR can protect osteocytes from apoptosis, promote differentiation of osteoblasts, induce the expression of a key regulator of bone remodeling in vivo –

sclerostin. Our aim was to study the serum IR level in rheumatoid arthritis (RA) patients with OP.

**Methods:** Our study included 170 patients: 110 RA patients (mean age 53.58±12.32; hereinafter M±SD) and 60 healthy controls. All RA patients were examined using DXA using Lunar DPX-Pro densitometer. All patients underwent the complex clinical and laboratory examination using standard methods. Serum IR level was measured by indirect solid-phase enzyme immunoassay using the commercial test system Irisin ELISA (BioVender, Cat No. RAG018R) according to the instructions attached to the kit. Eight people out of 110 patients with RA had fractures over the next 3 y and 6 months.

**Results:** We revealed that mean concentration of IR in RA group was 14.48±7.07 ug/ml, which was significantly lower than of healthy controls - 20.49±4.82 ug/ml ($p<0.001$). We divided the RA patients into two groups: the first group (n=44) included patients with reduced serum IR levels (<10.85 ug/mL), the second group (n=66) consisted of patients with normal IR level (>10.85 ug/ml). We did not note any significant relationships between serum IR level and BMD at any site and between IR with either lean or fat mass. We did not find any difference of bone turnover markers between the first and the second group. However, in 1st group we revealed lower level of 25(OH)- vitamin D ($p=0.044$). We observed higher incidence of pathological bone fractures in this group too ($p=0.047$).

**Conclusions:** Thus, we noted relationship between decreased serum IR level, 25(OH)-vitamin D concentration and higher incidence of pathological bone fractures in RA patients. We believe that the level of IR serum can be used to predict the occurrence of osteoporotic fractures.

## P1002
## PTH TREATMENT MODULATES CARTILAGE QUALITY

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PTH has demonstrated bone anabolic effects and PTH receptors are present in chondrocytes. By acting on the entire osteochondral plate, PTH could prevent the development of osteoarthritis as suggested by preclinical studies.

The objective of this study is to demonstrate the modulatory effect of systemic PTH administration on cartilage quality and subchondral bone, using an ovariectomized (OVX) mouse model with impaired cartilage quality and subchondral bone loss. PTH was injected at a dose of 80 mg/kg /d for 8 weeks. A bio-indentation test (PIUMA, OPTICS) was performed at both condyles. The elastic modulus (MPA) and the force (mN) were recorded by fixing a depth of indentation that affects the upper third of the cartilage. The cartilage thickness and bone microarchitecture were evaluated by computed tomography (Scanco 40) using an ionic contrast agent (Hexabrix).

| | SHAM (n=6) | OVX (n=5) | OVX+PTH (n=7) |
|---|---|---|---|
| Modulus (MPa) | 3.88±0.32 | 1.77±0.27*° | 4.00±0.45 |
| Force (mN) | 828±25 | 460±37*° | 848±21 |
| Hyalin cartilage (mm) | 0.017±0.001 | 0.022±0.006 | 0.017±0.001 |
| Mineralised cartilage (mm) | 0.047±0.002 | 0.050±0.007 | 0.042±0.003 |
| BV/TV (%) | 32.5±3.0 | 20.1±5.4* | 32.4±4.6 |

* vs. SHAM, ° vs. OVX+PTH (ANOVA)

PTH treatment fully prevented the decrease in modulus and indentation force induced by OVX at the level of the cartilage. Cartilage thickness did not change after OVX or after PTH administration. Administration of PTH prevented OVX induced alteration of the subchondral bone microarchitecture.

Ovariectomy induces an alteration in the cartilage quality (without modifying its mass) and in subchondral bone, both resembling early osteoarthritis. The administration of PTH totally prevents these deleterious effects on the osteochondral plate. PTH treatment could represent a potential therapeutic intervention for osteoarthritis.

## P1003
## THE REFERENCE VALUES OF BONE TURNOVER MARKER PINP, AND THE EFFECT OF CIRCADIAN RHYTHM ON ITS VALUE IN HEALTHY ELDERLY POPULATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** BTMs, as surrogates for bone metabolism, are suggested to be advantageous to assess the fracture risk and also to monitor the treatment response; however, extensive use of BTMs are still limited due to their variability, and uncertain biological significance. Serum type 1 procollagen (PINP) is a marker of bone formation. In this meta-analysis we aimed to determine the reference values of PINP in population aged ≥50 y and also to estimate the effect of circadian rhythm on the values.
**Methods:** A comprehensive search in the international databases including PubMed, EMBASE, Web of Science, Scopus and also google and google scholar was undertaken to find related articles up to October 2018. The search strategy included the keywords as "bone turnover marker" "BTMS" "PINP" "procollagen type I N-terminal peptide " for the reference values and "circadian rhythm/s" "twenty-four hour rhythm/s" "nyctohemeral rhythm/s" "diurnal rhythms" for the effect of circadian on the values of PINP. The random effects model was used to report the results at 95%CI. In some studies of diurnal rhythms, the PINP values were not reported for the all measurements; so the numbers corresponding to each measurement were extracted from the reported graphs. All analysis was conducted via Stata 11.
**Results:** In all, 9 studies were included to estimate the mean values of PINP and three studies on 5 different countries were used to identify the effect of circadian rhythms. The pooled mean of PINP concentration in population aged ≥50 y was 42.60 (95%CI: 41.19, 44.01). The reference value of PINP were 37.06 (95%CI: 33.35, 40.78) in men and 44.32 (95%CI: 43.05, 45.60) in women. As Figure 1 shows, there was no significant diurnal rhythms of PINP. It exhibited an early morning peak and lower concentrations during daytime.
**Conclusion:** The results showed no severe variation of PINP, with a peak value in early morning. To identify the role of PINP in the prediction of bone changes, complementary studies are needed.

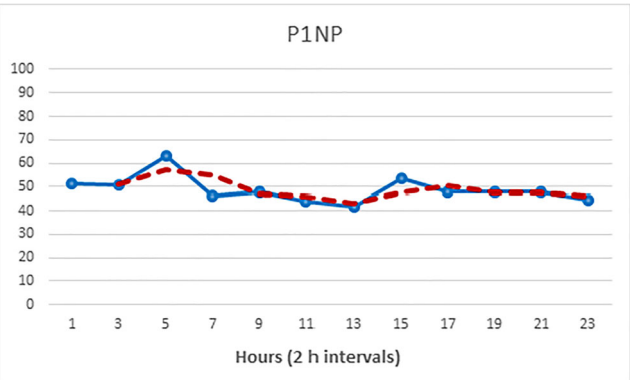


Figure 1: Diurnal time trend of the values of PINP (ng/ml) Solid line shows the real values and dotted line depicts the moving average

## P1004
## OSTEOCALCIN/OXYTOCIN/IL-6 AND NGF/BDNF MRNA LEVELS IN BONE MEDIATE MUSCLE PHENOTYPE DEPENDENT RESPONSE TO COLD STRESS CHALLENGE IN MICE

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Oxytocin (Oxt), osteocalcin (Ost) and NGF/BDNF pleiotropic functions on bone, reproduction and cognition. Oxt/Ost are required for muscle regeneration. Here, we explored the signaling regulating bone and muscle response to cold stress (CS). The mRNA levels of *Ngf, Bdnf, Ost, Oxt* and their receptors (*p75ntr, Ntrk1, Ntrk2, Gprc6a*, *Oxtr*), *Ucp1* and *Il-6* in bone, soleus (SOL) and tibialis (TA) muscles from 3 months-old mice exposed to CS were investigated. The expression of different Myosin heavy chain: *Mhc2b* (fast-glycolytic), *Mhc1* (slow-oxidative) were also investigated. Mice (n=15) were divided into: controls maintained at room temperature (RT=23°C), exposed to CS at T=4°C for 6 h and 5 d. CS exposure for 5 d enhanced *Ngf,* but not its receptors, and *Ucp1* genes in bone. *Ucp1* and *Ngf* genes were upregulated by 2- and 1.5-fold respectively in TA after 6 h CS. *Ntrk1* was upregulated by 4- and 22-fold respectively in SOL after 6 h and 5 d CS, while *p75Ntr* was downregulated in both muscles after 6 h CS. *Bdnf* increased by 9.5-fold in bone after 5 d CS while it was not affected in muscle. *Ntrk2* was upregulated after 5 d CS in TA. *Oxt* was upregulated by 5-fold following 5 d CS in bone. *Oxtr* and *Il-6* genes were upregulated respectively by 1- and 1.5-fold after 5 d CS in SOL. *Ost* increased by 16-fold in bone after 5 d while decreases in Sol by 0.9 fold. *Gprc6a* was unaffected. *Mhc2b* was downregulated respectively by 0.96- and 0.88-fold after 6 h and 5 d CS in SOL. *Mhc2a* was significantly downregulated by 0.88-fold after 5 d CS in TA. Our study confirms that *Ngf* and *Ucp1* are activated in bone as well as in muscle. Oxt and Ost are highly expressed in bone. Oxy exerts phenotype-dependent protective effects towards slow-twitch muscle through up-regulation of its receptor. Ost may use BDNF receptor to exert its action in muscle. CS induced a marked shift of SOL toward the slow-twitch phenotype. CS induced a mild shift of the TA toward the fast-twitch phenotype. IL-6 up-regulation in muscle after CS is consistent with the concept of a coordinated axis between bone and muscle.

## P1005
## OBESE, PHYSICALLY INACTIVE POSTMENOPAUSAL WOMEN WITH LOW WALKING SPEED SHOW ACCELERATED PERIPROSTHETIC BONE LOSS IN THE TROCHANTERIC REGIONS OF THE PROXIMAL FEMUR

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**Objective:** Postmenopausal women undergoing cementless total hip replacement (THR) are at an increased risk for late periprosthetic bone resorption. Strain-adaptive bone remodeling is a positive sign of femoral stem osseointegration but inevitably carries well known risks of bone fragility. The bone resorption process has been linked with female sex, aging, low preoperative BMD and mismatched in size between the stem and femoral bone. The latter may occur in aging women due to intramedullary widening of the proximal femur. Periprosthetic bone resorption does not develop in all subjects and the prediction of this adverse event is difficult. Probably there are still unknown patient-related risk factors. At best, these factors could be modifiable. We hypothesized that a patient's impaired functional capacity and low activity level could elicit accelerated periprosthetic bone loss. Our prospective 9-y study delineated the functional recovery and the progress of periprosthetic bone loss in a cohort of postmenopausal women. The subjects had experienced an uncomplicated surgical recovery from cementless THR with stable osseointegrated femoral stems verified on a prior 9-y follow-up with radiostereometric analysis[1].
**Methods:** The cohort consisted of 35 women (mean age, 62 ±8.4 y at the time of surgery), who underwent cementless THR for primary hip osteoarthritis with a proximal hydroxyapatite-coated anatomic femoral stem with ceramic-ceramic bearings. At baseline screening, 43% of the subjects were obese (class 1-3, BMI >30.0), 43% had one or more comorbidities (ASA 3), 55% had Dorr B or Dorr C femur morphology. Based on T-scores of preoperative DXA screening, 31% had normal BMD, 49% had osteopenia, and 11% had osteoporosis. Evaluation of functional recovery included the measurements of walking speed (GAITRite®). According to the recommendation[2], subjects were asked to walk at a self-selected comfortable walking speed along a 10-m walkway. The mean coefficient of variation of the repeated measurements was 4.7%. Aside with registering UCLA activity score, assessment of inter-individual differences in daily walking activity was performed by means of digital pedometers for periods of 14 d at defined periods up to 2 ys. DXA measurement for periprosthetic BMD (Hologic®) was performed for seven Gruen zones of the proximal femur, and the measured precision was 1.5–3.4% depending on the zone. The baseline measurements were before surgery and repeated at 3 months, 6 months, 1 y, 2 y and 9 y. The baseline measurement of periprosthetic BMD was performed within 5 d after surgery.
**Results:** The preoperative walking speed (mean±SD; 1.04 ±0.21 m/s) improved by 29.0% (95%CI 18.9 to 39.0) within 1 y after surgery (1.23±0.22 m/s), but declined again by 9 y (1.01±0.27 m/s). Compared with baseline, periprosthetic BMD decreased by 13.8% (95%CI, 8.4 to 19.2) in the greater trochanteric region (zone 1), by 9.0% (95%CI 3.3 to 14.7) in the lesser trochanteric region (zone 6) and by 40.4% (95%CI, 33.5 to 47.2) in the medial femoral neck region (zone 7) by 9 y. In univariate regression analysis, the measured walking speed at 9 y was a significant predictor of periprosthetic bone loss in the trochanteric regions (zone 1 and 6) and in the medial femoral neck (zone 7). Subsequently, the subjects were divided into two groups based on the median walking speed measured 1 y after surgery (1.25 m/s), representing the time-point of maximal walking speed. The subjects walking at the slower speed (<1.25 m/s) (n=17) had higher BMI ($p<0.001$), less walking steps per day before and after surgery ($p<0.001$), and lower UCLA activity scores preoperatively ($p=0.034$) and at 2 y ($p=0.049$) compared with the subjects with the walking speed of ≥1.25 m/s (n=18). Periprosthetic bone loss started faster in the subjects with low walking speed. At 9 y, the bone loss in the greater trochanteric region was higher (-19.0%, 95%CI -11.6 to -26.4) in the subjects with low walking speed compared with those with higher walking speed (-8.6%, 95%CI -0.7 to -16.4, respectively) ($p=0.048$). The bone loss was greater in the subjects with low walking speed also in the lesser trochanteric region (-15.0%, 95%CI -8.0 to -21.9) compared with those with higher walking speed (-3.0%, 95%CI -11.8 to -3.0) ($p=0.030$). The difference of bone loss in the medial femoral neck was not significant (-44.5% vs. -36.2%).
**Conclusion:** Postmenopausal women with high BMI walked at a slower speed and were physically inactive before and after total hip replacement. They experienced an accelerated loss of periprosthetic bone in the muscle insertion regions of the greater and lesser trochanters of the proximal femur. This result suggests that not only the stress-shielding effect of an osseointegrated hip prosthesis but also a decreased functional loading of the operated hip may contribute to periprosthetic bone loss.
**References:**
[1]Aro E et al. Acta Orthop 2018;89:490.
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## P1006
## COMPARISON OF LUMBAR SPINE BONE MINERAL DENSITY VALUES BY DXA WITH QUANTITATIVE COMPUTED TOMOGRAPHY (QCT): PRELIMINARY RESULTS

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**Objective:** QCT may represent an opportunity for BMD screening in patients performing computed tomography of the abdomen. We retrospectively compared lumbar spine QCT BMD values to BMD by DXA using a retrospective asynchronous calibration of QCT scans.

**Methods:** We retrospectively selected a cohort of 15 subjects that performed a CT of the abdomen for various reasons and a lumbar spine DXA during the previous year. CT exams were performed using a Siemens Somatom Definition AS scanner; DXA exams were performed using an Hologic QDR-Discovery W densitometer. Volumetric BMD (vBMD) were measured from lumbar spine using Mindways QCT Pro software with asynchronous calibration, without the subject present. The analysis included the first three lumbar vertebrae. T-score values were used for DXA diagnosis according to the WHO criteria. For QCT, the American College of Radiology ranges for trabecular spine BMD was used as follows: BMD >120 mg/cm$^3$=normal; 80 mg/cm$^3$ ≥ BMD ≥120 mg/cm$^3$=osteopenia; BMD <80 mg/cm$^3$=osteoporosis.

**Results:** Among the selected patients we included 12 females and 3 males, age 75±10 y (mean±SD). QCT diagnosis was as follows: osteoporosis=8; osteopenia=4; normal status=2. DXA diagnosis was as follows: osteoporosis=5; osteopenia=1; normal status=9. All subjects classified as osteoporotic at DXA were correctly classified at QCT, with the exception of one case in which QCT showed osteopenic values (vBMD=81.42 mg/cm$^3$). In 5 cases DXA was normal but QCT showed vBMD in the range of osteoporosis, and this was due to severe osteoarthrosis at lumbar spine leading to fictitious increase of DXA BMD values.

**Conclusion:** Our preliminary results showed that QCT with asynchronous calibration is able to provide vBMD values that are comparable to that of DXA in osteoporotic patient, thus offering the possibility for opportunistic identification of these subject. In addition, QCT showed the capability to diagnose osteoporosis in subject in which DXA was limited by the presence of osteoarthrosis.

## P1007
## LOW OSTEOCALCIN CONCENTRATION IS ASSOCIATED WITH HIGHER RISK OF TYPE 2 DIABETES IN THE 5-YEAR PROSPECTIVE COHORT ITDIAB

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**Objective:** In vivo mice experiments and human cross-sectional or retrospective studies suggest that bone is an endocrine organ active on energy metabolism through at least one hormone: osteocalcin. Since there was no prospective data, we aimed to assess the association between baseline osteocalcin serum level and the risk of mellitus diabetes.

**Methods:** IT-DIAB is a 5-y single center prospective cohort of men and women followed annually for diabetes onset. Included patients were prediabetic with an elevated FINDRISC, a score risk to predict diabetes and a fasting blood glucose between 1.1-1.26 g/L. At baseline, patients underwent a clinical examination and a morning fast blood withdrawal. Total serum osteocalcin was assessed using ELECSYS-Roche diagnosis kit. Primary endpoint was the onset of diabetes based on abnormal fasting blood glucose >1.26 g/L or positive oral glucose tolerance test. We performed a Cox multivariate survival analysis, a Youden analysis and a quartile analysis to analyze the link between osteocalcin and diabetes onset.

**Results:** Among 365 prediabetic individuals, 297 have been followed-up during 5 y. 103 patients became diabetic. Median time to diabetes onset was 24.7 months [interquartile range 13.1-38.9 months]. Lower total serum osteocalcin was significantly associated with an increased risk of diabetes onset (HR=1.56 per 1SD decrease [95%CI: 1.23–1.98; p<0.005]). This association persists even after adjustment on age, familial history of diabetes, glycated hemoglobin A1c (HbA1c), fasting blood glucose (HR=1.44 [1.13-1.83] p<0.01). The risk was notably increased (HR=2.54 [1.53-4.22] p<0.001) when osteocalcin was below the cutoff value of 0.2 SD (<17.4 ng/mL in men and <18.2 ng/mL in women) by comparison with patients over the cutoff. In addition, low osteocalcin was associated with diabetes onset even when the other classical risk factors (high FINDRISC score, hyperglycemia, family history of diabetes) were absent (HR=3.69 per 1 SD decrease [1.06 – 12.85] p<0.05).

**Conclusion:** We present here a prospective study where low serum osteocalcin in prediabetic patients is strongly associated with an increased risk of mellitus diabetes. We observe that osteocalcin brings an additive value to the usual risk factors of diabetes. Altogether, these data support the osteocalcin function on energy metabolism in humans.

## P1008
## REHABILITATION ENGAGEMENT LEVEL IN PATIENTS WITH OSTEOARTHRITIS

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**Objective:** Kinetotherapy is a nonpharmacological treatment that is recommended in clinical guidelines for the management of osteoarthritis (OA) and should be considered prior to pharmacological interventions. However, the participation levels of the patients in the therapy session are different and could influence the treatment outcomes. The aim of this study was to evaluate the engagement of patients with osteoarthritis in rehabilitation

kinetotherapy programs in clinical practice in the Republic of Moldova.
**Methods:** A structured interviews were conducted with patients with osteoarthritis and were admitted to outpatient rehabilitation facilities associated with a university medical center. By interviewing the patients, this study evaluates their opinion and engagement to kinetotherapy programs. The Hopkins Rehabilitation Engagement Rating Scale (HRERS) was used to measure engagement and was completed by five clinicians. The HRERS items rate the following: the level of attendance at therapy sessions, the attitude expressed by the patient toward his/her therapy, the need for verbal or physical prompts to facilitate initiation or maintenance of engagement within the therapy session, the patient's acknowledgment of the need for therapy, and the patient's level of active participation in the therapy.
**Results:** There were 78 patients enrolled in the study including 49 females (62, 8%), mean age±SD 56.7±14.7 (range 41-74) and the disease duration was 9.9±6.97 (range 2-24) y. Knee pain was present in 68 (87. 1%) of patients, the level of pain according to VAS was 56.7±.11.5 mm. The radiographic characteristics: KL II-41 (52.6%) patients, KL III-29 (37.2%) and the most severe form KLIV - 8 (10.2%) cases. The level of engagement and participation of patients in rehabilitation program varied from: 2 persons who needed clinical intervention to improve the patient's engagement (HRERS <20), 10 persons (12.8%) were "at risk" for greater absenteeism from therapy (score range, 20-25), and 66 patients (84.6%), had the score >25, that could be considered as fully engaged in their rehabilitation therapies. The degree of involvement was strongly dependent on the pain intensity and functional limitations of the knee ($r=0.47$, $p<0.05$). From patient's perspective, the most frequently cited reasons for low engagement level was interference with the patient's work schedule (64.1%), inconvenient sessions appointments (76.9%), and the long way to the rehabilitation center (43.5%).
**Conclusion:** The engagement level in outpatient rehabilitation programs in patients with knee osteoarthritis is high and it is determined by the pain intensity and functional limitation of the joint, also could be negatively influenced by personal and organizational factors.

## P1009
## PREDICTIVE FACTORS FOR FUNCTIONAL DISABILITY IN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS

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**Objective:** Various factors responsible for disability (pain, the activity of disease and The Stanford Health Assessment Questionnaire (HAQ)) were used to investigate the functional course of the rheumatoid arthritis disease.
**Methods:** A total of 61 female patients with rheumatoid arthritis (RA) (according to American College of Rheumatology criteria) were followed prospectively for 1 y. At baseline and at endpoint, HAQ scores, the activity of disease (DAS28), the level of pain (VAS10cm) and biological assessment were performed.
**Results:** Correlations between baseline data and HAQ or SF-36 scores at endpoint were analyzed, using nonparametric tests. A multilinear regression model was performed to select independent prognostic factors of disability for RA female patients. The mean HAQ decreased from 1.4(±0.35) to 0.4(±0.61) and the final HAQ disability was associated with baseline values of pain, DAS28 and C-reactive protein values but not with the level of anti-CCP antibodies. Age and rheumatoid factor did not contribute to prediction of the disability after 1 y follow-up.
**Conclusion:** The functional disability in female patients with rheumatoid arthritis reflects the cumulative effects of the disease evolution and can be an important outcome measure.

## P1010
## BONE MINERAL DENSITY AND BONE TURNOVER MAKERS IN DIFFERENTIATED THYROID CANCER PATIENTS

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**Objective:** Suppression of thyroid stimulating hormone (TSH) with levothyroxine (LT4) is long term management strategy aims to reduce recurrence and metastasis. Supraphysiologic doses of levothyroxine may have adverse effects on cardiovascular system and bone. The aim of this study was to investigate the BMD and bone turnover markers of the differentiated thyroid cancer patients who were under TSH suppression treatment with levothyroxine at least 1 y period in our endocrinology clinic.
**Methods:** Differentiated thyroid cancer who were followed at least a year under LT4 suppression treatment included in this cross-sectional study. BMD was measured by DXA at the lumbar spine and femoral neck. Serum calcium (Ca), parathormone (iPTH), 25OH vitamin D, osteocalcin (OC) and c-telopeptide (CTx) levels were evaluated.
**Results:** A total of 185 patients with of the patients (F/M: 154/31, 50.7±11.3 y) included in the study. Duration of disease was 6.2±4.6 y. The mean daily dose of levothyroxine was 129±42.4 μg/d and 1.85±2.05 μg/kg body weight. TSH level was suppressed (0.001±0.04 mIU/L). 25(OH)D levels were 27.9±11.7 ng/ml. Serum calcium, PTH,OC and CTx were in normal range. The mean femur neck BMD was 0.97±0.17 g/cm$^2$ and L1-4 BMD was 1.14±0.20 g/cm$^2$. There was a weak positive correlation between total daily levothyroxine dose and femur BMD ($r=0.23$, p:0.01) and L1-4 BMD ($r=0.21$, p:0.01). Duration of disease and femur neck BMD shown a significant negative correlation ($r=-0.16$, $p=0.02$) but not with lumbar BMD. There was

a negative correlation between femur (r:-0.22, p:0.01) and L1-4 BMD (r:-0.31, p:0.0004) and serum osteocalcin levels.
**Conclusion:** Duration of TSH suppression can be predictor for bone lose in TSH suppressed thyroid carcinoma patients. Patients need be monitored regularly for osteoporosis and unnecessary excessive TSH suppression should be avoided.

## P1011
## 3D ANALYSIS OF LOCAL BONE DENSITY DEFECTS IN PATIENTS WITH FEMORAL NECK FRACTURE

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**Objective:** To assess the anatomical distribution of bone density defects in patients with femoral neck fracture using a DXA-based 3D modelling technique.
**Methods:** 106 patients who recently suffered a femoral neck fracture and 106 sex- and age-matched (±5 y) subjects without hip fracture were included in this study (77 females and 29 males in each group). Mean age of patients was 79.9 (7.7) y and mean age of controls was 80.0 (7.8) (p=0.996). DXA scans (contralateral hip for patients) were performed using a Prodigy (GE Healthcare) scanner. DXA scans were performed on average 13 days after the fracture (range: 2-60 d). Areal BMD (aBMD) was calculated. The 3D-SHAPER software (v2.9, Galgo Medical) was used to model the femoral shape and volumetric BMD (vBMD) distribution from hip DXA scans. Trabecular vBMD and cortical surface BMD (sBMD) were calculated. DXA and DXA-derived 3D measurements calculated for each group were compared using Student's t-test. Area under the receiver operating curve (AUC) was computed.
**Results:** aBMD was found to be 5.0% lower at total femur (p=0.044) and 7.5% lower at neck (p<0.001) in the fracture group, compared to controls. aBMD at neck was shown to better discriminate between fracture and control groups, with an AUC of 0.642, compared to total hip aBMD (AUC of 0.580). Trabecular neck vBMD was 14.8% lower and cortical neck sBMD 6.3% lower in the fracture group, compared to controls (p<0.001). AUC was 0.668 for trabecular neck vBMD, and 0.618 for cortical neck sBMD (p<0.001). vBMD values obtained at each voxel of the patient-specific 3D models were compared between groups. Figure 1 (left) shows that vBMD values in the superior aspect of the femoral neck were associated with the highest AUCs (range: 0.667 – 0.759). When using the average vBMD in the superior aspect of the femoral neck (i.e., in the region highlighted in Figure 1, left) to discriminate between groups, an AUC of 0.748 was found (Figure 1, right).
**Conclusion:** Patients with neck fracture showed local defects in vBMD in the superior aspect of the femoral neck, which is consistent with findings of biomechanical studies testing sideways fall configuration. vBMD calculated in this region of interest using a DXA-based 3D modelling technique was found to better discriminate between patients with neck fracture and controls, compared to standard aBMD measurements at neck. Advanced assessment of local defects in vBMD could potentially improve fracture prevention.

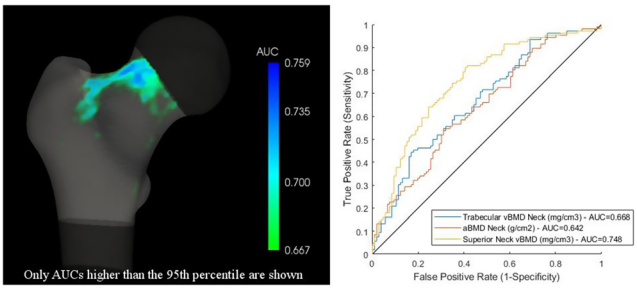


Figure 1: AUC obtained using vBMD values at each voxel (left). Comparison of ROC curves (right). The "superior Neck vBMD" curve was computed using the average vBMD calculated over the region highlighted in the left image.

## P1012
## ADIPOKINES AND VASCULAR MARKERS IN BONE REMODELING IN IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

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**Objective:** Osteoporosis is a major comorbidity of cardiorespiratory diseases, but the mechanistic links between pulmonary arterial hypertension and bone remain elusive. The purpose of the study was to evaluate serum adipokines and endothelin-1 (ET-1) levels in the patients with idiopathic pulmonary arterial hypertension (IPAH) NYHA class III-IV and to determine its associations with BMD.
**Methods:** Pulmonary and hemodynamic parameters, BMD Z-scores at the lumbar spine (LS) and femoral neck (FN), serum leptin, adiponectin, visfatin, ghrelin and endothelin-1 (ET-1), were evaluated in 32 patients with IPAH NYHA class III-IV and 30 healthy volunteers.
**Results:** Leptin, adiponectin and ET-1 were higher in the patients with IPAH than in healthy subjects. Visfatin and ghrelin levels showed a tendency to increase compared to that of healthy subjects. The univariate analysis revealed a positive correlation between BMD Z-scores at both sites and 6-min walk test, and inverse relation with pulmonary vascular resistance (PVR) and mean pulmonary arterial pressure (mPAP). Adiponectin and visfatin showed positive correlations with PVR (p=0.009 and p=0.006) while ghrelin correlated with mPAP (p=0.012). Serum adiponectin, visfatin, ghrelin and leptin were inversely associated with Z-scores. After adjusting for BMI and FMI, such associations persisted between visfatin and

adiponectin levels and Z-scores at both sites. ET-1 related to mPAP, cardiac index and PVR. Negative correlation was observed between ET-1 and FN BMD (p=0.01). Positive correlations have revealed between ET-1 and adiponectin (p=0.02), visfatin (p=0.004) in IPAH patients.
**Conclusion:** These results provide further evidence that adipokine and endothelial dysregulation may cause not only a decrease in BMD, but also an increase in hemodynamic disorders of IPAH.

## P1013
## ANALYSIS OF BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN MEN WITH ANKYLOSING SPONDYLITIS: RESULTS OF CROSS-SECTIONAL ANALYSIS

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**Objective:** Ankylosing spondylitis (AS) is characterized by pathologic new bone formation in the cortical bone of the spine and impairment and loss of trabecular bone mass of the vertebral body leading to osteoporosis with prevalent vertebral fractures (VF). Our aim was comparison of noninvasive bone parameters – BMD and trabecular bone score (TBS) of AS males with healthy controls.
**Methods:** A pilot cross-sectional study of AS males and healthy age, BMI- matched controls was performed. In all subjects, single measurements of BMD of total hip (TH) and lumbar spine (LS), femoral neck (FN), and trabecular bone score (TBS) was performed. N-terminal type 1 procollagen (PINP) and C-terminal telopeptide (CTx).
**Results:** We present a preliminary data from multicentric study currently ongoing in Slovakia. 38 male patients with AS and 32 healthy males without difference in age and BMI were included in the study. AS patients had significantly greater PINP (<.0001) and lower FN BMD (<.0001) in comparison to healthy controls. There was no difference in LS BMD, TBS and CTx observed between groups.
**Conclusion:** This analysis shows that AS men, had lower BMD at femoral neck and higher and PINP levels, but no difference in LS BMD compared to healthy controls. No difference in LS BMD in males along with activated bone formation may be associated with more active disease and advanced syndesmophytes formation. TBS differences between groups did not reach statistical significance, however, this study has some limitations such is small sample size, cross-sectional design and lack of data on VFs. Additional new tools, better reflecting bone quality and thus predicting VFs, are needed.

## P1014
## CLINICAL ASSESSMENTS AND BONE CHANGES IN ELDERLY PATIENTS WITH HIP ARTHROPLASTY DUE TO FEMORAL NECK FRACTURE

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**Objective:** To emphasize correlations between clinical manifestations and the morphological changes in femoral bone.
**Methods:** 39 patients were enrolled in the study (27 females and 12 males). Of these patients, 35 patients received cementless implants, while 4 received cemented implants. All the patients needed a complex rehabilitation programme. The indication of arthroplasty enabled specialists to obtain biological material needed for the histological study.
**Results:** The patients' ages were between 68-92 (with an average of 76); hip fractures are due to a loss in bone resistance by the appearance of osteoporosis, especially after the age of 75. The study established that most of the fractures took place after the patients falling usually while standing while the trauma intensity was small in 88% of cases. We may say that in women the hip fracture incidence is more frequent than in men.
**Conclusions:** After the age of 75, the number of femoral fractures shows an increase because of osteoporosis, the constant increase of the median life expectation, the presence of other comorbidities (such as cardiopathy, diabetes, dementing illnesses); the most frequent cause that led to fracture was falling from one's height.

## P1015
## HUMAN ALLOGENEIC CELL THERAPY AFTER MUSCLE TRAUMA IN HIP ARTHROPLASTY PATIENTS INCREASES FUNCTIONAL REGENERATION

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**Objectives:** Insufficient muscle regeneration following trauma represents an unaddressed clinical need, above all in elderly patients. On the basis of promising preclinical data, we evaluated safety and functional outcome following local placenta-derived mesenchymal like adherent stromal cell (PLX-PAD) transplantation using acute iatrogenic muscle damage after total hip arthroplasty (THA) as a model system.

**Methods:** We conducted a randomized, double blind, placebo-controlled phase I/II study. 20 patients undergoing THA via lateral approach received transplantation (TX) of $300x10^6$ (n=6), $150x10^6$ (n=7) PLX-PAD or placebo (n=7) into the injured gluteus medius muscle (GM). Follow-up included safety, function, MRI and muscle biopsies.
**Results:** The cell therapy could be shown to be save with no relevant AEs having been observed until 2 y follow-up. Primary efficacy endpoint, change of GM contraction moment after 26 weeks, showed a significant increase in the 150M group (+31.2±7.0 Nm, p=0.0067) compared to placebo (+5.4±6.5 Nm) accompanied by an increase in muscle volume (+24.4±4.2 $cm^3$, p=0.004). Change of contraction force and muscle volume in the 300M group showed a similar pattern as in the 150M group but was not statistically significant. Change of mean fiber diameters and regenerating myofiber count demonstrated a faster healing after cell TX. Surprisingly, placenta cell therapy resulted in a reduction of the postoperative stress reaction.
**Conclusions:** This is data from the first clinical study investigating allogeneic cell therapy for acute skeletal muscle injury. Although a limited number of patients were included in this trial, our results indicate a safe therapy with improved functional and structural outcome. Our data is the basis for the phase III study HIPGEN, which is supported by a Horizon 2020 grant, investigating the effect of this cell therapy on mobility and mortality of elderly hip fracture patients undergoing arthroplasty.

## P1016
## USE OF HIGH DOSES OF CHOLECALCIFEROL FOR THE TREATMENT OF HYPOVITAMINOSIS D IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** To assess the level of vitamin D in women with postmenopausal osteoporosis and to evaluate the effectiveness of treatment of hypovitaminosis D with high doses of cholecalciferol for 3 months.
**Methods:** 80 female patients with postmenopausal osteoporosis who were examined in Minsk city center of osteoporosis and diseases of the musculoskeletal system were enrolled in the study (mean age 66.4 (8.7) y). Serum concentration of 25(OH)D was determined by electrochemiluminescence (Cobas e411, Roche Diagnostic). Levels of 25(OH)D <30 ng/ml were considered as vitamin D insufficiency, <20 ng/ml - as vitamin D deficiency.
**Results:** Hypovitaminosis D was observed in 86% of patients. Median content of 25 (OH) D at baseline was 16.74 [7.42; 24.58] ng/ml. For the purpose of drug therapy, cholecalciferol was administered in a dose of 50,000 IU once every 2 weeks for 3 months. A repeated study of the level of vitamin D performed after 3 months of therapy showed a positive trend in the level of 25(OH)D in all subjects: median level 35.99 [32.11; 43.66] ng/ml, with p<0.001.
**Conclusions:** The doses of cholecalciferol used in the study (50,000 IU once in 2 weeks) can eliminate vitamin D deficiency and allow achieve optimal level of more than 30 ng/ml for 3 months in elderly female patients.

## P1017
## RELATIONSHIPS BETWEEN FUNCTIONAL PARAMETERS AND QUALITY OF LIFE IN KNEE OSTEOARTHRITIS PATIENTS

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**Objective:** To evaluate the impact of the functional status on the quality of life in patients with knee osteoarthritis (OA).
**Methods:** we included 81 patients diagnosed with knee OA (ACR criteria). All the patients were evaluated Modified Health Assessment Questionnaire (MHAQ) and WOMAC questionnaire.
**Results:** Pain (VAS100mm scale) was significantly higher in the elderly male patients (p<0.05) being strongly correlated with WOMAC value ($r^2$=0.611). The WOMAC values varied significantly for the 2 residing areas (p<0.05). Correlations were found for all functional parameters according to BMI but the most significant being for the physical function subscale of WOMAC ($r^2$=0.431).
**Conclusions:** Trying to investigate the functional disabilities and how they affect the patient's perception of their condition, we found female gender, residing in urban areas and obesity were all linked with higher WOMAC scores and were strongly correlated with MHAQ.

## P1018
## VALIDATING THE ACTIVITIES-SPECIFIC BALANCE CONFIDENCE (ABC) SCALE IN GREEK ELDERLY POPULATION

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**Objectives:** Fear of falling and balance disorders are closely related to the risk for falling and risk for fractures. Thus, evaluating the fear of falling is extremely important for falls prevention. The Activities-Specific Balance Confidence (ABC)

Scale is a questionnaire that very well documents the fear of falling, during 16 functional tasks in- and outdoors, and has good psychometric properties. However, it has not been adapted or validated into Greek. The objectives of the present study, therefore, are i) to cross culturally adapt the ABC scale into Greek and ii) to evaluate its psychometric properties in Greek elderly participants.

**Methods:** Cross cultural adaptation with forward and backward translation by 6 bilingual translators was conducted according to international guidelines and following permission by the instructor of the scale. The final Greek version of the scale ($ABC_{GR}$) was piloted to 30 healthy Greek elderly (13 males and 17 females, 66±6 years old) for testing its psychometric characteristics. The $ABC_{GR}$ was correlated with the Confidence Balance questionnaire (CONFbal), the Fall Efficacy Scale - International (FES-I) and the observational measure of the Functional Reach Test (FRT), for testing the convergent validity. Test-retest Reliability of the $ABC_{GR}$ questionnaire was assessed with repeated measure in 10-d period.

**Results:** Translation process completed with no particular difficulties. The content was clear and comprehensible to the participants and this led to the Greek version of the ABC ($ABC_{GR}$). The $ABC_{GR}$ yielded weak to strong correlations with the FES-I ($r=-0.654$, $p<0.001$), the CONFbal ($r=-0.368$, $p<0.05$), and the FRT ($r=500$, $p<0.05$). The test-retest reliability of the $ABC_{GR}$ was found to be excellent ($ICC_{1,1=}0.911$).

**Conclusions:** The $ABC_{GR}$ scale, is clear and comprehensible to the Greek population tested. The first results also indicate a valid and reliable tool for assessing the balance confidence in functional tasks. Further testing in a larger sample is required in order to obtain more representative results.

## P1019

## EFFECT OF EXERCISE GUIDANCE REGARDING ITS DELIVERY TIME ON FALLS REDUCTION AND THE IMPROVEMENT OF BALANCE AND PHYSICAL FUNCTIONING IN THE ELDERLY

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**Objectives:** Balance and strength group exercise-based intervention with verbal and visual guidance reduces falls and improve balance in the elderly. However, the efficacy of the timing that this visual and verbal guidance is given by the group leader has not been investigated. Thus, the objectives of this study are to evaluate the effects of guidance delivery time on falls related confidence, balance, gait and cognitive functions.

**Methods:** 24 community Cypriot elderly (aged 74±6 SD) participated in a single-blind clinical control trial. Being separated in 2 age matched groups, they received individually tailored progressive 12 weeks-Otago Exercise Program (OEP) for strength and balance, in two ways of delivery. Group 1 received visual and verbal additional guidance before the performance of the exercise while group 2 received the guidance by the exercise instructor only in parallel with the exercise. Fear of falling (Falls Efficacy Scale–International (FES-I), balance (mini-Balance Evaluation Systems Test (mini-BESTest), gait (Functional Gait Assessment (FGA) and cognitive function (Montreal Cognitive Assessment (MoCA) were evaluated at baseline, 6 and 12 weeks of the program. Ethics approval was given by the Cyprus National Bioethics Committee.

**Results:** In average, falls reduced by 11% and the participants reported less fear of falling (2 points reduction in the total FES-I score from 24 to 22/64, $p<0.05$). The gait performance improved by 2 points on the FGA scale (from 23 to 25/30, $p<0.05$). Balance was also improved by 3 points on the mini-BESTest scale (from 19 to 22/28, $p<0.05$). In addition, the cognitive performance was improved as indicated by a 3-points increase of the MoCA test scoring (from 22 to 25/30, $p<0.05$). The timing of visual feedback and previous exercise verbal explanation did not have any significant main effect ($p>.05$) on physical functioning and on the assessed scores, FES-I: ($F(1, 17)=1$, $r=.24$), mini-BESTest: ($F(1, 16)<1$, $r=.23$), FGA ($F(1, 17)<1$, $r=.08$) or mental activities ($F(1, 16)<1$, $r=.05$).

**Conclusions:** OEP reduced the incidents of falls, improved significantly balance, gait and cognitive functions of community older adults, regardless the delivery time of the verbal exercise explanation and the visual exercise demonstration provided.

**Acknowledgements:** Erasmus plus, Student Mobility for Studies.

## P1020

## EPIDEMIOLOGY OF HIP FRACTURES IN IRELAND: A SYSTEMATIC REVIEW

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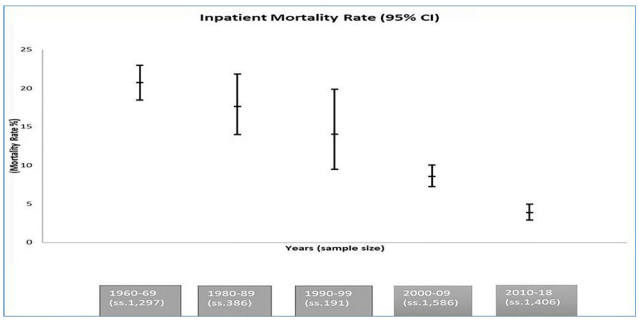
**Objective:** To perform a systematic review of published studies on hip fractures in Ireland.
**Methods:** A recent IOF report states Ireland has the 6th highest rate of hip fracture**,** but published data are limited. We performed a comprehensive systematic search of published Irish hip fracture literature from 1950-July 2018. No studies were found between 1950-1959 and 1970-1979. Screening, data extraction, and risk of bias assessment was done in duplicate. A qualitative overview, along with quantitative secular trend analyses of demographics, inpatient length of stay (LOS), inpatient (IMR) and 1-y mortality rates (1YMR) was performed. We summarized demographics. LOS and mortality rates were assessed by decade utilizing central tendency measures (means/medians) with 95%CI, using the one sample t-test or sign test as appropriate.
**Results:** 110 studies were included for qualitative analysis and 60 for quantitative data synthesis. Overall, there was considerable clinical & methodologic heterogeneity amongst studies, few interventional trials and none prior to 1960. Age remained stable: 79.2 to 80.7, but the proportion of males increased from 15.6% in 1960s to 26.16% after 2010. LOS, IMR, and 1YMR declined markedly from 1960 to 2018, in a similar pattern to other EU countries.
**Conclusions:** A 60-y literature on fragility hip fractures in Ireland is characterized by considerable variation in methods and outcomes. There has been a marked decline in LOS, IMR and 1YMR.

Figure 1: Decline in inpatient mortality over the past 60 y in Ireland




## P1021
## PREVALENCE OF SARCOPENIA USING SARC-F IN THE ELDERLY PATIENTS: CORRELATION BETWEEN BODY COMPOSITION, FUNCTIONAL STATUS AND PHYSICAL PERFORMANCE-A PRELIMINARY STUDY

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**Objectives:** Sarcopenia is the age-dependent loss of skeletal muscle mass and strength which causes disability, falls and hospitalizations in the elderly. A definite consensus on the diagnosis of sarcopenia has not been reached yet (2). The aim of this study was to assess the prevalence of sarcopenia by SARC-F -a simple clinical symptom index (1) and to investigate the relationship between SARC-F scores and body composition parameters, muscle strength. functional status and physical performance scores in a group of geriatric patients.
**Methods:** 60 patients from the outpatient clinics of Physical Medicine and Rehabilitation department were recruited according to the eligibility criteria. The demographical and clinical characteristics were recorded. Body composition comprising BMI, body fat, fat-free mass; muscle strength assessed by grip strength measurement and functional status assessed by short physical performance battery (SPPB) were determined. 4m gait speed, chair stand and balance tests were performed. The nutritional status assessed by mini nutritional assessment (MNA), and physical activity status assessed by Physical Activity Scale for the Elderly (PASE) were also recorded.
**Results:** 9 male and 51 female patients with a mean age of 66+4.8 y were included to the study. The mean BMI was 30.2±5.4 kg/m$^2$. 13.3% of patients had falls, 75% of them were nonsmokers, 92% nonalcoholic and 76% of them had more than two chronic diseases. 18% of the patients had sarcopenia. The demographical and clinical parameters except BMI, number of falls and the scores of chair stand and balance tests, were similar between patients with and without sarcopenia (Table 1). There were negative correlations between the scores of SARC-F and the grip strength (p:0.002,r:-0.39) chair stand (p:0.000, r:-0.44, balance test (p:0.033, r:-0.28) and SBBP total scores (p:0.011,r:-0.33).
**Conclusion:** Nearly 20% of the elderly had sarcopenia, in whom obesity and falls were common. Sarcopenia screened using SARC-F was associated with decreased muscle strength, balance and increased functional disability. We suggest the use of SARC-F as an easy, quick and practical screening tool for the diagnosis of sarcopenic elderly in the routine clinical practice.
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Table 1: The demographic and clinical characteristics according to the presence of sarcopenia.

| | SARCF<4 n=49 | SARCF≥4 n=11 | P |
|---|---|---|---|
| BMI (kg/m$^2$) | 29.5±5.3 | 34.3±5.6 | 0.047* |
| Body fat (%) | 35.1±7.5 | 36.8±6.7 | 0.408 |
| Fat-free mass (kg) | 45.6±7.1 | 49.9±45.6 | 0.228 |
| Grip strength (kg) | 21.9±6.6 | 20.9±8.8 | 0.546 |
| MNA | 24.5±3.0 | 25.1±4.3 | 0.643 |
| Falls (n) | 1.3±0.8 | 1.5±0.7 | 0.023* |
| PASE score | 68.7±30.2 | 74.4±38.8 | 0.876 |
| 4m gait speed test (min) | 2.5±1.1 | 2.1±1.4 | 0.459 |
| Chair stand test (min) | 1.9±1.1 | 0.9±0.9 | 0.005* |
| Balance test | 3.8±0.5 | 3.4±0.9 | 0.000* |
| SBBP total score | 8.2±1.9 | 6.4±2.1 | 0.074 |
| Comorbidity (n) | 1.8±1.6 | 2.9±1.4 | 0.938 |

## P1022

## RISK FACTORS FOR NEW AND PERSISTENT CHRONIC OPIOID USE AFTER HIP FRACTURE SURGERY: A DANISH NATIONWIDE COHORT STUDY FROM 2005 TO 2016

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**Objectives:** Opioids are commonly prescribed for acute pain treatment in hip fracture (HF) patients. However, 80% of patients taking opioids will experience an adverse effect and some patients might develop a chronic use of opioids after surgery. We examined risk factors for new and persistent chronic opioid use after HF surgery.

**Methods:** Using Danish nationwide health registries, we identified all HF surgery patients ≥65 y of age (n=69,456). Among nonusers before surgery, we defined new chronic opioid use as at least two dispensing within 1 y after surgery. Persistent chronic opioid use was defined as at least one dispensing of opioids 6 months before and two dispensing within 1 y after surgery. We calculated adjusted odds ratios (aOR) with 95%CIs to explore following risk factors: age, sex, surgical indications, preoperative medications, and comorbidities defined through Charlson Comorbidity Index (CCI low, medium and high) and a number of individual comorbidities.

**Results:** A total of 9% patients were new users, whereas 13% were persistent users. The aORs for being a new user were 1.39 (1.28-1.50) and 1.23 (1.15-1.32) for age groups 65-74 and 75-84 y, (ref=85+) 1.09 (1.02-1.16) for female (ref=male), 1.02 (0.96-1.09) and 0.93 (0.86-1.02) for medium and high CCI (ref=low, no known comorbidity), 1.20 (1.12-1.29) and 1.53 (1.38-1.70) for overweight and obese patients (ref=normal BMI), and 1.26 (1.15-1.37) for preoperative use of NSAID. The aORs for being a persistent user were 1.45 (1.35-1.55) and 1.25 (1.18-1.33) for age groups 65-74 and 75-84 y, 1.83 (1.72-1.95) for female, 1.59 (1.50-1.69) and 2.07 (1.93-2.22) for medium and high CCI, 1.19 (1.10-1.1.29) and 1.35 (1.23-1.48) for underweight and obese patients, and 1.75 (1.63-1.88) for preoperative use of NSAID. There was no association between other potential risk factors and chronic opioid use.

**Conclusion:** We identified several risk factors associated with new and persistent chronic opioid use, including high age, female sex, comorbidity and preoperative NSAID use. This is clinically relevant in order to identify and develop more effective and targeted preventive intervention strategies to reduce opioid use and thereby the associated adverse events among elderly patients.

## P1023

## INFLUENCE OF HIGHEST AND LOWEST BODY MASS INDEX HISTORY IN BONE MINERAL DENSITY AMONG WOMEN WITH ANOREXIA NERVOSA AND BULIMIA NERVOSA

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**Objective:** To evaluate BMD among women with anorexia nervosa (AN) or bulimia nervosa (BN).

**Methods:** It is a cross-sectional study with female patients from the Eating Disorder Program of University of São Paulo, Brazil. DXA was performed to access total, femoral neck and lumbar-spine BMD. Body weight and height were measured and eating disorder history was evaluated by standardized questionnaire. Independent T-Test and Pearson's correlations were performed at a significance level of 0.05. Results: 29 patients, mean age 32.2 years old (SD=9.67), were evaluated. Mean illness duration was 13.0 y (SD=9.2) and 40% have menses interrupted throughout life. BMI did not differ between AN (n=19) and BN (n=10) patients (23.5 kg/m$^2$, SD=9,97 vs. 31.8 kg/m$^2$, SD=26.0; respectively); and 16.7% of the patients were underweight, 53.3% normal weight, 16.7% overweight and 6.7% class III obesity. No differences were observed in total BMD (1.123 g/cm3, SD=0.103), lumbar spine BMD (1.157 g/cm3, SD=0.136) and femoral neck BMD (0.976 g/cm3, SD=0.150) between AN and BN. According to z-score, 1 BN (BMI=27.2 kg/m$^2$) and 1 AN (BMI=14.3 Kg/m$^2$) patient presented lumbar spine BMD below the expected range for age and another 1 from BN (BMI=23.6 kg/m$^2$) presented femoral neck BMD below

the expected range for age. History of lowest weight for actual height (39.5 kg, SD=6.8 vs. 51.4 kg SD=18.3; p=0.016) and highest weight for actual height (62.3 kg, SD=9.7 vs. 73.3, SD=19.1; p=0.008) differed between AN and BN, respectively. History of highest BMI correlated with total BMD (r=0.431, p=0.02) and of lowest BMI correlated with total BMD (r=0.439, p=0.017) and lumbar spine BMD (r=0.393, p=0.035). Actual BMI presented positive correlation with total BMD (r=0.694, p=0.001) and lumbar-spine BMD (r=0.414, r=0.029). Amenorrhea length (mean 2.38 months; SD=5.3) correlated negatively with lumbar-spine BMD (r=-0.397, p=0.033).

**Conclusions:** No significant differences were observed in BMD among AN and BN patients. However, the history of amenorrhea and weight variation throughout adult life may explain BMD alterations. Future analysis should include the measurement of biochemical parameters in order to clarify the influence of body weight variations in BMD in this population.

## P1024

## PSYCHOLOGICAL IMPLICATIONS OF AESTHETIC FUNCTION RESTAURATION IN PATIENTS WITH DENTOMAXILLARY DISHARMONS ASSOCIATED WITH POSTURAL IMBALANCES

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**Objective:** To study the changes that occur psychologically in the patient with dentomaxillary disharmons that frequently associate with postural imbalances. Research that has taken place over the past 20 y has shown that the entire musculoskeletal apparatus together with the skull and the mandible is a unique anatomic-functional system. When only one component of this system works generates negative repercussions on the whole organism.

**Method:** The study took place between 2015-2018. I studied 54 patients (25 women and 29 men) diagnosed with dental-associated jawbone disharmonies postural imbalances evaluated before and after 6 months after recovery treatment . The treatment was performed in collaboration with a dentist - kinetotherapist specialist. The patients were evaluated by a psychologist before, 6 months after the beginning of the treatment and at the end of it. The psychological reports were centralized and processed.

**Results:** 81.72% of the self-esteem of the patient increased the self-esteem of the patient and 79.6% of the males and the social relations improved to 78, 56% of the barabati and 86.7% of the women. The motivation also increased to 65.4% of women and 61.3% of men.

**Conclusion:** The restoration of aesthetic function in a patient leads to the growth of psychic attributes such as self-esteem, motivation, also anxiety decreases. We can also conclude that in the results we did not notice significant differences between the sexes.

## P1025

## ASSOCIATION BETWEEN DYSPHAGIA AND FRAILTY IN COMMUNITY DWELLING OLDER ADULTS

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**Objective:** Dysphagia is described as a geriatric syndrome that occurs more frequently with aging. It is associated with deterioration in functionality but usually ignored. Frailty is a geriatric syndrome that is recognized more with its well known adverse consequences. Frailty can be related falls and osteoporotic fractures Very recently, dysphagia has been suggested to accompany frailty in older adults. We aimed to investigate the association between dysphagia and frailty in the community dwelling older adults.

**Method:** Design: prospective, cross-sectional study. Setting: geriatric outpatient clinic. Participants: older adults aged ≥60 y. Measurements: Dysphagia was evaluated by EAT-10 questionnaire and frailty by FRAIL scale. Handgrip strength (HGS) was evaluated by hand-dynamometer. Gait speed was evaluated by 4-m usual gait speed (UGS). Nutritional status was assessed by mininutritional assessment-short form (MNA-SF).

**Results:** 1138 patients were enrolled. Mean age was 74.1±7.3 y. EAT 10 questionnaire was answered by all and FRAIL-scale by 851 subjects. EAT 10 score >15 points was regarded as significant dysphagia risk. EAT-10 score >15 points was associated with older age (p=0.002), female gender (p<0.001), neurodegenerative diseases (p=0.002), higher number of chronic diseases (p=0.001) and regular drugs (p=0.001), higher FRAIL score (p=0.001), lower HGS (p=0.002), UGS (p=0.01) and MNA-SF scores (p<0.001). In multivariate analyses, the factors independently associated with presence of EAT-10 score>15 were FRAIL score and the number of drugs.

**Conclusion:** Dysphagia is associated with frailty irrespective to age, presence of neurodegenerative diseases, number of chronic diseases and drugs. To our knowledge, this is the largest series in the literature providing data on independent association of dysphagia with frailty. Frailty and dysphagia may reflect fall risk and osteoporotic fractures indirectly. These patients should be considered in terms of fall because of the increased risk of fracture in the frail elderly who have dysphagia.

## P1026

## INCIDENCE AND RELATED FACTORS FOR INPATIENT FALLS IN THE DEPARTMENT OF INTERNAL MEDICINE

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**Objective:** Prevention of in-hospital falls and injuries are possible if enough awareness is constituted. Falls are common problems in hospital and associated with serious morbidity and mortality. There are many scales used in clinical practice to determine the factors that increase the risk of falling in inpatients and to take measures if possible. 'Itaki the fall Scale' developed for this purpose in Turkey and is a scale commonly used in hospitalized patients for risk assessment of falling The aim of this study was to assess the prevalence of fall-related factors in patients admitted to the Internal Medicine Clinic of the Istanbul Faculty of Medicine and the possible relationship with the clinics, and to determine whether the risk score in these patients predictive for falling by national scale of Itaki.

**Method:** We examined the results of Itaki scale risk scores, possible risk factors, total number of diseases, current medication and falling outcomes of >18 y patients hospitalized in Istanbul Medical Faculty Internal Medicine Clinics between 2012-2016.

**Results:** In a 5-y follow-up period, 5598 patients (women n=2665; men n=2933) and total 8337 hospitalizations were evaluated retrospectively. The mean age of all patients was 56.9±17.7 and the mean age of the fallen patients was 59.5 ±18. It was observed that 2.2% (n=121) of the inpatients had fallen. In fallen patients, 6.6% (n=8) had a recurrent fall. The mean risk of falling in all patients was 10±4.4; (9.8±4.3 in males and 10.1±4.5 in females). The risk of falling in women was higher ($p<0.005$). ($P<0.001$) .The fall risk scores was significantly increased with age ($p<0.001$) The Itaki fall risk score in patients in the faller group was significantly higher ($p<0.001$) than the non-faller group ($p<0.001$). Most of the faller patients was observed in hematology clinic (n=32) Repeated falls was associated with bone marrow deficiency ($P<0.005$), such as MDS and aplastic anemia ($p<0.005$). ($p<0.005$, $p<0.005$, $p<0.001$, respectively).

**Conclusion:** In-hospital falls is a clinical problem requiring adequate awareness and related to significant morbidity and mortality . Fall risk identification of inpatients is important to take preventing measures, enhance the quality of patients life and preclude new comorbidities increasing mortality. According to our study, the Itaki Falling Risk Scale seems to be predictive for falling. According to our hospital's 5-y data, the average falling rate is 2.2%, which seems to be in accordance with the literature (0.5% to 3.5%). In addition, since there is no previous study in the literature studied Falling Risk Scale. our study is important to increase the awareness of this scale outside our country. Due to longness of hospitalization, falling rates was observed most common in the hematology clinic among all internal medicine clinics. According to our study, female gender and older age was associated with more falls. High Itaki risk scores seems to be predictive for falls so that the more falls were seen in patients with higher risk score

## P1027
## FSH ROLE IN LOW BONE DENSITY IN PRIMARY OVARIAN INSUFFICIENCY

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**Objective:** Primary ovarian insufficiency (POI) is the cessation of menses before age 40 y, associated with estrogen decrease and gonadotropins increased. It is associated with loss bone mass, osteoporosis and risk of fracture. The FSH has been studied as the possible cause, although its full role is not clear. It could be related with activity and differentiation of the osteoclast.

**Methods:** retrospective analytical and descriptive study. POI patients with <5 y of amenorrhea were evaluated. Our aim was to evaluate the relationship between FSH, LH and E2 with BMD of LS and FN. 41 women with POI confirmed were included in this study. Women with secondary causes of low bone mass and with hormonal replacement therapy were exclude. For the statistical analysis the infostat statistic package was used, the relationship between the variables was determined by Pearson's linear correlation and the calculation of the coefficient of determination by linear regression.

**Results:** The values are expressed as means. The age of consultation was 36.4 y while the age of amenorrhea was 35 y. The FSH LH E2 and vitamin D values were 80.2 mIU/ml, 40.12 mIU/ml, 34.06 pg/ml and 23.6 ng/ml respectively. No differences were observed between vitamin D levels and seasons (21 ng/mL winter, 22 ng/mL autumn and 21 ng/mL spring). More than 50% of the patients had T-score <-1 in any of the 2 regions. Patients with low bone mass had higher FSH levels than patients with normal BMD 66 vs. 84 mIU/mL. A negative linear correlation was observed between FSH and BMD CL r -0.48 and a coefficient of determination r2 0.24 p=0.02.

**Conclusion:** A negative correlation was observed between FSH levels and BMD. This demonstrates the influence of FSH and its receptors on osteoclastic activity and bone resorption. Maybe it explains a part of the physiopathogenesis of the low bone mass of these patients that apparently does not only depend on estradiol levels

## P1028
## SARCOPENIA AND TYPE 2 DIABETES MELLITUS

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**Objective:** The analysis of body composition for assessing the health and nutrition of the individual is a useful test. Diseases such as diabetes mellitus may be associated with adverse changes in body composition. Sarcopenia is characterized by a progressive and generalized loss of skeletal muscle mass and functionality. However, there is a lack of studies that examine the association of sarcopenia in patients with type 2 diabetes mellitus (T2DM).
**Methods:** In this retrospective, non-randomized study, we studied 35 individuals who visited endocrinological outpatient clinics, aged 20-80 years, to assess the presence of sarcopenia in T2DM in comparison with 16 controls. Sarcopenia was defined using the European Working Group on Sarcopenia in Elderly, EWGOSP) that includes both muscle mass (skeletal muscle index, SMI) and muscle function/physical activity (walking speed as a measure of physical performance). Appendicular skeletal mass (ASM) and other parameters such as total fat and total muscle mass (in kg) were calculated. The skeletal muscle index (SMI) was calculated as ASM divided by the square of the body height in meters. Low muscle mass is defined as SMI <7.0 kg/m$^2$ in males and SMI <5.7 kg/m$^2$ in females. Low physical performance was defined as a walking speed of <0.8 m/s.
**Results:** The incidence of sarcopenia was significantly higher in patients with T2DM than in healthy subjects (27% vs. 20%, p=0.01 for sarcopenia) and higher in elderly participants (70 y and over) vs. younger (40% vs. 12%, p<0.001). Walking velocity was significantly lower in patients with T2DM than in controls men and women (1.02±0.34 vs. 1.25±0.15, p<0.001) and (1.01±0.22 vs. 1.27±0.12, p<0.001), respectively.
**Conclusions:** The prevalence of sarcopenia in patients with T2DM is moderate and gradually increases significantly in older men.

## P1029
## REAL-WORLD EFFECTIVENESS OF OSTEOPOROSIS (OP) TREATMENT IN THE OLDEST OLD

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**Objectives:** To study real-world effectiveness of OP treatment in oldest old women (≥80 y) compared with younger women (65-79 y) in the clinical setting using Swedish health register data. A secondary objective was to estimate the health benefit of treatment in this elderly population.
**Methods:** National registers and data from DXA machines were used to study effectiveness of all available OP treatments in women 60-79 and ≥80 y using three different methods: 1) BMD change up to 8 y after treatment start; 2) fracture incidence where patients served as their own controls, comparing the first 3 months after treatment start (proxy for no treatment) with the subsequent 12 months; and 3) fracture incidence postfracture in women ≥80 y treated with either OP treatment or Ca/Vit-D monotherapy. QALYs from treating women who received Ca/Vit-D for 3 y after a fracture were estimated with the IOF reference model using effectiveness results from this study.
**Results:** Analysis 1 (n=2161): Total hip BMD increased by up to 6.7% and 7.7% in women 60-79 and ≥80 years old, respectively. Increase in BMD was 1.1% per year in both age groups. Analysis 2 (n=116,581): Relative to the 3-month baseline, fracture incidence was lower in the subsequent 12 months of treatment. Incidence rate ratios were estimated at 0.65, 0.74, 0.29, and 0.81 for any, hip, vertebral and nonhip-nonvertebral fractures respectively (p<0.05), with no statistical differences between age groups. Analysis 3 (n=25,805): Incidence over 24 months of any fracture in women ≥80 y on OP treatment (21%) was lower than women given Ca/vit-D (15%) (adjusted HR=0.78, p<0.05). Treatment allocation was not random, with higher mortality (HR=2.0) and fewer prior vertebral fractures (14% vs. 32%), but more hip fractures (43% vs. 31%), in patients on Ca/vit-D. QALYs gained from treatment was estimated at 0.101, 0.046, 0.035 in women 65, 80, and 85 y.
**Conclusions:** Treatment effect on fracture risk and BMD was similar in the oldest old and younger women. Treatment decisions after fracture in women ≥80 y appears to be influenced by health status and prior fracture type over other risk factors. Health benefits in older patients are attenuated by shorter life expectancy but still tangible and warrant treatment consideration.

## P1030
## MIDTERM RESULTS OF MINIMALLY INVASIVE ANTEROLATERAL THA USING A SHORT FEMORAL STEM

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**Objective:** Short femoral stems became available in Japan in 2012. The objective of this study is to evaluate the outcome of THA using short femoral stem (Taperloc Micropasty) in Japanese patients.
**Methods:** We retrospectively reviewed all 60 THA between July 2013 and December 2015 at our institute, and 32 THA (53%) were done with short femoral stems. A single orthopedic surgeon performed all THA procedures. The surgical approach was antero-lateral in the lateral position in all cases. The mean age of patients at the time of surgery was 66.7 y. The original diseases were 29 osteoarthritis and 3 osteonecrosis.

**Results:** There was no revision, infection, deep vein thrombosis, nor dislocation. One patient had femoral fracture during the surgery, we had to switch the stem to the standard one in this case. The average surgery time was 108 min (range, 80-168 min); the average blood loss during surgery was 282 g (range, 95-720 g). The cup we used was Regenerex M2a Taper (Zimmer Biomet). Median cup size was 52 mm (range, 48-60 mm); median stem size was 8 and 9 (range, 4-13). The bearing surfaces were all ceramic on highly crosslinked polyethylene. Radiological findings showed stem subsidence (within 5 mm) in 2 patients; one had severe osteoporosis, while the other had leg length discrepancy.
**Conclusions:** THA using a short femoral stem has satisfactory clinical and radiological results in Japanese patients.

## P1031
## SARCOPENIA AND RELATED FACTORS IN HOSPITALIZED PATIENTS

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**Objective:** Patients admitted to the hospital due to an acute illness may develop sarcopenia due to the acute illness itself or previous chronic diseases, decreased physical activity and nutrition and appetite problems. We aimed to investigate sarcopenia and associated factors in patients admitted to our inpatient clinic.
**Methods:** Between April 2017–December 2017, prospectively with patients admitted to the study. Patients were evaluated with bioimpedance analysis (BIA), normal gait speed (NGS) and hand grip strength (HGS) within the first 48 h after admission and BIA, NGS and HGS measurements were repeated during discharging. Age, height, weight and gender data were also recorded.
**Results:** A total of 143 patients admitted to the study were included. The mean age of the patients was 62.3±17.6. The prevalence of sarcopenia was 24%. There was a significant difference the HGS (21.8±11.4 at the time of admission and 23.9±10.4 at the discharge) between admission and discharge. The difference between the mean values of the BIA muscle analysis (47±9.2 on admission and 44.8±7.4 on exit) between admission and discharge was found to be statistically significant (p=0.02). There was a significant positive correlation between hand grip strength and BIA muscle analysis at admission and discharge. This suggests that patients recovering from acute illness may have improved muscle function, although there is no increase in muscle mass.
**Conclusion:** In the study, it was determined that muscle function measured by HGS and NGS was better at the discharge. This suggests that recovery of acute disease can improve muscle function without changing muscle mass.

## P1032
## ANALYSIS OF FACTORS AFFECTING BONE MINERAL DENSITY IN AN INDIAN ADULT POPULATION

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**Objective:** As the age advances the plethora of chronic diseases does too. Comorbidities often adversely affect the management of osteoporosis. There is a need for detailed information on the comorbidities that may alter the course of osteoporosis by reducing the BMD. The T-scoring system is based on females, male remain under diagnosed or undertreated. We aimed to determine the factors affecting BMD.
**Methods:** The height and weight indexing was done at the time of visit, and the BMI calculated accordingly. Brief history (including comorbidities and time since menopause) taken and documented. The BMD was measured using Sunlight mini omni machine, which is an ultrasound based scan. The software (provided by the company) computed the T-score. All the patients were prescribed standard calcium and vitamin D preparation. And was followed up for a minimum of 6 weeks. Two consecutive follow-up was taken. The follow-up (response to treatment) was done on the basis of T-score.
**Results:** 542 cases were included of which 445 were females and 97 were males. The BMI calculated showed significant difference between the groups (p=0.035). There was significant difference between overweight and obese (p=0.047). On assessment of T-score on the first visit males had a mean of -1.25±1.40 and the females had a mean of -1.66±1.31. On follow-up both the groups had a positive response to treatment. But males had a slower response to treatment (p=0.005). The menopausal women (n=311) had a negative relationship between BMD and duration of menopause. There was positive trend in the response to treatment in diabetics and hypertensives, but there was no statistical difference between cases with diabetes and hypertension and those without.
**Conclusion:** Contrary to the current literature, high BMI can be associated with lower levels of BMD. Response to treatment is slower in male in comparison to females. There is an inverse relationship between BMD and duration of menopause. There is a positive response to treatment even with patients with comorbidities.

## P1033
## PTH TYPE-1 RECEPTOR GENE EXPRESSION ANALYSIS DURING IN VITRO MYOGENESIS OF HUMAN SKELETAL MUSCLE SATELLITE CELLS

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**Objective:** The skeletal muscle function is severely impaired in hypoparathyroidism. The direct effect of PTH deficiency in skeletal muscle regeneration has not been fully elucidated. Satellite cells are the stem cells of the skeletal muscle, responsible for skeletal muscle regeneration. The aim of this work is to analyze the expression of PTH type-1 receptor (PTH1R) during *in vitro* myogenesis of human satellite cells (hSCs).
**Methods:** The hSCs were isolated from healthy human skeletal muscle biopsies and characterized by analysing the presence of gene and protein of the main nuclear transcription factor PAX7, by PCR and flow cytometry (FACS), respectively. To establish a model of *in vitro* myogenesis, hSCs were grown in differentiation medium for 7 days and we have characterized the myogenic phenotype, by verifying the presence of multinucleated cells by microscopy and the expression of terminal differentiation marker Myosin Heavy Chain (MHC) by qPCR. To detect variation in expression of PTH1R gene during *in vitro* myogenesis, the hSCs were grown for $T^0$-3-6-9 days in myogenic differentiation medium and qPCR was performed.
**Results:** We have isolated and established the primary culture of hSCs. The results of PCR and FACS analysis in cultured hSCs have shown the presence of the gene and the protein (98%) of PAX7, respectively. We have confirmed the myogenic phenotype during differentiation by detection of multinucleated cells and by a significant increase in expression of MHC gene vs. control group $T^0$ ($p<0.05$). The obtained results show the suitability of the *in vitro* myogenesis model, for further studies. The results of PTH1R gene expression analysis have shown a significant increase of this receptor after 6 days of *in vitro* myogenesis vs. control group $T^0$ ($p<0.05$).
**Conclusion:** The results have shown the successful isolation and characterization of cultured hSCs and the establishment of an *in vitro* myogenesis model, used for the PTH1R expression analysis. The major finding of the studies is detection of increase in expression of the PTH1R gene during myogenic differentiation, suggesting the possible involvement of PTH1R in myopathies related to hypoparathyroidism.
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## P1034
## STATIN EFFECTS ON THE BMD FOR DYSLIPIDEMIC SMOKING PATIENTS VS. NONSMOKING ONES

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**Objective:** The prevalence of osteoporosis depends on the risk of bone mass loss, as well on the risk factors that accelerate this process. Statins are widely used as lipid-lowering medicines; however other beneficial effects have been observed. some of which have an impact on the bone metabolism. This study aims at establishing if statins have the same beneficial effects on osteoporosis smoking patients.
**Methods:** There have been included in the study a number of 63 smoking patients (42 men, 21 women) with high values of total cholesterol and triglycerides. 17 of whom follow a statin cure. We have excluded subjects with autoimmune and inflammatory chronic diseases as well as those with corticotherapy and those who have followed of are currently following bisphosphonate treatment. The study was carried on between 2016-2018 and included patients aged between 53-68. For the patients' evaluation we have applied a survey referring to the number of smoked cigarettes a day, the duration of smoking and the dose of statins administered per day. For measuring BMD, we have used the DXA lumbar spine.
**Results:** In the studied groups, BMI averaged 20.7 kg/m2, the duration of smoking was on average 10 y (±2), and the average number of cigarettes per day was 18. The doses of statins administered did not exceed 40 mg/d, the drugs used were atorvastatin (80%) and sinvastatin (20%). BMD measurements have shown higher T-score values in the lumbar spine DXA for statin treated smoking patients as compared with the statin nontreated smoking patients considering the number of smoked cigarettes a day; thus, according to the number of cigarettes per day we recorded the following T-score values: for smokers of between 1-10 cigarettes/d (-0.21, - 0.71) with statins vs. (-0.7, -1.3) for those without statins, for those with 11-20 cigarettes/d a T-score (-0.43-0.98) with statins vs. (-0.87, -1.8) for those without treatment and for smokers of over 20 cigarettes/d a T-score (-0.49, -1.3) with statins vs. (-1.3, -2.1) for the nonstatin ones.
**Conclusions:** Our study has demonstrated the potential beneficial role of statin use in dyslipidemic patients, even in the presence of additional risk factors such as smoking, in increasing or maintaining the BMD, through stimulation of bone formation, biochemical mechanisms of cholesterol synthesis and osteoclastogenesis being similar.

## P1035
## OSTEOPOROTIC HIP FRACTURES IN THE WEST OF IRELAND: A SECULAR TREND ANALYSIS (2005-2015)

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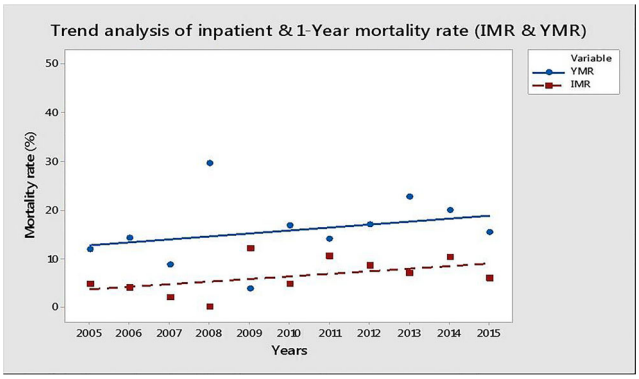
**Objective:** Review trends of demographics, hospital length of stay (LOS), inpatient and 1-y mortality rates (1YMR) among West of Ireland hip fragility fracture patients between 2005-2015.
**Methods:** A recent IOF report states Ireland has the 6th highest rate of hip fracture, but published data are limited. As part of our hospitals' FLS programme, The HOOF Project, data were cleaned, validated and summarised for admissions from 2005-2015. Analytical statistical methods were used to summarize inpatient (IMR) and 1YMR using the one sample proportion statistical test. Subgroup analyses included age and gender specific mortality rates.
**Results:** 4792 patients were identified, and some missing data especially 2008 and 2009. 2899, 2307, 1705, and 1680 patients had validated data for analysis of demographics, LOS, inpatient and 1-y mortality respectively. Median age was 80 y (IQR: 80-87), and increased from 79 in 2005 to 83 in 2015. 71% were female (range: 61-79), and remained stable. Median inpatient length of stay was 13 d (IQR: 9-21); a slight decline was noted. IMR and 1YMR increased, average rates: 6.6% (95%CI: 5-8), and 16% (95%CI: 14-18) respectively.
**Conclusions:** Our analysis is in keeping with prior Irish studies. Despite an overall decline in LOS, IMR and 1YMR fragility remain high in Irish hip fracture patients.




## P1036
## TREATMENT OF AN ADULT PATIENT WITH HYPOPHOSPHATASIA WITH ASFOTASE ALFA

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Hypophoshatasia is a rare condition in osteomalacia and is due to a mutation in the TNSALP (tissue-nonspecific alkaline phosphatase) gene. Clinically, it may present as osteoporosis. Therefore, if a patient with osteoporosis also shows low level of alkaline phosphatase the diagnosis of hypophosphatasia has to be considered. Therapy of hypophosphatasia is challenging. The following case report demonstrates the course of treatment in an adult patient.
Patient history: The female patient, born in 1963, presented herself for the first time in 2010. She suffered within a short time interval fractures of both ankles without adequate trauma. Fracture healing was delayed, so that the patient was immobilized and unable to walk. The patient was premenopausal. Risk factors for osteoporosis were a mild diabetes mellitus, lactose intolerance and familial osteoporosis disposition. DXA bone densitometry yielded a femoral neck T-score of -2.0. Differential diagnosis of hypophosphatasia was discarded despite low alkaline phosphatase levels because pyridoxal phosphate levels (vitamin B6) as an additional hypophosphatasia marker were normal. After approval by the health insurance company, osteoanabole treatment with teriparatide (in premenopausal women off label) was performed over 18 months. With this therapy, the ankle fractures healed and the patient was able to walk again. Consecutively, alendronate was given as sequential therapy. After 3 y of alendronate therapy the patient suffered fractures of the feet and was again immobilized. Therefore, differential diagnosis of hypophosphatasia was considered again and molecular genetic analysis was performed. Two mutations in the TNSALP –Gen werde detected: c.787>C: T/C het and c.1565>C: T/C het, thus confirming the diagnosis of hypophosphatasia. An enzyme replacement therapy with Asfotase Alfa (Alexion Inc.) was started. No further fractures occurred, the patient remained mobile and her quality of life was markedly increased.
**Conclusions:** In patients with low levels of alkaline phosphatase and an unusual course of osteoporosis hypophosphatasia should be considered even if pyridoxal phosphate levels are normal. Nowadays, the confirmation of diagnosis of hypophosphatasia by molecular genetic analyzes is possible. Enzyme replacement therapy with Asfotase Alfa is successful in adult patients, too.

## P1037
## ULTRASOUND, DYNAMOMETRY AND ELASTOGRAPHY: A PILOT STUDY OF THE CLINICAL FEASIBILITY OF DIFFERENT DIAGNOSTIC TECHNIQUES IN THE MUSCLE EVALUATION

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**Objectives:** This pilot study was to assess the clinical feasibility of the ultrasound in evaluating muscle function, if it is

possible to obtain accurate information in everyday practice with an ultrasound and how the sonographically obtained parameters correlate with muscle strength assessed with a dynamometer.

**Methods:** Measurements were performed on a homogenous cohort of 9 healthy volunteers (4 of them female) aged 26-34 y (mean 29). Rectus femoris (RF) was evaluated with the ultrasound in its middle third during muscle relaxation and maximum voluntary isometric contraction of the knee extensors of the dominant leg. Parameters measured with the ultrasound with the knee at 90° angle and the patient seated over the edge of the table were: muscle thickness (MTr - relaxed, MTc - contracted), pennation angle (PAr - relaxed, PAc - contracted) and muscle cross-sectional area in the relaxed (CSAr) and contracted state (CSAc). RF muscle stiffness was evaluated with shear-wave elastography in the longitudinal plane in the relaxed and contracted muscle (SWEr - relaxed, SWEc - contracted). The isometric extensor knee torque was tested with isokinetic dynamometer at 90° knee angle.

**Results:** Statistically significant differences were found between MTr and MTc (p=0.015) as well as SWEr and SWEc (p=0.008). The differences between CSAr - CSAc and PAr - PAc were not statistically significant (p=0.260 and p=0.671, respectively). A strong correlation was found between extensor knee torque and SWEc using the Spearman correlation coefficient (R=0.683; p=0.042). Change in CSA and MT also statistically significantly correlated with knee extensor torque (R=0.667, p=0.05; R=0.678, p=0.045, respectively) but change in PA did not (R=-0.294, p=0.442).

**Conclusion:** The results of our pilot study show that SWE strongly correlates with muscle strength; however, the sample size was too small to draw firm conclusions. According to changes in muscle thickness and cross-sectional area of the muscle in our sample, these parameters could also predict muscle strength but this was not the case with changes in pennation angle in our study.

## P1038

## SEX HORMONES INTERACTION WITH TRABECULAR BONE SCORE AND MINERAL DENSITY IN MEN

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**Objective:** To evaluate the relationship of sex hormones with bone quality and mineral density in men.

**Methods:** We examined 72 men aged 40-87 y. Depending on their BMI, all the subjects were divided into 2 groups: Group I – 19 men with obesity whose BMI was ≥30 kg/m$^2$ (mean age 60.3±10.8 years, height – 177.3±5.8 cm, weight – 102.5±7.6 kg, BMI 32.6±1.9 kg/m$^2$), and Group II – 53 men without obesity and BMI of <30 kg/m$^2$ (mean age – 60.5±13.5 y, height – 174.6±6.9 cm, weight – 79.2±10.3 kg, BMI – 25.9 ±2.4 kg/m$^2$). The BMD of lumbar spine at the site $L_1$-$L_4$ and femoral neck were measured by DXA (Prodigy, GEHC Lunar, Madison, WI, USA). The TBS of $L_1$- $L_4$ was assessed by means of TBS iNsight® software installed on our DXA machine (product of Med-Imaps, Pessac, France). Total testosterone and SHBG were measured in all the subjects using an enzyme immunoassay method. The level of free testosterone was calculated using the ISSAM website calculator.

**Results:** In general, we found that obese men have a significantly higher BMD at the level of lumbar spine (group I – 1.402±0.232 g/cm$^2$, group II – 1.203±0.245 g/cm$^2$, F=9.08, p=0.004) and femoral neck (I group – 1.050±0.141 g/cm$^2$, group II – 0.925±0.164 g/cm$^2$, F=8.80, p=0.004) in comparison with men of no obesity. Significant differences between the groups for the TBS were not found. When assessing the hormonal status in men, it was revealed that obese men have a significantly lower total testosterone (group I – 12.55±3.48, group II – 17.64±6.10, F=11.74, p=0.001) and SHBG (group I – 43.03±20.27, group II – 58.15±25.39, F=5.46, p=0.02). However, the probable differences in the levels of free and bioavailable testosterone were not found. The level of SHBG increased with age and there was a probable negative correlation with BMD of femoral neck (r=-0.39; p<0.001). There was no significant correlation between total testosterone and BMD of femoral neck in men with a normal body weight (r=-0.19, p=0.2) and an obesity (r=0.02, p=0.93). Significant association between TBS and sex hormones in men was not revealed.

**Conclusions:** Men with obesity have a significantly lower total testosterone and SHBG, but their BMD is significantly higher than the one of men with a normal weight.

## P1039

## PREVALENCE OF GASTROINTESTINAL EFFECTS IN OSTEOPOROSIS PATIENTS WITH BISPHOSPHONATES

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**Objective:** Bisphosphonates, such as alendronate, risedronate, ibandronate and zoledronate, are the leading drugs that have been used in the treatment of osteoporosis. Usually, they are well tolerated and safe, however side effects have been observed, such as gastrointestinal and kidney consequences, osteonecrosis of the jaw, atrial fibrillation and esophageal cancer. We have considered 40 women patients

with osteoporosis following bisphosphonates treatment in which we assessed the prevalence of gastrointestinal effects.
**Methods:** 40 postmenopausal women prescribed with osteoporosis medication were enrolled in the study. The average age of the study-group was 62.5 y (58-73) and the average duration of the treatment lasted for a period between 3 months and 4 y.
**Results:** Of the total number of subjects, 8 (20%) patients presented at least one gastrointestinal side-effect. In 37,5% of the cases, heartburn and indigestion were the dominant consequences, 12.5% complained of vomiting and nausea, 25% had an aggravated pre-existent gastroesophageal reflux. 15% of the patients already had preexistent risk factors of gastrointestinal comorbidities such corticosteroids treatment, alcohol consumption or smoking.
**Conclusions:** Gastrointestinal side effects of oral bisphosphonate consumption are often observed in postmenopausal women with osteoporosis, but these effects can be minimized in the case of patients taking oral bisphosphonates on an empty stomach, with plain water, while remaining in an upright position without eating or drinking for at least 30-60 min.

## P1040
## GENDER FEATURES OF BONE MINERAL DENSITY IN THE UKRAINIAN PATIENTS WITH NEUROLOGICAL DISORDERS

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**Objective:** Stroke, Parkinson's disease and systemic osteoporosis are important age-related diseases which are associated with an increased disability. Each of them has own prevalence, risk factors and clinical features; however, their combination is life threatening for older age patients. Furthermore, gender is a common crucial risk factor for both pathologies. The aim of this research was to study the gender features of BMD and body composition indexes in patients with stroke and Parkinson's disease.
**Methods:** We performed a cross-sectional case-control research design and examined 295 patients aged 50-80 years old, who were divided into three groups: the first group – patients without PD and any other illnesses and conditions which may influence the bone state and turnover (control group, n=126 (66 women and 60 men)), the second group – patients with PD (n=85 (47 women and 38 men)), the third group - patients after stroke (n=84, 40 men and 44 women). BMD was measured using the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA).
**Result:** Our study showed an increased incidence of osteoporosis in patients with neurological disorders in comparison with the control group. Males after stroke had a significantly lower total body, upper extremity and trunk BMDs compared to indexes of control group without any differences in lower extremity BMDs in contrast to the women after stroke who had lower BMDs of total body, trunk and upper/lower extremities in comparison with parameters of the control group. The results of our study indicated significant difference between the BMD values in PD patients compared to controls in women at lumbar spine, femoral neck and proximal femur, distal radius and total body in contrast to men, who demonstrated lower BMD indexes of femoral neck, distal radius and total body compared with control group.
**Conclusion:** BMDs in patients with neurological disorders have their own national and gender particularities that should be taken into account during their assessment and development of rehabilitation programs.

## P1041
## CAN WE AVOID THE LOSS OF BONE MINERAL DENSITY ONE YEAR AFTER DENOSUMAB DISCONTINUATION? THE REOLAUS BONE PROJECT

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**Objectives:** Denosumab discontinuation (DD) induces bone turnover markers (BTMs) increase, BMD decrease, and increased risk of spontaneous vertebral fractures. Prescribing a bisphosphonate after DD could avoid this rebound effect. The objective of the ReoLaus (Rebound Effect Observatory in Lausanne) Bone Project is to follow bone parameters after DD. We report the determinants associated to BMD loss 1 year after DD.
**Methods:** 170 patients are followed in ReoLaus. Patients with a BMD follow-up ≥1 y after DD with a standardized management were included. We defined as significant a lumbar spine BMD loss (Loosers group) over 3.96% at one year after DD as compared with values at the end of the denosumab treatment 18 months after last injection.
**Results:** 71 postmenopausal women stopped denosumab after 7.7±2.2 injections: age 63.8±8.1 years, BMI 23.8±4.5, 0.96 prevalent fractures/patient, 8.45% previously exposed to corticoids, 22.54% to anti-aromatases. 17.25 months after last denosumab injection 30 patients were classified as Loosers and 41 as Stable. At denosumab introduction Loosers were younger (61.4±7.3 vs. 65.5±8.2 y, p=0.034) with higher sCTX level (644.7 vs. 474.1 ng/ml, p=0.005). The rate of BP given <2 y before denosumab was not different, but none of the Loosers had received zoledronate vs. 12% of the Stable (p=0.047). Other pre-denosumab characteristics were not different. Number of denosumab injections, BTMs and BMD values were comparable in both groups during denosumab treatment. First BTMs values measured 7.5 months (median) after last denosumab injection and before bisphosphonates were not different (sCTX: Loosers, 592 ng/ml; Stable, 379 ng/ml, p=0.06). At DD 59% received zoledronate, 24% alendronate, 3% others, and 14% nothing (p=0.39 between groups). BTMs 12.8 months post-BP were higher in Loosers as compared to Stable (sCTX 537 vs. 336 ng/ml, p=0.009).

Incidence of new fractures was low (0.18/patient) without between group's difference.
**Conclusion:** In our subcohort, being younger, having high BMTs and not having received zoledronate before denosumab introduction increases the risk of a BMD loss, even if a bisphosphonate is prescribed at DD. Our results support the use of denosumab after a bisphosphonate to restrain the BMD loss at its discontinuation.

## P1042
## RELATIONSHIP BETWEEN DIABETES AND HANDGRIP STRENGTH AMONG KOREANS AGED MORE THAN 20 YEARS

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**Objective:** Handgrip strength (HGS) is simple, quick, and inexpensive method to measure muscle strength. Few studies investigated the relationship between the diabetes and handgrip strength, but their results are conflicting. This study assessed the association of relative handgrip strength with the diabetes in the Korean adult population.
**Methods:** Data from 7644 Korean adults aged ≥20 y (3,377 men and 4,276 women) who participated Korea National Health and Nutrition Examination Survey (KNHANES) 2014 to 2015 were analyzed.
**Results:** The increasing quartiles of relative HGS (defined as the sum of both hands' HGS divided by BMI) were inversely associated with the risk of diabetes in both men and women (OR, 0.74; 95%CI, 0.65-0.85, vs. OR, 0.66; 95%CI, 0.55-0.79, respectively) after multivariable adjustment for age, smoking status, monthly alcohol consumption, regular aerobic exercise, and education level. On multivariable logistic regression analyses, participants with the highest relative HGS had a significant decrease in relative risk of diabetes, compared with those with the lowest relative HGS. The multivariable adjusted ORs (with 95%CIs) for Diabetes in quartiles 1, 2, 3, and 4 were 1.00, 0.73 (0.51-1.04), 0.71 (0.48-1.05), and 0.34(0.21-0.55) in men and 1.00, 0.80 (0.55-1.17), 0.56 (0.34-0.93), and 0.22 (0.11-0.42) in women, respectively.
**Conclusions:** Relative HGS, which is which is an indicator of muscle strength, was inversely associated with the risk of diabetes in Korean adults. Top of form longitudinal studies are required to investigate the association between muscle strength and diabetes.

## P1043
## INTERNALIZATION OF THE SUBSTANCE P RECEPTOR FOLLOWING TREADMILL EXERCISE IN AN ANKLE JOINT MODEL OF OSTEOARTHRITIS

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**Objective:** The internalization of the receptor for substance P, the neurokinin-1 receptor (NK-1r) on lamina I projection neurons of the spinal dorsal horn has been used as a marker of nociceptive responses. Lamina I is an important centre for the modulation and forwarding to the brain of pain-related information. Therefore, changes in the properties of lamina I projection neurons may be important for pain. Previous work from our lab has shown de novo expression of NK-1r on lamina I pyramidal neurons in both neuropathic pain and inflammatory arthritis models. In addition to this, we have shown that forced movement of an inflamed joint or intradermal injection of capsaicin leads to NK-1r internalization. This project aims to investigate whether internalization of the receptor on NK-1r positive neurons will occur in a rat ankle joint model of osteoarthritis (OA) after a treadmill exercise.
**Methods:** Using rats of both sexes, OA was induced using an injection of the glycolytic inhibitor monoiodoacetate (MIA) into the right tibio-talar joint. At 8 weeks post MIA injection, a time where OA-related pain is consistent and irreversible, animals were forced to run for 10 min at a speed of 15 m/min on a treadmill and immediately perfused. NK-1r internalization was then analyzed using immunocytochemistry and confocal microscopy.
**Results:** Qualitative analysis of our results shows that running MIA animals underwent significant internalization of the NK-1r as compared to nonrunning MIA animals and vehicle-injected controls. This indicates that movement during a treadmill exercise results in pain, which is of significance as pain during movement is a major complaint of osteoarthritis patients.
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## P1044
## IMPACT OF HYPOGONADISM ON BOTH CORTICAL AND TRABECULAR COMPARTMENTS AT THE PROXIMAL FEMUR USING 3D DXA MODELING APPROACH

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**Objective:** In men may lead to an overall bone loss and thus, one of the major causes of secondary osteoporosis in men. The aim of this study was to evaluate the effect of hypogonadism on the cortical and femoral bones.
**Methods:** The BMD of the lumbar spine and hip by DXA (QDR4500 Acclaim and Discovery W, Hologic, USA) in 60 hypogonadal [(HYP+), mean age=51.4 ±16.2 years] and in 70 normal (HYP-) men; 3D DXA modeling was performed using a software algorithm (3D-SHAPER® v2.9, Galgo Medical, Spain) in order to derive QCT-like subject-specific 3D models from the hip DXA scans. The following 3D measurements were extracted: the trabecular and cortical volumetric BMD (Trabecular/cortical vBMD), the cortical thickness (Cth) and the cortical surface BMD (Cortical sBMD) as well as neck cross-sectional moment of inertia (CSMI) and Z modulus. In addition, appendicular fat and lean mass were assessed using dedicated DXA acquisition. Adequate statistical tests were used depending on parameter normality distribution (statistical significance $P<0.05$).
**Results:** The mean age, height, weight and BMI were identical. HYP+ had lower BMD at both lumbar spine ($p=0.003$) and total femur ($p=0.0001$), lower lean mass than HYP- (54 *vs.* 58 kg, $p<0.01$), but higher fat content (26 *vs.* 21 kg, $p<0.01$). Univariate 3D analysis showed impairment of both compartments in HYP+ (all $p<0.01$). Among all 3D measurements, Cth was the best discriminant between HYP+ and HYP- ($p=0.0004$). Further, HYP+ had lower CSMI and Z modulus ($p<0.0001$). Multivariate analysis showed that, among all studied parameters (2D and 3D), femoral neck CSMI was the best to discriminate the presence of hypogonadism ($p<0.0001$) with an AUC of 0.72 [0.64-0.8].
**Conclusion:** In this first study, several bone parameters, measured either by conventional 2D DXA or using 3D DXA-based modeling, were impaired in hypogonadism. 3D analysis highlighted a more prominent negative effect of hypogonadism on the cortical thickness and CSMI. These results suggest a possible major involvement of the cortical compartment in such condition and a bone more likely to sustain a fracture.

## P1045
## MUSCLE ASSESSMENT IN PATIENTS WITH ANKYLOSING SPONDYLITIS: ARE THEY AT RISK OF SARCOPENIA?

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**Objective:** Ankylosing spondylitis (AS) is an impairing chronic condition associated with pain and rigidity. The main aim of this study was to assess sarcopenia and muscular inflammation in progress in this pathology.
**Methods:** A prospective noninterventional study was performed on 73 patients. Definition of European Working Group on Sarcopenia in Older People, classifying patients with sarcopenia was used. Ultrasound examinations (US) of scapulo-humeral and coxo-femoral joints assessed muscular inflammation. Moreover, muscle strength was estimated by using handgrip dynamometer test (low muscle strength <20 kg in women and <30 kg in men) [1] and muscle mass as in Landi's formula: MAC=mid-arm circumference –(3.14 x triceps skinfold thickness) (low muscle mass as MAC<21.1 cm in men and MAC<19.2 cm in women) [2].
**Results:** Two-thirds were men, diagnosed in their early 30s, with more than 15% having family antecedents and hip replacement surgery. Only 60 patients were fully examined. The majority of them was hyperstenic (BMI=28.44 kg/m$^2$), meanwhile more than half of them hypertensive and 1/3 had diabetes. Inflammatory markers were elevated in more than 15% patients, respectively typical joints alterations were present (40% osteophytes, 23% entesophytes, 19% calcifications). MAC proved that more than 15% of patients have a low muscle mass and dynamometer tests pointed out that more than 25% of men and 75% of women had low muscle strength, both decreasing by age. An association between visual analogue scale and muscular strength was observed ($p=0.003$; $p=0.002$). Also, US could play a role in diagnosing protocol of sarcopenia as associations between US and MAC (for osteophytes $p=0.015$), respectively US and muscle strength (for entesophytes $p=0.005$) were proven.
**Conclusion:** The muscle performance of the patients with AS is severely affected, particularly in women. A muscle strength decrease, by ageing could have a toll on life quality.
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## P1046

## MYELITIS AS A BEHCET DISEASE MANIFESTATION

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**Objective:** Behcet disease is a multisystemic vasculitis, of unknown cause, that typically runs a relapsing and remitting course, with recurrent bipolar aphthosis and eye, skin, nerve, vessel or joint involvement. Central nervous system is involved in <5% of the cases, especially in men. Most frequently involved segment is cerebral trunk with pyramidal tracts, III, IV and VI cranial nerves.

**Methods:** We present the case of a 50 yo male, with the onset of the disease 10 y before presentation. He was then suspect for having a seronegative spondyloarthritis on inflammatory back pain, MRI, with bilateral sacroiliac bones STIR hypersignal, but with negative result for HLA-B27) and he started treatment with 2 g of sulphasalazine, for 2 y, with no improvement and more than that, he started to feel numbness in hands and feet. He was referred to a neurologist, that recommended electromyography, and cervical MRI that showed myelitis at the level of C3-T9. Laboratory tests revealed ANA negative, rheumatoid factor absent, HLA B51-pozitiv, HLA DR 17-pozitiv.

**Results:** Based on HLA B51 positivity, nervous system involvement, mouth and genital aphthosis and specific eye involvement, he was diagnosed with Behcet disease and the treatment with cyclophosphamide 600 mg per months, for 6 months, was started, followed by Azathioprine with a good outcome. Later assessment included MRI of the lumbar spine and sacroiliac joints, that showed no bone marrow involvement progression.

**Conclusion:** Imaging methods, as MRI a musculoskeletal ultrasonography gained more and more importance lately, due to quick and accurate diagnosis and to the possibility of dynamic evaluation of the patient's response to treatment.

## P1047

## THE ROLE OF MUSCULOSKELETAL ULTRASONOGRAPHY IN THE EVALUATION OF CONJUNCTIVE TISSUE DISEASES PATIENTS WITH HAND TENDONS INVOLVEMENT

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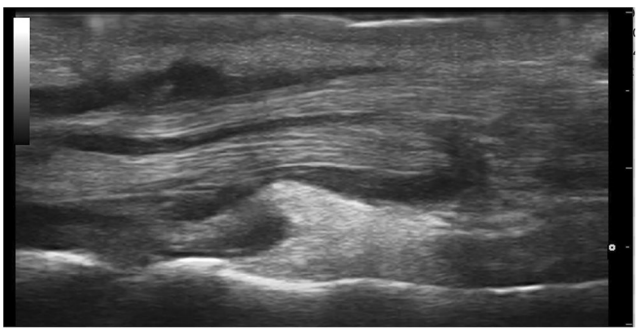
Infections are frequent in patients with autoimmune diseases, sometimes promoting autoinflammatory process and sometimes secondary to immune system disfunction or to immunosuppressant therapies. Our aim was to prove the role of musculoskeletal ultrasonography in evaluation of conjunctive tissue diseases patients with hand tendons involvement

**Methods:** We present the case of a female 40 yo patient, former smoker, known with an overlap syndrome, SLE with hematologic, joint, kidney and serositis involvement and systemic scleroderma, with limited skin involvement. Autoimmune status was confirmed by the presence of anti dsDNA, anti-Sm, antihistone, antiribosomal p protein, anti-SCL 70 antibodies. At admission time, the patient status was influenced, with specific facies, digital ulcers, telangiectasia on the face and thorax, and active/late capillaroscopic pattern. Blood tests showed increased inflammation markers and complement consumption. Kidney tests showed a proteinuria of 1317.50 mg/24h. Computer tomography (CT) of the thorax initially revealed basal opacity, that was interpreted as bacterial pneumonia and was treated with macrolide and quinolones antibiotics, with good outcome. Control CT showed basal and apical fibrotic lesions. The patient remained on 20 mg/d prednisone, 50 mg/d azathioprine and peripheric vasodilators and after 2 months, she presented with no skin ulcers, clinical status improved, except pain, fusiform swelling, flexed resting position and local celsian signs present at the level of the third right finger.

**Results:** Ultrasonography of the hand showed dactylitis of the 3rd right finger, with tenosynovitis of the flexor tendons, synovitis of the metacarpophalangeal (MCP) and proximal interphalangeal joints. Despite empirical antibiotic treatment, with a 2nd generation cephalosporin, there was no improvement in the finger symptoms after 2 weeks and the patient was sent to Plastic surgery Department. The infectious tenosynovitis was confirmed and after surgical drainage was tried with no results, finger amputation was decided, at the level of MCP joint with respect to the systemic scleroderma disease, with favorable outcome.

**Conclusion:** Ultrasonography permitted fast and accurate diagnosis of the tendon involvement and although tenosynovitis is a common finding in patients with systemic scleroderma, the glucocorticoids and immunosuppressant therapies favored infection at the tendon sheet level.



## P1048
## CASE REPORT: TIBIAL NERVE DAMAGE DUE TO BAKER'S CYST ASPIRATION

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**Objectives:** Baker's cyst is one of the most common masses of popliteal fossa, which is caused by swelling of the gastrocnemius-semimembranosus bursa filled with joint fluid. Although most Baker cysts commonly present as an asymptomatic mass, they may cause clinical problems such as thrombophlebitis, compartment syndrome, and entrapment neuropathy. Among those, neuropathy can occur either from the cyst itself or after cyst rupture. Treatment options include medication, cyst aspiration and surgical removal.

**Methods:** We introduce a case of tibial nerve injury due to aspiration of Baker's cyst. For this case report, we tested MRI of knee and needle EMG.

**Results:** A 53 years old man presented with pain, burning and numbness started from the left popliteal region radiating down through the posterior thigh, calf and dorsolateral of foot. These symptoms had been started suddenly about 1 month before the cyst aspirated by the doctor. Hypoesthesia was seen in the dorsolateral of the foot and no motor losses. MRI revealed a baker's cyst of approximately 2.8 cm away from the tibial nerve with a diameter of 2 cm. Knee joint was in a normal form. The EMG revealed that the motor parts of tibial and sural nerve were not affected, sensation branches were affected. Physical therapy and rehabilitation started Gabapentin and vitamin B complex were added to the treatment. At the end of the 4th month clinical improvement was observed.

**Conclusions:** Although Baker's cyst is frequently seen as asymptomatic, patients with local pain, tenderness and neural compression due to rupture of baker cysts have been reported in the literature. No cases were reported due to aspiration. In our patient, it was not decided whether the damage in the nerve was due to the contact of the needle to the nerve during aspiration or the chemical reaction due to the rupture of the cyst during that time. As a result, aspiration of baker's cyst should not be preferred because of the possibility of recurrence and complication. We believe that aspiration should be performed on the threshold of USG to avoid complications in cases where the patient is not suitable for surgery and cannot respond to conservative treatment in rare cases.

## P1049
## RISK FACTORS ASSOCIATED WITH LOW BONE DENSITY AND FRACTURE RISK IN ADULTS WITH INTELLECTUAL DISABILITY

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**Objectives:** The population of people with intellectual disabilities (ID) is underprivileged and their health needs impact on primary and secondary healthcare specialties. One important aspect of their physical health is bone health as people with ID have increased risk factors associated with osteoporosis. It has been identified that this population has an increased prevalence of low BMD and osteoporosis. The aim of this study was screening of the risk factors.

**Methods:** This study was conducted in a national education and nursing institution in Yunlin, Taiwan. 200 female adults with moderate to severe ID underwent blood test, BMD and detailed questionnaires. Their basic characters were recorded. Statistical analyses used to evaluate the association included chi-squared tests, ANOVA, and logistic regression. $p<0.05$ was considered as significant.

**Results:** Of these participants, 81% had abnormal BMD, and 43% met the criteria for osteoporosis. After adjusting for potential confounding variables, the determinant risk factors for low BMD were age ($\beta$=0.242, $p$=0.001), lower body weight ($\beta$=0.326, $p$=0.016), menopause ($\beta$=0.239, $p$=0.001) and the scale of falling risk ($\beta$=0.121, $p$=0.04). The risk factors for high fracture risk were age ($\beta$=0.105, $p<0.001$), level of ambulation ($\beta$=1.777, $p$=0.009), and without osteoporosis medication ($\beta$=1.925, $p<0.001$). Though the majority of participants with osteoporosis were under medication treatment, only 29% of participants with osteopenia had received treatment.

**Conclusion:** This study identified a high prevalence of low BMD among adults with ID, even they were in premenopause status. We conclude that we should be screening for the risk factors associated with low BMD in adults with ID. These ID adults who are at high risk of fracture need early treatment to prevent morbidity and improve their quality of life.

## P1050
## OSTEOCALCIN SERUM LEVEL IN PATIENTS WITH NONTRAUMATIC AVASCULAR NECROSIS (AVN) OF THE FEMORAL HEAD

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**Objective:** Osteocalcin is a protein (noncollagenous) that can be found in the bones extracellular matrix, as well as in the circulating blood serum. It is produced by osteoblasts and chondrocytes and stimulated by vitamin K. This protein is a marker of bone formation and turnover. Nontraumatic AVN is a situation that develops during bone cells blood flow interruption. Etiology and pathophysiology of nontraumatic AVN has multiple factors. We aimed in evaluating osteocalcin serum level in patients with nontraumatic AVN of the femoral head in different stages.

**Methods:** We examined 84 patients diagnosed with nontraumatic AVN of the femoral head (48 males, aged 34±6.7 years old and 36 females, aged 29±5.4 years old). AVN diagnosis was established after performing hips MRI. To all the patients osteocalcin serum level was measured using the ELISA-OSTEO kit (13-46 ng/ml). Patients were divided in three groups according to the MRI findings: AVN stage I, II-III, IV (based on AVN classification according to Ficat and Arlet).

**Results:** Osteocalcin serum levels in the three groups of patients in our study represented significant differences. Patients with AVN stage I (20 patients), osteocalcin serum level was low 6±1.09 ng/ml; in the second group with AVN stage II-III (36 patients) osteocalcin serum level was elevated 43±6.4 ng/ml and in the third group with 28 patients osteocalcin serum level was low or near the normal values 13.3±4.5 ng/ml. If we compare the osteocalcin serum levels between the patients with AVN group one and two we can see the high serum levels of osteocalcin indicating that in stage II and III of AVN, bone remodeling is remarkably significant ($p<0.001$); in the third group, AVN stage IV, bone remodeling lowers its intensity and osteocalcin serum level tends to be closer to the normal values.

**Conclusion:** This study results emphasize the role of osteocalcin in non-traumatic AVN. In patients with non-traumatic AVN of the femoral head stage II and III where the bone remodeling process is remarkably significant, the osteocalcin serum level is higher; in patients stage I osteocalcin serum level is lower and it can probably be considered a risk factor for AVN but this issue requires another detailed study; in patients with AVN stage IV where bone remodeling is expected to be lower, osteocalcin serum levels are close to normal.

## P1051
## INCIDENT FRACTURE AND OSTEOPOROSIS RISK IN MIDDLE-AGED WOMEN WITH TYPE 1 DIABETES: A 15-YEAR LONGITUDINAL STUDY

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**Objectives:** To determine the relative risk of incident fracture and osteoporosis diagnoses in middle-aged women with Type 1 diabetes (T1D), compared to age-matched controls, and to examine baseline risk factors for fracture and osteoporosis in this group.

**Methods:** Longitudinal observational study using data from the Australian Longitudinal Study in Women's Health, of 106 women with self-reported T1D and 11,761 age-matched controls. Women were followed for up to 15 y over 6 questionnaires. The main outcomes of interest were self-reported incident fracture and osteoporosis diagnoses. Women with type 2 diabetes were excluded from the study.

**Results:** No differences between mean age at baseline (47.4±1.5 vs. 47.1±1.5 years, p=0.08) or BMI (25.4 ±5.0 vs. 25.8±5.0 kg/m$^2$, p=0.57) were observed between women with T1D or controls. Mean age at

menopause was lower (47.7±3.4 vs. 50.3±3.7 y, p<0.001) in women with T1D. 1180 fractures and 1013 new diagnoses of osteoporosis occurred in the control group, compared to 16 fractures and 18 new diagnoses of osteoporosis in the group with T1D, over 155,328 person-years of follow-up. Incidence rate ratios for fracture and osteoporosis in women with type 1 diabetes vs. controls, were 1.44 (95%CI 0.76 – 2.47, p=0.21) and 2.02 (95%CI 1.17 – 3.24, p=0.001), respectively. The mean time to fracture (7.2±4.3 vs. 9.8±4.3 years, p=0.03) and new osteoporosis diagnoses (6.7±4.6 vs. 8.8±4.0 years, p=0.02) was shorter in women with T1D. Among women with T1D, those with a new diagnosis of osteoporosis had lower BMI (22.9±2.7 vs. 26.0 ±5.2 kg/m$^2$, p=0.04) and underwent menopause earlier (45.8±4.2 vs. 48.1±3.1 years, p=0.04). No differences in characteristics were observed between women with T1D with or without incident fracture.

**Conclusions:** The incidence rate of self-reported osteoporosis is two-fold greater in women with T1D compared to controls. While incident fracture rates were not different, time to fracture was shorter in women with T1D. Women with T1D reach menopause at a younger age than controls, and the perimenopausal period provides an important opportunity for bone health assessment in this cohort.

## P1052
## ADDRESSING PITFALLS AND CHALLENGES IN THE EVALUATION AND MANAGEMENT OF BONE FRAGILITY IN FD/MAS

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**Objective:** To address pitfalls and challenges encountered in the evaluation and management of bone fragility in FD/MAS.

**Methods:** Reviewing factors contributing to poor bone quality, decreased bone strength and increased bone fragility in FD/MAS and addressing difficulties and controversies faced by multidisciplinary teams of healthcare professionals engaged in its evaluation and management.

**Results:** Skeletal manifestations of FD/MAS are due to post-somatic activating *GNSα* mutations in cells of the osteogenic lineage, leading to replacement of normal bone by disorganized and poorly mineralized fibro-osseous tissue at one or more skeletal site. Local over-expression of RANKL and IL-6 increases the number and activity of osteoclasts, FGF23-mediated renal phosphate wasting and hypophosphatemia further disturb mineralisation, and FD-associated endocrinopathies may worsen bone remodeling. All these factors may variably decrease bone strength by locally disrupting bone microarchitecture and mineralisation, leading to increased morbidity due to pain, deformities and fractures, curtailing patient autonomy and impairing quality of life. There are still controversies on how best to evaluate bone fragility in FD/MAS. The value of bone markers and of current imaging techniques in evaluating determinants of bone fragility such as FD activity, the relationship of these markers with pain, and their value in the evaluation of clinical outcome of treatment remain to be established. Whereas it is essential to correct vitamin deficiency, hypophosphatemia and hyperfunctioning endocrinopathies in all cases, a prerequisite before considering treatment with antiresorptives, opinions are still divided on the beneficial effects of bisphosphonates in FD/MAS and data about other antiresorptives are scarce in this disorder.

**Conclusion:** Identifying difficulties, controversies and remaining knowledge gaps in the complex evaluation and management of the patient with FD/MAS, has led our FD/MAS international consortium to develop consensus best clinical practice guidelines, which are currently being finalised, aiming at informing and improving care for all patients with this complex and fascinating rare bone disease.

**Acknowledgments:** Members of the FD/MAS International consortium and involved PAGs

## P1053
## OUTCOMES OF TOTAL HIP REPLACEMENT IN PATIENTS WITH ANKYLOSIS OF THE HIP JOINT

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**Objective:** Ankylosis of the hip joint is one of the most difficult pathologies of the hip joint which leads to a significant reduction of the patient's life quality. The most recognized method of treatment is a total hip replacement (THR). The aim of the study was to evaluate the results of total arthroplasty in patients with ankylosis of the hip joint.

**Methods:** We analyzed the results of total hip replacement in 65 patients with ankylosis of the hip joint who were operated from January 1, 2012 to December 31, 2017. Gender distribution: 28 women and 37 men. The mean age of patients was 67±5.9 y. Surgical approach - anterolateral. All patients were implanted of Double Mobility Cup System. Surgery was performed under endotracheal anesthesia in combination with neuroleptanalgesia. All patients received standard treatment in the postoperative period. Results of surgical treatment were evaluated using a Harris Hip Score (HHS), Oxford Hip Score (OHS) and a VAS scale after 1 y. Statistical processing of data was carried out using Microsoft Excel AtteStat 12.0.5.

**Results:** The average values on the HHS scale were 71±3.6 points. The distribution of outcomes was 34% (22 patients) poor, 47% (31 patient) fair, 19% (12 patients) good. Excellent results were not obtained in any patient. The average value on the OHS scale was 29±2.7 points. A full recovery of the hip joint function in any case was not noted. The average value on the VAS scale was 4.9±1.1 points. The most common complications were recurrent dislocations of the prosthetic head, aseptic loosening of the components.

**Conclusion:** THR associated with a high percentage of poor results and complications in patients with ankylosis of the hip joint. It could be treat using THR only if muscle component of gluteal region and lower extremity is in action, and ankylosis is not too much old.

## P1054

## RELATIONSHIP BETWEEN OSTEOPOROSIS VERTEBRAL COMPRESSION FRACTURE PATIENTS AND THE RISK OF VENOUS THROMBOEMBOLISM: A NATIONWIDE, POPULATION-BASED CASE-CONTROL STUDY

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**Objective:** Percutaneous vertebroplasty (PV) is a therapeutic procedure for vertebral compression fracture. Venous thromboembolisms (VTE) have been reported as procedure complications. The relationship between PV and the risk of VTE is unclear.

**Methods:** We conducted a retrospective, population-based case-control study using the National Health Insurance Research Database (NHIRD) to investigate the relationship between vertebral compression fracture patients receiving PV and risk of VTE. We identified 1639 patients with receiving PV and 14,887 subjects without receiving PV from 2000-2013. After development of 1:1 propensity score-matched cohort study, 1639 PV patients and 1639 control patients were followed up for more than 12 y. Using the application of PV as the exposure factor, cause-specified Cox's proportional hazard model was performed to examine the association between PV and VTE. We used three different adjusted models, including covariate adjustment using the propensity score, traditional measured confounders and confounder selection model using backward elimination procedure.

**Results:** The incidence and risk of VTE between patients receiving PV and matched participants were insignificantly different after propensity matching and using three different adjusted models. In the subgroup analyses, age, sex, comorbidity and cancer were not to increase the risk of VTE between the two cohorts. However, vertebral compression fracture patients with the history of heart failure, arrhythmia, cancer, with using antihypertension medications, and aged were significantly increase the risk of VTE regardless receiving PV or not, and patients receiving analgesic drugs decreased the risk of VTE.

**Table 1: Demographic**

Table 1: Demographic

| | Before propensity score matching | | | After propensity score matching | | |
|---|---|---|---|---|---|---|
| | Percutaneous vertebroplasty=0 | Percutaneous vertebroplasty=1 | P-value | Percutaneous vertebroplasty=0 | Percutaneous vertebroplasty=1 | P-value |
| | N=14887 | N=1639 | | N=1639 | N=1639 | |
| Age | 65.97±16.86 | 74.99±10.38 | <0.001 | 75.39±10.65 | 74.99±10.38 | 0.277 |
| Gender | 5235(35.16%) | 416(25.38%) | <0.001 | 409(24.95%) | 416(25.38%) | 0.778 |
| Geographic location | | | | | | |
| Northern Taiwan | 6167(41.43%) | 659(40.21%) | 0.356 | 661(40.33%) | 659(40.21%) | 0.972 |
| Central Taiwan | 2885(19.38%) | 313(19.1%) | <0.001 | 325(19.83%) | 313(19.1%) | 0.628 |
| Southern Taiwan | 5407(36.32%) | 626(38.19%) | 0.038 | 608(37.1%) | 626(38.19%) | 0.540 |
| Eastern Taiwan and Islands | 428(2.87%) | 41(2.5%) | 0.047 | 45(2.75%) | 41(2.5%) | 0.743 |
| Monthly Income | 12253.7±11731.64 | 11054.81±9944.2 | <0.001 | 10862.96±11287.37 | 11054.81±9944.2 | 0.606 |
| Charlson Comorbidity Index | 2.51±2.4 | 3.54±2.66 | <0.001 | 3.47±2.63 | 3.54±2.66 | 0.4633 |
| Hypertension | 7093(47.65%) | 1120(68.33%) | <0.001 | 1145(69.86%) | 1120(68.33%) | 0.345 |
| Hyperlipidemia | 2704(18.16%) | 427(26.05%) | <0.001 | 415(25.32%) | 427(26.05%) | 0.631 |
| Diabetes Mellitus | 3105(20.86%) | 508(30.99%) | <0.001 | 502(30.63%) | 508(30.99%) | 0.820 |
| Coronary Artery Disease | 3043(20.44%) | 474(28.92%) | <0.001 | 474(28.92%) | 474(28.92%) | 1.000 |
| Congestive Heart Faihure | 1346(9.04%) | 277(16.9%) | <0.001 | 247(15.07%) | 277(16.9%) | 0.153 |
| Chronic kidney disease | 1318(8.85%) | 250(15.25%) | <0.001 | 233(14.22%) | 250(15.25%) | 0.402 |
| Stroke | 2264(15.21%) | 371(22.64%) | <0.001 | 382(23.31%) | 371(22.64%) | 0.648 |
| COPD | 3001(20.16%) | 463(28.25%) | <0.001 | 460(28.07%) | 463(28.25%) | 0.907 |
| PAOD | 252(1.69%) | 38(2.32%) | 0.067 | 36(2.2%) | 38(2.32%) | 0.814 |
| Dysarrhythmia | 1507(10.12%) | 284(17.33%) | <0.001 | 258(15.74%) | 284(17.33%) | 0.222 |

**Figure 1: Kaplan-Meier estimation for PE/DVT risk among patients with (solid line) and without (dashed line) percutaneous vertebroplasty before and after propensity score matching**

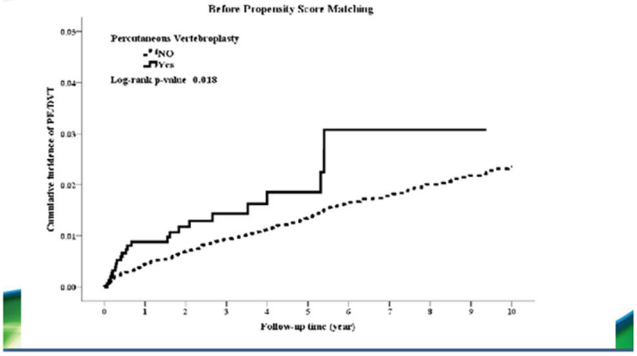
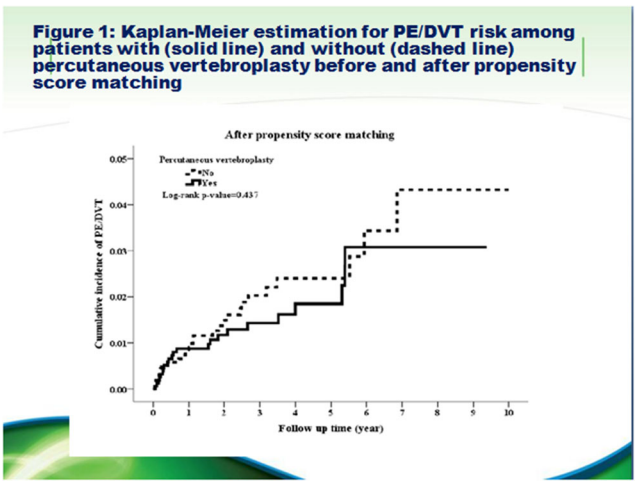



**Figure 1: Kaplan-Meier estimation for PE/DVT risk among patients with (solid line) and without (dashed line) percutaneous vertebroplasty before and after propensity score matching**



## Table 2. Incidence and risk of PE/DVT in patients with percutaneous vertebroplasty and without percutaneous vertebroplasty or matched participants.

Table 2. Incidence and risk of PE/DVT in patients with percutaneous vertebroplasty and without percutaneous vertebroplasty or matched participants.

| | Events | PY | Incidence[a] | Model 1[b] | | Model 2[c] | | Model 3[d] | | Model 4[e] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | cHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value |
| **Before propensity score matching** | | | | | | | | | | | |
| Control cohort | 204 | 77136 | 2.64 (2.28,3.01) | Reference | – | Reference | – | Reference | – | Reference | – |
| Percutaneous vertebroplasty | 23 | 4502 | 5.11 (3.02,7.20) | 1.684 (1.09,2.60) | 0.0191 | 1.079 (0.70,1.68) | 0.734 | 1.088 (0.69,1.72) | 0.7196 | 1.084 (0.68,1.72) | 0.7321 |
| **After propensity score matching** | | | | | | | | | | | |
| Control cohort | 28 | 4411 | 6.35 (4.00,8.7) | Reference | – | Reference | – | Reference | – | Reference | – |
| Percutaneous vertebroplasty | 23 | 4502 | 5.11 (3.02,7.20) | 0.804 (0.46,1.40) | 0.4379 | 0.775 (0.45,1.35) | 0.3678 | 0.807 (0.47,1.40) | 0.4455 | 0.798 (0.46,1.40) | 0.4301 |

Abbreviations: aHR, adjusted hazard ratio; cHR, crude hazard ratio; CI, confidence interval; CKD, chronic kidney disease; PY, person-years.
[a]Incidence rate, per 1,000 person-years.
[b]Model 1: cHR for crude hazard ratio.
[c]Model 2: Adjusted for all variables listed in Table 1 and Cox regression model with backward elimination procedure was carried out.
[d]Model 3: Adjusted for propensity score.
[e]Model 4: Adjusted for propensity score and percutaneous vertebroplasty was performed in time-varying variable.

## Table . The short term risk of PE/DVT in patients with percutaneous vertebroplasty and matched participants.

Table ?. The short term risk of PE/DVT in patients with percutaneous vertebroplasty and matched participants.

| | Events | PY | Incidence[a] | Model 1[b] | | Model 2[c] | | Model 3[d] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | cHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value |
| **Within 6 month risk of PE/DVT** | | | | | | | | | |
| Control cohort | 9 | 755.27 | 11.92 (4.13,19.7) | Reference | – | Reference | – | Reference | – |
| Percutaneous vertebroplasty | 10 | 757.18 | 13.21 (5.02,21.39) | 1.11 (0.45,2.72) | 0.825 | 1.08 (0.44,2.67) | 0.871 | 1.11 (0.45,2.72) | 0.829 |
| **Within 12 month risk of PE/DVT** | | | | | | | | | |
| Control cohort | 12 | 1398 | 8.58 (3.73,13.44) | Reference | – | Reference | – | Reference | – |
| Percutaneous vertebroplasty | 13 | 1405.69 | 9.25 (4.22,14.28) | 1.08 (0.49,2.36) | 0.850 | 1.05 (0.48,2.30) | 0.903 | 1.08 (0.49,2.37) | 0.847 |

Abbreviations: aHR, adjusted hazard ratio; cHR, crude hazard ratio; CI, confidence interval; CKD, chronic kidney disease; PY, person-years.
[a]Incidence rate, per 1,000 person-years.
[b]Model 1: cHR for crude hazard ratio.
[c]Model 2: Adjusted for all variables listed in Table 1 and Cox regression model with backward elimination procedure was carried out.
[d]Model 3: Adjusted for propensity score.

## Table 3. Subgroup analyses of the risk of CKD in patients with percutaneous vertebroplasty and matched participants.

Table 3. Subgroup analyses of the risk of CKD in patients with percutaneous vertebroplasty and matched participants.

| Subgroup | Subjects without percutaneous vertebroplasty | | Subjects with percutaneous vertebroplasty | | Compared to control group | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | Event | n | Event | aHR (95% CI)§ | P-value | $P_{interaction}$ | aHR (95% CI)‡ | P-value | $P_{interaction}$ |
| **Before propensity score matching** | | | | | | | | | | |
| Gender | | | | | | | 0.4616 | | | 0.9190 |
| Female | 9652 | 140 | 1223 | 18 | 1.19(0.718,1.973) | 0.5005 | | 1.136(0.674,1.915) | 0.6314 | |
| Male | 5235 | 64 | 416 | 5 | 0.927(0.362,2.376) | 0.8751 | | 0.931(0.354,2.447) | 0.884 | |
| Age, years | | | | | | | 0.6754 | | | 0.4158 |
| <75 | 9420 | 98 | 665 | 7 | 1.165(0.534,2.542) | 0.7017 | | 1.079(0.479,2.428) | 0.855 | |
| ≥75 | 5467 | 106 | 974 | 16 | 1.141(0.668,1.951) | 0.6287 | | 1.049(0.604,1.822) | 0.8637 | |
| Comorbidity | | | | | | | 0.2878 | | | 0.5508 |
| <3 | 10401 | 100 | 853 | 5 | 0.681(0.274,1.69) | 0.407 | | 0.704(0.276,1.795) | 0.4621 | |
| ≥3 | 4486 | 65 | 489 | 13 | 1.314(0.788,2.188) | 0.2949 | | 1.247(0.735,2.117) | 0.4126 | |
| Cancer | | | | | | | | | | |
| Yes | 201 | 5 | 35 | 0 | -- | -- | -- | -- | -- | -- |
| No | 14686 | 199 | 1604 | 23 | 1.145(0.737,1.779) | 0.5479 | | 1.119(0.707,1.773) | 0.6309 | |
| Anticoagulant drug used within 1 month after the index-date | | | | | | | 0.8579 | | | 0.8687 |
| Yes | 216 | 8 | 27 | 1 | 1.305(0.151,11.283) | 0.809 | | 1.95(0.208,18.312) | 0.559 | |
| No | 14671 | 196 | 1612 | 22 | 1.089(0.694,1.709) | 0.7099 | | 1.088(0.682,1.735) | 0.7231 | |
| **After propensity score matching** | | | | | | | | | | |
| Gender | | | | | | | 0.8905 | | | 0.8920 |
| Female | 1253 | 23 | 1223 | 18 | 0.808(0.435,1.503) | 0.5007 | | 0.788(0.425,1.461) | 0.4502 | |
| Male | 386 | 5 | 416 | 5 | 0.89(0.255,3.11) | 0.8554 | | 0.828(0.239,2.876) | 0.7668 | |
| Age, years | | | | | | | 0.6760 | | | 0.7183 |

## The propensity-score model results of probability of percutaneous vertebroplasty

Supplementary table: The propensity-score model results of probability of percutaneous vertebroplasty

| Variables | Estimate | Odds ratio | 95% CI | | *P* value |
|---|---|---|---|---|---|
| | | | Lower | Upper | |
| Age | 0.0312 | 1.032 | 1.027 | 1.037 | <.0001 |
| Gender | -0.3027 | 0.739 | 0.652 | 0.837 | <.0001 |
| Index-year | 0.2597 | 1.296 | 1.272 | 1.321 | <.0001 |
| Geographic location | | | | | |
| Northern Taiwan | 1 | -- | -- | -- | -- |
| Central Taiwan | 0.011 | 1.011 | 0.870 | 1.175 | 0.887 |
| Southern Taiwan | 0.144 | 1.155 | 1.021 | 1.306 | 0.022 |
| Eastern Taiwan and Islands | 0.083 | 1.087 | 0.765 | 1.544 | 0.642 |
| Comorbidity diseases at baseline | | | | | |
| Hypertension | 0.1652 | 1.18 | 1.04 | 1.338 | 0.0101 |
| Congestive Heart Failure | 0.1875 | 1.206 | 1.027 | 1.417 | 0.0224 |
| COPD | 0.1613 | 1.175 | 1.033 | 1.337 | 0.0142 |
| Dysrhythmia | 0.153 | 1.165 | 0.997 | 1.363 | 0.0552 |
| Medication | | | | | |
| Anti-diabetic agents | 0.1827 | 1.201 | 1.049 | 1.374 | 0.0081 |
| Analgesic drugs | 0.4709 | 1.601 | 1.419 | 1.807 | <.0001 |

Abbreviations: PAOD, peripheral artery occlusive disease; CI, confidence interval.

## Table 3. Subgroup analyses of the risk of CKD in patients with percutaneous vertebroplasty and matched participants.

Table 3. Subgroup analyses of the risk of CKD in patients with percutaneous vertebroplasty and matched participants.

| Subgroup | Subjects without percutaneous vertebroplasty | | Subjects with percutaneous vertebroplasty | | Compared to control group | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | Event | n | Event | aHR (95% CI)§ | P-value | $P_{interaction}$ | aHR (95% CI)‡ | P-value | $P_{interaction}$ |
| <75 | 657 | 7 | 665 | 7 | 0.973(0.324,2.919) | 0.9608 | | 0.947(0.332,2.703) | 0.919 | |
| ≥75 | 982 | 21 | 974 | 16 | 0.795(0.413,1.529) | 0.4913 | | 0.759(0.396,1.455) | 0.4064 | |
| Comorbidity | | | | | | | 0.8066 | | | 0.7975 |
| <=3 | 1175 | 12 | 1142 | 10 | 0.985(0.416,2.332) | 0.9734 | | 0.847(0.366,1.961) | 0.6982 | |
| >3 | 464 | 16 | 497 | 13 | 0.855(0.404,1.808) | 0.6813 | | 0.721(0.347,1.5) | 0.382 | |
| Cancer | | | | | | | | | | |
| Yes | 42 | 2 | 35 | 0 | -- | -- | -- | -- | -- | -- |
| No | 1597 | 26 | 1604 | 23 | 0.875(0.497,1.539) | 0.6423 | | 0.864(0.493,1.513) | 0.6084 | |
| Anticoagulant drug used within 3 month after the index-date | | | | | | | | | | |
| Yes | 30 | 0 | 27 | 1 | -- | -- | -- | -- | -- | -- |
| No | 1609 | 28 | 1612 | 22 | 0.778(0.444,1.364) | 0.3803 | | 0.767(0.439,1.341) | 0.3526 | |

§Model was adjusted for all variables listed in Table 1.
‡Model Adjusted for propensity score.

## Table 3: The significant risk factor of PE/DVT

Table 3: The significant risk factor of PE/DVT

| | Before propensity score matching | | After propensity score matching | |
|---|---|---|---|---|
| | aHR (95% CI) | *P* Value | aHR (95% CI) | *P* Value |
| Age | 1.033(1.021,1.046) | <.0001 | | |
| Coronary Artery Disease | | | 2.126(1.166,3.877) | 0.0139 |
| Congestive Heart Failure | 2.152(1.552,2.984) | <.0001 | 2.24(1.221,4.111) | 0.0092 |
| Dysrhythmia | 1.473(1.053,2.062) | 0.0239 | | |
| Cancer | 2.799(1.152,6.803) | 0.0231 | | |
| Antihypertension drug | 1.878(1.396,2.526) | <.0001 | 2.73(1.237,6.025) | 0.0129 |
| Analgesic drugs | | | 0.5(0.26,0.962) | 0.038 |

The results showed that LA could inhibit the activation, migration, and formation of osteoclastogenesis of macrophages in a dose-dependent manner. In RA-bearing mice, the expressions of inflammation-related cytokines were suppressed, and clinical symptoms and bone erosion were ameliorated by LA. The accumulation of 18F-FDG in the joints of RA-bearing mice was also significantly decreased by LA. The results indicate that LA significantly improves the symptoms of RA by down-regulating expressions of inflammatory cytokines and osteoclastogenesis.
**Conclusions:** Vertebral compression fracture patients who received PV seems not to increase the risk of VTE, but should be monitored cautiously in subgroup prone to developing VTE.
**Acknowledgement:** We thank the grant support from the Taiwanese Osteoporosis Association.

## P1055
## EFFECTS OF EARLY PHYSICAL EXERCISE PROGRAM IN PATIENTS WITH RECENT HIP ARTHROPLASTY FOR OSTEOARTHRITIS

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**Objective:** To examine the effects of a two weeks kinetic program on pain and functional status in patients with recent hip arthroplasty for osteoarthritis.
**Methods:** We conducted an observational, prospective, randomized study on a sample of 47 patients with recent hip arthroplasty for osteoarthritis. Patients were transferred from the Traumatology and Orthopedics Clinic to the Physical Medicine and Rehabilitation Clinic from 7 to 10 d after undergoing surgery and were randomly assigned to a control group (23 patients) who received only analgesics and NSAID's when needed (group 1) and a study group (24 patients) whose therapeutic program included daily physical exercise (group 2). Patients were initially evaluated and after two weeks of rehabilitation treatment. The clinical and functional parameters assessed were pain on a visual analogue scale (100 mmVAS), physical impairments (muscular strength, mobility of hip joint) and disabilities (Tinetti Gait Scale, D'Aubigné Scale and movement capacity).
**Results:** The scores for functional parameters improved: pain- 42.6% (group 2) and 33.4% (group 1) ($p=0.000054$); physical impairments: muscular strength- 8.3% (group 2), without improving by group 1, mobility: 41.8% (group2) and 21.4% (group 1); disabilities: Tinetti Gait Scale- 33.6% (group 2) and 22.1% (group 1), D'Aubigné Scale- 35.8% (group 2) and 22.4% (group 1), movement capacity- 55.8% (group2) and 31.9% (group 1). The results were statistic significant ($p<0.05$).
**Conclusions:** Improvement of pain, physical impairments and disabilities for the study group certifies the efficacy of the early rehabilitation program including physical exercise in patients with hip arthroplasty for osteoarthritis and motivates the continuation of the study on a longer period of time and on a larger number of patients. Rehabilitation program must begin right after patients underwent surgery for hip replacement.

## P1056
## THE FRACTURE PREDICTIVE ABILITY OF LUMBAR SPINE BMD AND TBS AS CALCULATED BASED ON DIFFERENT COMBINATIONS OF THE LUMBAR SPINE VERTEBRAE: THE OSTEOLAUS STUDY

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**Objective:** Trabecular bone score (TBS), a surrogate of bone microarchitecture, is an independent predictor of osteoporotic fractures. It is measured in the lumbar spine (LS) DXA scans in the same regions of interest as BMD, L1-L4. We aimed to study whether different combinations of the lumbar vertebrae in the calculations of LS TBS and BMD perform differently in major osteoporotic fractures (MOF) prediction.
**Methods:** Study comprised 1475 postmenopausal women (mean age=64.5 y) of the OsteoLaus Study, a Swiss population-based cohort, who had undergone questionnaires, vertebral fracture assessments, LS DXA scans (Hologic) and TBS (Medimaps, v4.0) measurements. T-tests were run to test the differences in general characteristics between women who fractured and those who did not; binary logistic regressions adjusted for age+BMI or for age+BMI+LS BMD were performed to study the odds ratios per one SD decrease in LS BMD or TBS, respectively; the areas under the curve (AUC) were then calculated for each model.
**Results:** During the 5 y of follow-up, 125 women had a fracture. Fractured women were older, had higher BMI, and lower LS BMD and TBS. TBS was an independent predictor of MOF. The best lumbar vertebrae combination for TBS was L1-L2 (OR(95%CI): 1.81(1.35-2.44); AUC (95%CI): 0.716(0.654-0.778)), whereas the poorest combination was L3-L4 (OR(95%CI): 1.24(0.92-1.68); AUC (95%CI): 0.686(0.621-0.751)). Similarly, for BMD the L1-L2 combination also had the best performance in MOF prediction (OR(95%CI): 1.47(1.21-1.78); AUC (95%CI): 0.689(0.625-0.753)), whereas the L2-L4 had the poorest performance (OR(95%CI): 1.27(1.10-1.46); AUC (95%CI): 0.673(0.608-0.738)). Compared to the current used combination (L1-L4), L1-L2 and L1-L3 performed better for both BMD and TBS.
**Conclusion:** Excluding L4 seemed to improve the fracture risk prediction in overall. L4 might be affected by spine lordosis, thus its accuracy is questionable. Nevertheless, further investigation is needed to clarify the possible causes for the differences in performance among the LS vertebrae combinations.
**Disclosures:** Didier Hans holds stock in Medimaps Group, the makers of the Trabecular Bone Score software.

## P1057
## VERTEBRAL PAIN AND PHYSICAL PERFORMANCE INDICES IN POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURES DEPENDING ON BONE MINERAL DENSITY PARAMETERS

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Vertebral fractures (VFs) are amongst one of the most crucial osteoporotic fractures which manifest increased morbidity and mortality; however, their clinical features usually differ. BMD is one of the important parameters of bone strength and risk of osteoporotic fractures. The aim of the research was to study the indices of vertebral pain (VP) and physical performance (PP) in postmenopausal women with VFs depending on BMD parameters. We examined 89 females aged 50-89 years old with VFs in thoracic and/or lumbar spine which were divided into 3 groups: I – patients with osteoporosis (OP), according to WHO criteria for DXA, n=41; II – women with osteopenia (OPN), n=26; III – females with normal BMDs (NB), n=22. The parameters of VP in thoracic and/or lumbar spine were measured by 11-component visual analog scale (VAS), the indices of PP using static and dynamic functional tests (Thomayer, Schober tests, chest excursion, lateral trunk lean, 3-, 4-, 15-meter tests, "stand up from the chair", static balancing). BMD was measured by DXA (Lunar, Prodigy). We have found the significantly lower parameters of weight and height in women with VFs and OP or OPN compared to females with NB. However, we did not establish any reliable differences of VP neither in thoracic nor in lumbar spine depending on BMD state. Also, we did not reveal the significant differences of most parameters of PP, except for the indices of chest excursion (mean parameter, of the inhalation and exhalation) which were reliably lower in patients with OP.

In conclusion, the indices of VP and PP do not differ in postmenopausal women depending on BMD parameters, except for chest excursion that should be taken into account in rehabilitation programs for females with VFs.

## P1058
## QUETIAPINE AMELIORATES BONE RESORPTION IN COLLAGEN-INDUCED ARTHRITIS IN MICE VIA SUPPRESSIONS OF THE AKT AND ERK SIGNALING PATHWAYS

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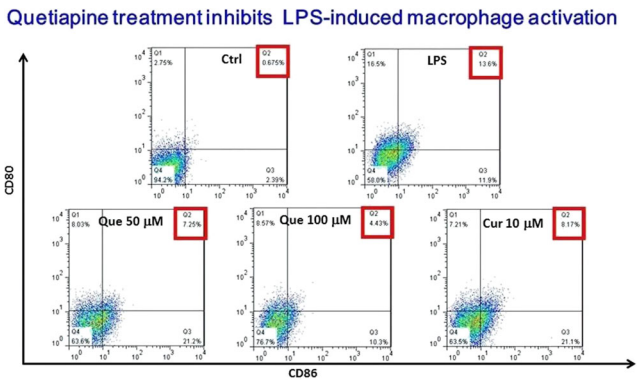
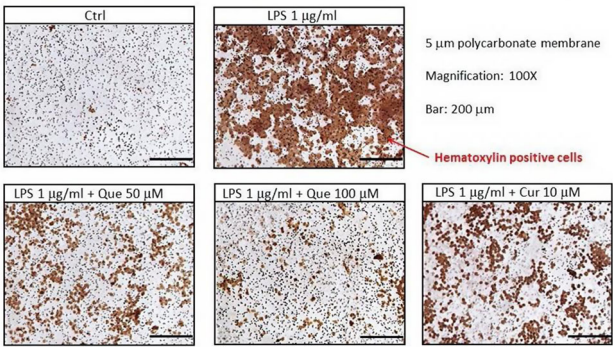
**Objective:** Quetiapine, an atypical antipsychotic drug, shows anti-inflammatory effects; however, its underlying mechanism during collagen-induced arthritis (CIA) remains ambiguous. IL-6, TNFα and IL-1β were reduced by quetiapine via an inhibition of ERK and AKT phosphorylation and this was followed by a subsequent effect on the NF-κB and CREB signaling pathways. The therapeutic efficacy of quetiapine in CIA mouse model was also explored. Pro-inflammatory cytokines IL-17, IL-6 and IL-1β were decreased, while the immunosuppressive factors TGFβ and IL-10 were increased when CIA mice were treated with quetiapine. 18F-FDG/microPET was used to monitor the inflammation status of the CIA mouse's joints. The severity of bone resorption was also evaluated by microCT and H&E staining. Bone resorption and the uptake of 18F-FDG were absent in the quetiapine-treated group, which had PET images similar to the control mice. On the other hand, uptake of 18F-FDG was observed in the celecoxib-treated group on days 32 and 43. These findings suggest that quetiapine is a potential anti-inflammatory drug and may be useful as an adjuvant treatment for rheumatoid arthritis.

**Methods:** Inhibition by quetiapine of various proinflammatory cytokines, namely IL-6, TNFα and IL-1β, using lipopolysaccharide (LPS)-stimulated RAW 264.7 macrophage model was investigated. The therapeutic efficacy of quetiapine in CIA mouse model was also explored. CIA mice were treated with quetiapine. 18F-FDG/microPET was used to monitor the inflammation status of the CIA mouse's joints. The severity of bone erosion was also evaluated by microCT and H&E staining. Uptake of 18F-FDG was observed in the celecoxib-treated group on days 32 and 43.

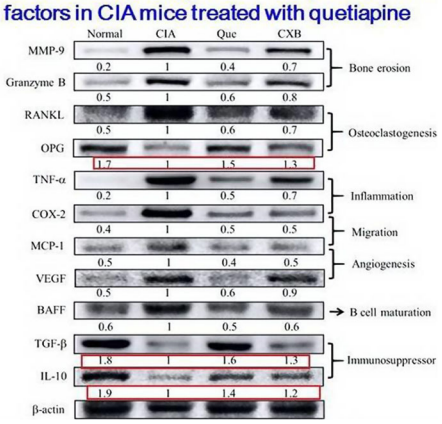
**Results:** IL-6, TNFα and IL-1β cytokines were reduced by quetiapine via an inhibition of ERK and AKT phosphorylation and this was followed by a subsequent effect on the NF-κB and CREB signaling pathways. The therapeutic efficacy of quetiapine in CIA mouse model was also explored. Pro-inflammatory cytokines IL-17, IL-6 and IL-1β were decreased, while the immunosuppressive factors TGFβ and IL-10 were increased when CIA mice were treated with quetiapine. 18F-FDG/microPET was used to monitor the inflammation status of the CIA mouse's joints. The severity of bone resorption was also evaluated by microCT and H&E staining. Bone resorption and the uptake of 18F-FDG were absent in the quetiapine-treated group, which had PET images similar to the control mice. On the other hand, uptake of 18F-FDG was observed in the celecoxib-treated group on days 32 and 43. Similar results were obtained by ex vivo autoradiography.



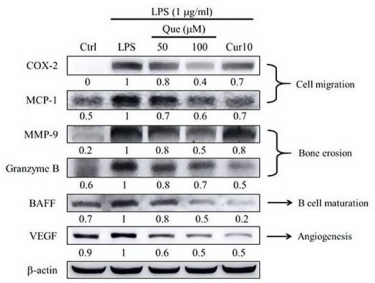
### Quetiapine diminishes the migration ability of RAW 264.7 cells




### Quetiapine suppresses arthritis-related proteins and promotes the immunosuppressive factors in CIA mice treated with quetiapine

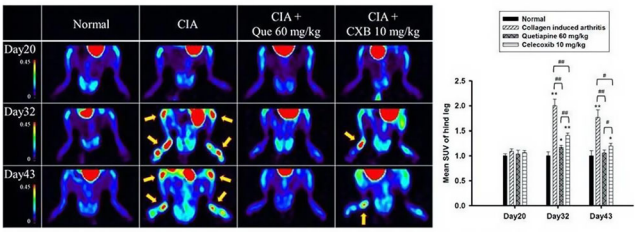



### Anti-inflammatory effects of quetiapine on LPS-stimulated RAW 264.7 cells



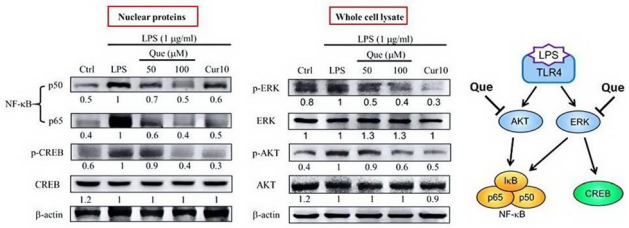

The lysates of RAW 264.7 cells were analyzed with Western blot.

### Quetiapine decreases the uptake of $^{18}$F-FDG in the joints of CIA mice



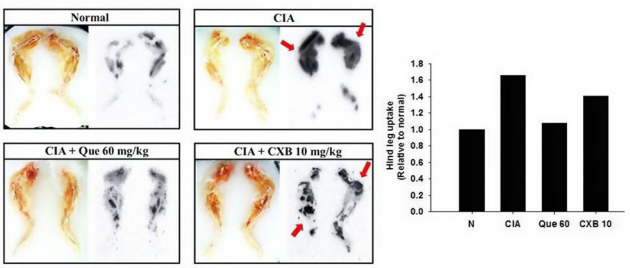

Each group of mice were i.v. injected with 18.5 MBq/0.1 ml of $^{18}$F-FDG on day 20, 32 and 43 for micro-PET imaging. For each hind leg, a region of interest (ROI) was drawn on the summed $^{18}$F-FDG image and standardized uptake value (SUV) was calculated from knee to paw. $^{**}P$ <0.01, $^{*}P$ <0.05 versus normal mice, $^{\#\#}P < 0.01$, $^{\#}P < 0.05$.

### Quetiapine inhibits NF-κB and CREB signaling pathways *via* suppressions of ERK and AKT phosphorylation



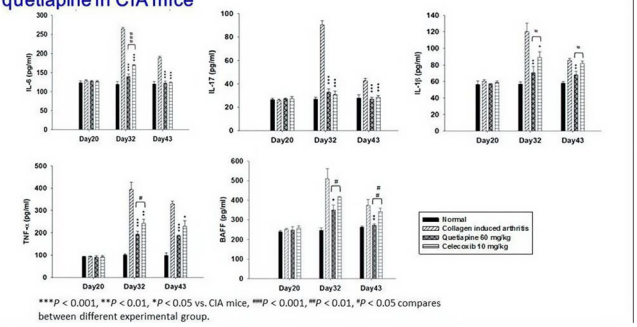

Nuclear proteins and whole cell lysate from the RAW 264.7 cells were analyzed with Western blot.

### Quetiapine decreases the uptake of $^{18}$F-FDG in the joints of CIA mice




Each groups of mice were i.v. injected with 18.5 MBq/0.1 ml of $^{18}$F-FDG on day 32 for *ex-vivo* autoradiography.

### The levels of serum IL-6, IL-17, IL-1β, TNF-α and BAFF are decreased by quetiapine in CIA mice




$^{***}P < 0.001$, $^{**}P < 0.01$, $^{*}P < 0.05$ vs. CIA mice, $^{\#\#\#}P < 0.001$, $^{\#\#}P < 0.01$, $^{\#}P < 0.05$ compares between different experimental group.

The results showed that quetiapine could inhibit the activation, migration, and formation of osteoclastogenesis of macrophages in a dose-dependent manner. In RA-bearing mice, the expressions of inflammation-related cytokines were suppressed, and clinical symptoms and bone erosion were ameliorated by quetiapine. The accumulation of 18F-FDG in the joints of RA-bearing mice was also significantly decreased by quetiapine. The results indicate that quetiapine significantly improves the symptoms of RA by downregulating expressions of inflammatory cytokines and osteoclastogenesis.

**Conclusions:** These findings suggest that quetiapine is a potential anti-inflammatory drug and may be useful as an adjuvant treatment for rheumatoid arthritis.

**Acknowledgement:** We thank the grant support from the Taiwanese Osteoporosis Association.

## P1059
## TRABECULAR BONE SCORE AND LIFE EXPECTANCY WITH AND WITHOUT OSTEOPOROTIC FRACTURE: THE ROTTERDAM STUDY

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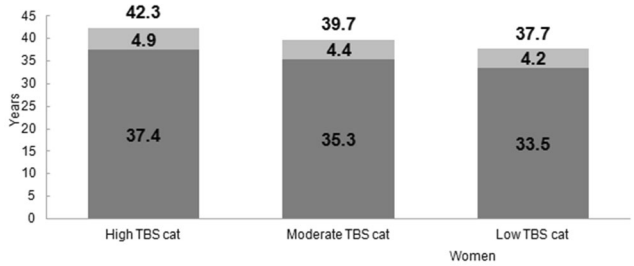
[1]Lausanne University Hospital, Lausanne, Switzerland, Lausanne, Switzerland, [2]Department of Epidemiology, Erasmus University Medical Centre, Rotterdam, Netherlands, Rotterdam, The Netherlands, [3]Institute of Social and Preventive Medicine, Bern, Switzerland, Bern, Switzerland, [4]Department of Internal Medicine, Erasmus University Medical Centre, Rotterdam, Netherlands, Rotterdam, The Netherlands

**Objective:** Trabecular bone score (TBS), a texture analysis of lumbar spine (LS) DXA scans, predicts major osteoporotic fractures (MOF) independently of BMD. We aimed to study the association of TBS with overall life expectancy (LE), and when considering MOF.
**Methods:** Study comprised 6849 individuals (3,982 women) with a mean age of 65 y from the Dutch population-based Rotterdam Study. We developed a multistate life table to calculate LE for individuals who had low, moderate and high TBS values; considering difference in years lived with and without MOF. Calculations employed prevalence, incidence rate, and hazard ratios (HRs) for three transitions (healthy to MOF, healthy to death, and MOF to death), categorized by baseline TBS tertiles adjusted for BMI, LS-BMD and cohort.
**Results:** During 7.2 y, 306 incident MOF and 522 deaths were observed in women; and 114 MOF and 558 deaths in men. Individuals with the lowest (HR: 1.25(0.92-1.71) in women and 1.91(1.08-3.40) in men) and mid (HR:1.12(0.82-1.52) in women and 1.75(1.01-3.02) in men) tertiles of TBS had a higher MOF risk as compared to the highest. Mortality of nonfractured individuals was also higher in the lowest and mid TBS tertiles. Fractured individuals with the lowest (HR:2.34(1.34-4.07) in women and 5.87(2.80-12.29) in men) and mid (HR: 1.81(1.02-3.22) in women and 2.80(1.33-5.88) in men) tertiles of TBS had higher risk of death as compared to the highest. Total LE was higher in women (39.7 y) than in men (35.3 y).
**Conclusion:** Women and men have an increased mortality risk after suffering a MOF. The risk is higher among those with lower TBS, and among men.



[Figure 1. Life expectancy with and without fracture in women of each TBS category]

## P1060
## BMD, TBS AND FRAX INDICES IN POSTMENOPAUSAL WOMEN WITH DIFFERENT TYPES OF OSTEOPOROTIC FRACTURES

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BMD and Trabecular bone score (TBS) are independent parameters of bone strength which effectively predict osteoporotic fractures risk. FRAX and adjusted FRAX by TBS are simple calculators which assess 10-years probability of major osteoporotic fractures (MOFs) and hip fracture (HF). Their significance was confirmed in various studies; however, information depending on type of osteoporotic fractures is limited. The purpose was to study the indices of BMD, TBS, FRAX and adjusted FRAX by TBS in postmenopausal women with different types of osteoporotic fractures. We examined 275 women aged 50 years and older, which were divided into two groups depending on previous fractures (PFs) presence. The females with fractures also were divided according to fracture localization: vertebral fractures (VFs), humerus fractures (HFs), ulna/radius fractures (URFs) and wrist fractures (WFs). BMD and TBS were measured by X-ray absorptiometry (Lunar, Prodigy), assessment of risk factors was performed by FRAX and adjusted FRAX by TBS. FRAX scores with BMI, BMD and TBS were calculated. It was established that BMD of lumbar spine and total body and TBS indices were significantly lower only in patients with VFs compared to women without previous fractures (PFs) in contrast to patients with other fractures. BMD of femoral neck and total hip did not differ in any group with fractures compared to control. In addition, indices of FRAX/BMI-MOFs were significantly higher for women independently of type of fractures, however, FRAX/BMI-HF were reliably higher only at women with VFs and URFs compared to parameters of women without PFs. FRAX/BMD-MOFs and FRAX/TBS-MOFs indices were significantly higher in females independently from type of fractures, except the women with HFs. Parameters of FRAX/BMD-HF and FRAX/TBS-HF were higher only in patients with VFs. In conclusion, BMD of lumbar spine and total body, but not in femoral neck, TBS indices are reliably lower only in patients with VFs compared to women with other osteoporotic fractures. FRAX and adjusted FRAX by

TBS are important indices for fractures risk assessment in postmenopausal women with previous fractures which propose additional information without BMD measurement.

## P1061
## ASSOCIATION BETWEEN POLYPHARMACY AND SARCOPENIA DIAGNOSED ACCORDING TO DIFFERENT DEFINITIONS

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[1]Faculty of Medicine, Vilnius University, Vilnius, Lithuania

**Objective:** To investigate the association between polypharmacy and sarcopenia diagnosed using three different definitions.
**Methods:** A cross-sectional study was performed in National Osteoporosis Center based in Vilnius, Lithuania. Inclusion criteria were: age 60 or more years, unrestricted mobility, MMSE score ≥21. Number of medications taken was evaluated by total count of prescribed, over-the-counter and supplemental medicines. Polypharmacy was defined as regular use of 5 or more medications. Sarcopenia was defined according to 1) European Working Group on Sarcopenia in Older People criteria made in 2018 (EWGSOP2), 2) International Working Group on Sarcopenia (IWGS) and 3) Foundation for the National Institutes of Health (FNIH) criteria. Muscle mass was measured by DXA (iDXA, GE Lunar, USA), muscle strength was evaluated measuring handgrip strength (JAMAR, Patterson Medical, UK), and physical performance was evaluated by the Short Physical Performance Battery (SPPB) test or gait speed, where appropriate. Relationship between polypharmacy and sarcopenia was assessed using binary logistic regression.
**Results:** The study was performed on 246 subjects: 87 (35.4%) men and 159 (64.6%) women. Mean age was 79.27 ±6.48 y, ranging from 62.8-94.7 years. Mean number of medications taken was 3.76±1.82. Polypharmacy was prevalent in 49 (19.9%) subjects. Sarcopenia was defined in 79 (32.1%), 82 (33.3%) and 23 (9.3%) subjects according to EWGSOP2, IWGS and FNIH criteria, respectively. Logistic regression analysis confirmed that polypharmacy was associated with sarcopenia diagnosed using EWGSOP2 and IWGS definitions (OR: 0.27 (0.11-0.66) and 0.29 (0.12-0.71), respectively). There was no association between polypharmacy and sarcopenia diagnosed according to FNIH criteria (OR: 0.47 (0.14-1.65). Number of medications taken was associated with sarcopenia diagnosed using criteria of all three operational definitions: EWGSOP2 (OR: 1.86 (1.41-2.44), IWGS (OR: 1.81 (1.38-2.37) and FNIH (OR: 1.57 (1.05-2.35).
**Conclusion:** Results of our study shows that number of medications taken was associated with sarcopenia despite the diagnostic criteria used. Polypharmacy was associated with sarcopenia diagnosed according to EWGSOP2 and IWGS criteria.

## P1062
## PROTON PUMP INHIBITORS: A RISK FACTOR FOR OSTEOPOROSIS?

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**Objectives:** Recent data in the specialty literature have shown that proton pump inhibitors (PPI) can interfere with calcium absorption by inducing hypochlorhydria. These agents are widely used both for gastrointestinal disorders and in combination with anti-inflammatory drugs. This study is aimed at analyzing long-term effects of PPI on serum calcium and BMD variations in patients with PPI treatment.
**Methods:** Two groups of patients, menopausal women in particular, 78 subjects with a daily 40 mg omeprazole or pantoprazole administration, for gastroesophageal reflux and gastritis and 62 patients in the control group (without PPI treatment). Patients who had previously received calcium and vitamin D3 supplements, as well as those with bisphosphonate treatment, those with malabsorption syndrome and those with an operated stomach were not included in the study. Patients were evaluated twice a year between 2016-2018. Reference serum calcium values were between 8.6-10 mg/dl. The BMD was assessed using the DXA at the lumbar spine level.
**Results:** In the group of patients with PPI treatment, the registered serum calcium values were between 7.6-8.9 mg/dl as compared to the control group where the serum calcium values were between 8.1-9 mg/dl. The initial T-score in the first group varied between -1 and -2.8 SD as compared to the patients without PPI treatment where T-score values were between 0.6 and -1.4 SD. On the final assessment, there was a decrease in the BMD by approximately 1.7% in the study group, compared to vs. the control group where the measured BMD did not record significant variations.
**Conclusions:** The long-term use of PPI seems to have an unfavorable impact on the BMD by achieving a negative balance of calcium. This effect could be fought against with citrate calcium supplements whose absorption is not influenced by a decrease in gastric acidity.

## P1063
## CONSISTENT IMPLANT RESORPTION AND BONE FORMATION IN THREE SPECIES WITH AND WITHOUT ANTIRESORPTIVE THERAPY FOLLOWING TREATMENT WITH A TRIPHASIC CALCIUM-BASED IMPLANT MATERIAL

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**Objective:** The study compared implant resorption and bone formation in 3 species with and without antiresorptive therapy following triphasic calcium-based implant material (AGN1) implantation.
**Methods:** Three species were studied, each with subgroups receiving either antiresorptive treatment or none: drill hole defects in OVX rat proximal femurs (N=6/group) and dog humeri (N=10/group), and proximal femurs in 12 osteoporotic women. Patients had one proximal femur injected with AGN1 as part of a local osteo-enhancement procedure (LOEP); the other was an untreated control. Half were prescribed antiresorptives. Analyses included μCT/histopathology (rat/dog), biomechanics (dog) and DXA/CT (patients). Follow-up timepoints for rats, dogs, and patients were 18, 26, and 25 weeks.
**Results:** More than 95% of AGN1 was resorbed by 26 weeks in all species; resorption was not significantly affected by antiresorptive treatment. AGN1 was replaced by normal bone in rats as assessed by histology/μCT and in dogs by histology/μCT/biomechanical testing. In patients, AGN1 increased bone in the proximal femur as assessed by CT and femoral neck aBMD (0.917±0.140 vs. control 0.530±0.045 g/cm$^2$, p<0.001). In rats, alendronate (15μg/kg 2x wk) increased percent bone (26.4±14.0% vs. 13.4±6.0%, p=0.012). In dogs, alendronate (0.2mg/kg/d) had minimal impact on percent bone (22.0±5.2% vs. 19.0±3.4%, p=0.147). In patients, antiresorptives did not significantly impact aBMD (0.938 ±0.152 vs. 0.897±0.139 g/cm$^2$, p=0.636).
**Conclusions:** The study showed antiresorptives had no significant effect on AGN1 resorption across species. Normal bone formed in rat and dog implanted defects regardless of antiresorptive treatment. The good bone quality in the preclinical models and similar patient results suggest that new patient bone would also be healthy and metabolically active. These results demonstrate that the effectiveness of AGN1 LOEP as a treatment for local osteoporotic bone loss is not compromised by antiresorptive treatment.

## P1064
## STUDY OF PREVALENCE OF OSTEOPOROSIS AND VITAMIN D DEFICIENCY IN ELDERLY PATIENTS WITH HIP FRACTURES

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**Objective:** Osteoporosis is a major public health problem worldwide. Concomitant vitamin D deficiency increases the risk of fractures secondary to low bone mass and muscle imbalance leading to frequent falls. Vitamin D deficiency is often under-recognized, especially in the elderly.
**Methods:** Prospective cohort study between January 2013 and December 2013. Consecutive elderly patients (aged >60 y) with proximal femur fractures were enrolled. Patients with malignancy, significant trauma or fractures of additional bones were excluded. Osteoporosis was identified by DXA scan of nonfractured hip and lumber spine. Metabolic tests including serum calcium, renal functions, parathormone and vitamin D levels were done.
**Results:** 66 patients were included over 1 y. Majority were females (n=37, 56%). Mean age at presentation was 64.1±13.8 in males and 70.3±12.1 y in females. Common fracture sites were inter-trochanteric (53%; N=35), neck of femur (37.9%; N=25) and subtrochanteric fractures (9.1%; N=6). Majority of fractures were sustained at home (N=49; 74.2%), after a fall in bathroom/wet floor. Vitamin D was deficient in 74.2% (N=49) patients (72.4% men, 75.7% women). Mean serum vitamin levels were 10.1±9.5 ng/ml in men and 9.7±9.1 ng/ml in women. Mean parathormone levels were 67.4±37.8 pg/ml in men and 106.2±150.2 pg/ml in women. Secondary hyperparathyroidism was observed in 27 patients (40.9%). Mean BMD of hip was 0.62±0.1 g/cm$^2$ and of spine was 0.848±0.2 g/cm$^2$. Prevalence of osteopenia, osteoporosis and severe osteoporosis was 15.2%, 62.1% and 18.2% respectively. BMD was similar in men and women for hip (0.620±0.2 g/cm$^2$ vs. 0.624±0.1 g/cm$^2$), whereas lower in women for spine (0.892±0.3 g/cm$^2$ vs. 0.815±0.2 g/cm$^2$ respectively). Other risk factors included smoking (N=14, 21.2%), alcoholism (N=12, 18.2%) and inadequate sun exposure (60%). Family history of fragile fractures was present in 8%; past history was noted in 18%. No significant difference was observed in the BMD of patients with or without adequate sunlight exposure, calcium and vitamin D supplementation at the time of fracture.
**Conclusion:** Prevalence of osteoporosis and vitamin D deficiency is very high in elderly patients with hip fractures. It is an under-recognized cause of morbidity and mortality in the elderly population and needs timely intervention.

## P1065
## VALIDATION OF THE LITHUANIAN VERSION OF SARCOPENIA SPECIFIC QUALITY OF LIFE QUESTIONNAIRE (SARQOL®)

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**Objective:** To translate and validate the SarQoL questionnaire into Lithuanian language.

**Methods:** A cross-sectional study was performed on community-dwelling Lithuanian people aged ≥60 y. European Working Group on Sarcopenia in Older People criteria were used for diagnosis of sarcopenia. Muscle mass was evaluated by DXA. Muscle strength was assessed measuring handgrip strength with hydraulic dynamometer. Physical performance was evaluated by short physical performance battery. Primary translation from French to Lithuanian, backward translation to French, expert committee review, pretest of final version of the Lithuanian SarQoL was performed. Subjects also completed quality of life questionnaires SF-36 and EQ-5D. To analyse the test-retest reliability, sarcopenic subjects again filled the SarQoL questionnaire after two weeks. Validity of the Lithuanian SarQoL was assessed by discriminative power and construct validity, reliability was evaluated by internal consistency and test–retest reliability. Adjusted logistic regression analysis was used to compare sarcopenic and non-sarcopenic subjects. Internal consistency was determined using Cronbach's alpha coefficient. The correlation of each domain of the SarQoL and SF-36, EQ-5D questionnaires with the score of the whole SarQoL was measured using Spearman´s correlations. Test-retest reliability was measured by the intraclass coefficient correlation.

**Results:** The study was performed on 166 subjects: 99 women (59.6%) and 67 men (40.4%). Median age of subjects was 78 (62.8–94.7) y. Sarcopenia was diagnosed in sixty three subjects. After adjustment for confounders, the total score of the SarQoL questionnaire was significantly lower for sarcopenic than for nonsarcopenic subjects: 77.55±9.8 vs. 49.16±7.46, OR 0.802 (95%CI 0.68–0.945). Cronbach's alpha coefficient was 0.96 for internal consistency. The SarQoL questionnaire revealed good correlation with some domains of the SF-36 and EQ-5D questionnaires for convergent validity and weak correlation with some domains of the EQ-5D for divergent validity. An excellent agreement between test and retest was found with an ICC of 0.99 (95%CI 0.98–1).

**Conclusions:** Lithuanian version of the SarQoL is valid, reliable and consistent and could be used to assess quality of life in sarcopenic population.

## P1066

## BONE TEXTURE ASSESSMENT ON VFA LATERAL SPINE IMAGES BY USING THE TEXTURE RESEARCH INVESTIGATIONAL PLATFORM (TRIP) AND ITS FRACTURE DISCRIMINATION ABILITY: THE OSTEOLAUS STUDY.

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Trabecular bone score (TBS) is a grey-level texture score, which is shown to be a surrogate for trabecular bone microarchitecture. TBS is measured from the anterio-posterior (AP) spine DXA images. A recently developed tool, Texture Research Investigational Platform (TRIP), can assess bone texture scores (BTS) based on a derived approach of the TBS algorithm on any skeletal site besides spine and any image type besides AP spine DXA. Lateral view of the spine has the advantage to enable the exclusion of the posterior elements from the region of analysis.

**Objectives**

We aimed to measure BTS on the lateral spine VFA images, to study its correlation with spine bone mineral density (BMD) and TBS, and to see how it differs between fractured and non-fractured individuals.

**Material and methods**

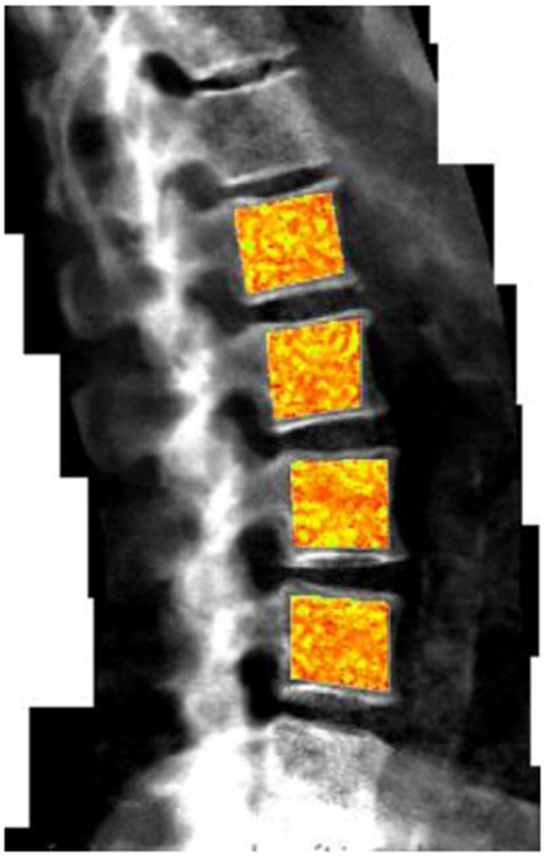
We evaluated 90 women from the OsteoLaus study (45 fractured and 45 non-fractured, age-matched), with a mean age of 72.3(7.7) years and mean BMI 25.9(4.1) kg/m$^2$. All women had AP lumbar DXA scans and lateral VFAs performed using Lunar iDXA (GE Healthcare, Madison, WI, USA) and TBS measured using v3.03. BTS was assessed using TRIP v1.0 (Medimaps, France) by manually employing 8-points on each L1-L4 vertebrae (see image). Vertebral fractures were assessed in VFA images based on the Genant's method. The correlations of BTS with spine BMD and TBS were assessed by using Pearson`s correlation coefficient and the differences between the fractured and non-fractured women were assessed by independent samples t-tests.

**Results**

In general, fractured women had a higher BMI and were shorter. Spine BMD was significantly correlated with TBS (r=0.56, p<0.001) and BTS (r=0.38, p<0.001); BTS was non significantly correlated with TBS (r=0.14, p=0.20). Those who fractured had a significantly lower spine BMD T-score (-1.15 vs –0.02, p<0.05), and TBS (1.24 vs 1.33, p<0.001). BTS was also lower among the fractured women (0.52 vs 0.54).

**Conclusion**

In conclusion, this study showed that BTS as measured on the lateral spine VFA images had indeed lower values among the fractured individuals. Nevertheless, our study sample was small and further investigations in larger studies are needed to confirm the ability of BTS from VFA image in fracture discrimination or prediction.



## P1067
## FAMILY HISTORY INFLUENCES FRACTURE RISK BMD INDEPENDENTLY

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Osteoporosis, a major public health issue has been associated with a positive family history. We aimed to evaluate how family history of osteoporotic fractures influences: 1. fracture rate, 2. BMD levels, 3 BMD levels when the fractures occurred compared to negative history. We included 541 patients, with an average age of 55 years. Our study confirms that a positive family history significantly increase fracture prevalence (37 vs. 17%, $p<0.001$), decreases BMD scores and: fractures occurred at higher (better) T and Z-scores. As a conclusion we can affirm that family history increases the probability of a fracture also independently of the BMD scores.

## P1068
## PREDICTORS OF OSTEOPOROTIC HIP FRACTURE BEYOND FRAX

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**Objective:** Osteoporotic hip fractures remain a major cause of mortality and morbidity in individuals above 65 years of age. The aim of this study was to determine causative agents other than those included in the FRAX model contributing to the development of such incidents.
**Methods:** All patients over 65 admitted in a secondary general hospital for a period of 1 y due to osteoporotic risk fractures were included in a cohort trial, recording their demographics, quality of life, main health indicators and comorbidities and surgical outcome up to 3 months post admission. The study was approved by the Institutional and the National Bioethics Committee and the Personal Data Protection Commissioner. All data was pseudonymized and analyzed via the SPSS 20 Statistical Package.
**Results:** In total, 206 patients were enrolled in the trial, of which 128 female and 78 male, with a mean age of 81.1 y. No correlation was detected between incidence of osteoporotic fracture and increasing age, sex or the prevalence of comorbidities such as cancer (any site), hypertension or chronic heart/renal failure. On the contrary, an increased risk was observed for patients with diabetes type 2 (prevalence 27.7% vs. 22% in the general population, $p=0.045$) and atrial fibrillation (prevalence 13.6% vs. 5.9% in the general population, $p<0.001$).
**Conclusion:** Apart from the FRAX score, additional factors, such as atrial fibrillation and diabetes mellitus also contribute to the incidence of major osteoporotic fractures. In patients over 65, such comorbidities enhance the clinical indication for osteoporosis screening and prevention.

## P1069
## ARE ORTHOPEDIC DOCTORS SUFFICIENTLY CONCERNED WITH VITAMIN D?

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**Objectives:** Vitamin D is synthesized in the skin under the influence of ultraviolet lights coming from the sun or is obtained from food and it is known that it has a very important place for the skeletal structure. Studies stated that the deficiency clinically causes deformations such as joint swelling, rickets, muscle weakness, fractures, bone loss, chronic fatigue, pain and falls, and increases the risk of falling and fractures. Regular intake of vitamin D is very important to decreasing the risk of falling by increasing the protein synthesis, which enables the growth of muscle cells with vitamin D receptor mechanism. The aim of our study was to emphasize the importance of investigating vitamin D levels affecting the musculoskeletal system and to reduce the risks as an orthopedists.

**Methods:** In the last 2 y, 50.453 (17.022M, 33.431 F) vitamin D (25 (OH) D) examination was performed. After 12 h fasting, the test was performed before 10:00 am. The insufficiency limit was determined <20 ng/ml, the deficiency values were between 20-30 ng/ml and the normal value was 30-80 ng/ml. The results were classified according to the gender and department that ordered and were grouped for age range as <18, 18-45, 46-65 and >65 y.

**Results:** Vitamin D level of individuals with a mean age of 33.71 was 26.31. When the results of vitamin D were measured, 24138 (47%) were insufficiency, 9251 (18%) were deficient and 17064 (35%) were within normal limits. According to age groups, under the age of 18, 46.47%, between the age of 18-45, 74.68%, and between the age of 45-65, 72.43% found to be deficient and incomplete in the individuals. When the results were evaluated according to the ordering departments 342 (0.67%) of 50453 tests were ordered by the orthopedics and traumatology department.

**Conclusions:** In our study, a high rate of vitamin D insufficiency and deficiency was determined and this rate was found to be around 70% in the adult age group. It is noteworthy that orthopedics and traumatology doctors are not interested in vitamin D great lack of deficiency which affects negative the musculoskeletal system. These doctors, who deal with pain, falls and fractures, need to increase their interest in vitamin D metabolism, measurement, evaluation and treatment.

## P1070

## SUCCESSFUL TREATMENT OF RHEUMATOID ARTHRITIS WITH TOCILIZUMAB AND ITS EFFECT ON METHOTREXATE AND CORTICOSTEROID DOSING SCHEDULE

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**Objective:** Successful management of rheumatoid arthritis (RA) depends on the early administration of DMARDs and biologic DMARDs. The biologic agent tocilizumab, an interleukin-6 receptor inhibitor, has been used for the management of RA. The aim was to describe a cohort of RA patients treated with tocilizumab and the effect of this treatment on the other DMARDs used, namely methotrexate and corticosteroids.

**Methods:** In a cohort of 80 patients with rheumatoid arthritis the biologic agent tocilizumab was administered in combination with methotrexate administered sc and 10 mg prednisolone. Within this cohort, 26 patients were on tocilizumab administered iv 8 mg/kg/4wks (maximum dose 800 mg) and 54 were on tocilizumab administered sc 162 mg/wk. As corticosteroid administration is characterized by adverse effects, such as osteoporosis and diabetes mellitus, in the course of the disease, in all patients an effort was made to reduce and, if possible, withdraw corticosteroids. An effort was also made to reduce methotrexate dosage. After a year, prednisolone was either significantly reduced or withdrawn. The final dosage of prednisolone was either 2.5-5 mg or complete withdrawal. The successful reduction of methotrexate dosing schedule was also achieved. The final methotrexate dose was either 12.5 mg sc or complete withdrawal. After a period of 52 weeks in this cohort 42 of 80 patients (52.5%) were on monotherapy with tocilizumab.

**Results:** In a cohort of 80 patients with RA the administrations of tocilizumab, either iv or sc, proved safe and effective. Remission or low disease activity of RA was achieved. Corticosteroid dosage was reduced. Methotrexate dosage was also reduced. After 52 weeks within the group of RA patients on treatment with tocilizumab, in 42 complete withdrawal of corticosteroids and methotrexate proved feasible. Patients on tocilizumab monotherapy remained in remission.

**Conclusions:** It appears that tocilizumab is safe and effective for the treatment of RA. Tocilizumab treatment may permit withdrawal of both corticosteroids and methotrexate in patients with RA. The management of active RA initially with low dose corticosteroids in combination with methotrexate sc and, in the case of failure to achieve remission, with the addition of the biologic agent tocilizumab had as a result either significant corticosteroid reduction or complete withdrawal and reduction of methotrexate dosage, the disease remaining in remission.

## P1071

## ASSOCIATION OF ESSENTIAL MINERALS WITH CONCENTRATIONS OF 25-HYDROXYVITAMIN D AND 1,25-DIHYDROXYVITAMIN D AMONG SAUDI PATIENTS

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**Objective:** To determine the patterns of essential minerals in Saudi patients with and without vitamin D deficiency and explore known associations between essential minerals with 25- hydroxyvitamin D and 1,25-dihydroxyvitamin D among Saudi patients.

**Method:** A convenience sample case-control study involving (N=199) Saudi patients, with vitamin D deficiency (N=87) (35male/52female), and vitamin D sufficiency (N=112) (66male/46female), were included in this study. Calcium, phosphate, magnesium, copper, iron, total iron binding capacity (TIBC), lipid profile, 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D were measured.

**Results:** Results showed a significant difference (P<0.05) in plasma glucose (P=0.053), TIBC (P=0.015) and transferrin

saturation (P=0.004) and no significant difference in calcium, phosphate, magnesium, copper and iron concentration between the vitamin D deficient and the vitamin D sufficient group. High levels of 25-hydroxyvitamin D in the vitamin D sufficient group was found to be significantly associated with high levels of HDL cholesterol, and low levels of calcium and magnesium. High levels of 25-hydroxyvitamin D in the vitamin D deficient group was found to be significantly associated with low levels of cupper and glucose. High levels of 1,25-dihydroxyvitamin D in the vitamin D deficient group was found to be significantly associated with low levels of magnesium.

**Conclusion:** In conclusion, association between vitamin D and various essential minerals varies considerably.

Table: Associations between bone strength and its changes at the distal radius and tibia and the risk of incident major osteoporotic fractures in women.

| Multivariate cox regression | | RADIUS (n=514) | | TIBIA (n=556) | |
|---|---|---|---|---|---|
| | | HR (95%CI) | P-value | HR (95%CI) | P-value |
| Failure load (baseline) | ↘SD | 1.81 (1.06, 3.10) | **0.030** | 1.63 (1.01, 2.61) | **0.045** |
| Failure load (change) | ↗SD | 0.80 (0.52, 1.23) | 0.310 | 1.33 (0.94, 1.89) | 0.106 |
| Age | ↗SD | 0.92 (0.58, 1.46) | 0.736 | 0.94 (0.63, 1.42) | 0.782 |

*Data are hazard ratio associated with one standard deviation change of each parameter, obtained from Cox's proportional hazard models.*

## P1072

## COMPARATIVE STUDY OF WEEKLY ALENDRONATE VS. YEARLY ZOLEDRONIC ACID INJECTION IN TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN TERMS OF EFFICACY, COMPLIANCE AND BONE MARKERS ESTIMATION

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**Objectives:** To compare the efficacy and compliance of alendronate vs. zoledronic acid in treatment of postmenopausal osteoporosis with calculation of bone turnover markers level in serum and urine.

**Methods:** A total of 122 postmenopausal women with osteoporosis were included followed by written consent. Diagnosis of osteoporosis was made by DXA scan (T-score <-2.5 or below). Patients were categorized in two treatment groups (group 1 & 2) by random allocation methods. Group 1 and 2 were designated as alendronate (AL) arm zoledronic acid (ZA) arm respectively. The changes recorded in patients were observed at baseline, 3 and 12 months of therapy either with AL or ZA. Compliance for the drug AL was assessed by asking the patient to return the empty packets of medicines consumed by them. Efficacy of treatment was assessed by calculating bone turnover markers for bone resorption such as urine NTx, BCTx and bone formation markers such as BSAP and PINP. Two-sample Wilcoxon rank-sum (Mann-Whitney) test was used. Data are represented in median (min-max) values and p value was considered significant as <0.05.

**Results:** The mean age, height and weight of patients were 60.40±6.98 y, 147.56±6.55, and 58.45±8.58 respectively. The median baseline BMD, PTH, vitamin D, calcium, ALP and phosphorous were -3.7 g/cm$^3$, 46.27 pg/ml, 33.60, 9.33, 180.88 Ka/IU and 3.94 mg/dl respectively. While comparing the data in alendronate and zoledronic acid arms, we analysed values in between groups at baseline, and at 3 months and 1 y follow-up. The value of different bone markers were statistically compared between the two groups. The bone resorption markers, B-CTx shows p value of 0.4296 and 0.5208 between the two groups at 3 months and 1 year follow-up respectively, and NTx shows p value of 0.9206 and 0.1580 between two groups at 3 months and 1 y respectively. Additionally, the bone formation markers, PINP and BSAP shows p values of 0.6988 and 0.4227, 0.9174 and 0.5028 at 3 months and 1 year between two groups respectively.

**Conclusion:** As seen from the final statistical analysis, it is clear that there is no difference between the 2 groups in terms of efficacy of treatment. It may be noted that the compliance rate in treatment with zoledronic acid group was 100% as the injection was only given once under supervision, making it a superior drug in terms of convenience. However, oral bisphosphonate (alendronate) being effective and affordable may remain a first line of therapy for the treatment of osteoporosis. A longer term follow-up, however, is desired to adequately compare the difference in outcomes between these two drug groups.

## P1073

## ARE THYROID HORMONES IN THE NORMAL RANGES ASSOCIATED WITH BONE MINERAL DENSITY, TBS, OR INCIDENT FRACTURES IN POSTMENOPAUSAL WOMEN? THE 5-YEAR FOLLOW-UP COLAUS/OSTEOLAUS COHORT

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**Objective:** Several studies found that subclinical hyperthyroidism is associated with low BMD and increased fracture risk. In healthy postmenopausal women, results regarding an association between TSH levels in the normal range and BMD are contradictory. Trabecular bone score (TBS) is often deceased in secondary osteoporosis. The aim of this study was to determine the association between thyroid hormones (TSH, fT4) in the normal range and BMD, TBS, and incident fractures at 5 y.

**Method:** We assessed 1475 women aged 50-80 y following in the CoLaus/OsteoLaus cohort. Exclusion criteria were treatment for OP, diabetes, hypo/hyperthyroidism, with hormonal replacement therapy or prednisone, and TSH or fT4 outside the normal ranges. We evaluated BMD at lumbar spine, femoral neck and total hip, TBS, and vertebral fracture with DXA.

Incident major OP fractures were evaluated 5-years later by questionnaire and DXA.

**Results:** 710 women (age 68.7±7.5 y, BMI 25.9±4.6 kg/m$^2$, TSH 2.31±1.34 mU/l, fT4 15.45±2.00 pmol/l) met the inclusion criteria. There was no significant association between TSH or fT4 and BMD measures at any site. A positive correlation was found between TSH and TBS ($p<0.001$), even after correction for tissue thickness ($p<0.001$). This correlation was no more significant after multiple adjustments for age, BMI, renal function, and smoking history. There was no significant association between fT4 and TBS. Mean TSH (2.32±0.53 vs. 2.15±0.18 mU/l) and mean fT4 (15.47±0.79 vs. 15.18±0.24 pmol/l) were similar in women without or with major OP fracture 5 years later.

**Conclusion:** In postmenopausal women with TSH or fT4 in the normal ranges, neither BMD, nor major OP fractures incidence were associated with TSH or fT4 values. This is the first study showing a correlation between TSH and TBS. Lower TSH may lead to a weaker bone structure without affecting BMD, but further studies are needed to evaluate the influence of thyroid hormones on TBS.

## P1074

## THE EVALUATION OF BONE MINERAL DENSITY AND VERTEBRAL FRACTURE FREQUENCY IN PATIENTS WITH PROLACTIN SECRETING PITUITARY ADENOMA

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**Objective:** An increased prevalence of radiological vertebral fractures was observed in women with prolactin (PRL)-secreting pituitary adenoma. The aim of this study was to evaluate BMD, bone turnover markers and vertebral fracture frequency in patients admitted a tertiary endocrine clinic

**Methods:** 230 patients diagnosed prolactinoma over a year and 46 controls were in this cross-sectional study. Vertebral fractures assessment done on lateral X-ray examinations of the thoracic and lumbar spine according to Genant's classification. BMD was measured at the lumbar spine and femoral neck by DXA. The levels of prolactin, calcium, PTH, 25 OH vit D, osteocalcin, C telopeptide levels were evaluated. BMI was calculated.

**Results:** Vertebral fractures were observed in 106(46%) patients with prolactinoma and in 13 (20.3%) of controls ($P<0.001$). vertebral Fracture detected. Clinical and laboratory results of the vertebral fracture positive and negative prolactinoma patients was shown in Table 1. Vertebral fracture detected prolactinoma patients have lower BMD measurements compared to patients without vertebral fracture ($p<0.001$). Fractured patients with prolactinoma were older than nonfractured patients ($p=0.006$) but there was not a difference in the duration of the disease (p 0.88). The serum prolactin level at the follow-up wasn't statistically different between two groups ($p=0.96$).

**Conclusion:** This cross-sectional study shows that radiological vertebral fractures occurred more in patients with PRL-secreting pituitary adenomas according to the controls. Vertebral fractures were significantly correlated with BMD.

Table 1: Clinical and laboratory parameters of vertebral fracture positive and negative prolactinoma patinets

| | Vertebral Fracture + (n:106) | Vertebral fracture - (n:124) | P-values |
|---|---|---|---|
| Age (years) | 44,43 ± 12,46 | 38,45 ± 9,79 | 0,006 |
| Duration of disease (years) | 6,434 ± 6,035 | 6,355 ± 5,541 | 0,88 |
| BMI (kg/m2) | 29,47 ± 7,674 | 29,94 ± 6,600 | 0,75 |
| L1-L4 BMD (g/cm2) | 1,114 ± 0,1869 | 1,196 ± 0,1808 | 0,0008 |
| Femur neck BMD (g/cm2) | 0,9589 ± 0,1848 | 0,9935 ± 0,1415 | 0,07 |
| Serum Prolactine (ng/ml) | 128 ± 346,5 | 261,3 ± 17,54 | 0,96 |
| 25-OH-D (ng/dl) | 22,4 ± 11,38 | 20,09 ± 10,63 | 0,14 |

## P1075

## THE BIOLOGIC AGENT SB4 ETANERCEPT BIOSIMILAR IN THE TREATMENT OF AUTOIMMUNE RHEUMATIC DISORDERS: REMISSION OF MUSCULOSKELETAL AND OTHER MANIFESTATIONS

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**Objective:** The etanercept biosimilar SB4 has entered the market recently and is being evaluated for its safety and efficacy in the treatment of autoimmune rheumatic disorders. The aim of the study was to describe the efficacy and safety of the etanercept biosimilar SB4 in the treatment of autoimmune rheumatic disorders. In particular, the efficacy of the etanercept biosimilar SB4 in the treatment of the musculoskeletal manifestations of autoimmune rheumatic disorders was evaluated.

**Methods:** The etanercept biosimilar SB4 was administered in 50 patients with autoimmune rheumatic disorders, 16 with rheumatoid arthritis, 14 with ankylosing spondylitis and 20 with psoriatic arthritis. Patients were previously on treatment with various agents, DMARDs and biologic agents. In particular, within the group of 16 patients with rheumatoid arthritis, 10 were on treatment with various anti-TNF agents and methotrexate, while 6 were on treatment with methotrexate and corticosteroids. Thus, within this group of 16 patients with rheumatoid arthritis in 6 the SB4 etanercept biosimilar was administered as a first line biologic treatment. Within the group of 14 patients with ankylosing spondylitis 11 were on treatment with anti-TNF agents and were switched to SB4. Within this group of 14 patients with ankylosing spondylitis in 3 biologic treatment was initiated with SB4. Within the group of 20 patients with psoriatic arthritis 12 were on treatment with anti-TNF agents and were switched to SB4, 4 were on treatment with an interleukin-17 inhibitor and were

switched to SB4, 1 was on treatment with the IL-12/23 inhibitor ustekinumab and was switched to SB4 and in 3 biologic treatment was initiated with SB4.
**Results:** All 16 patients with rheumatoid arthritis achieved remission of the disease and tolerated the agent well. All 14 patients with ankylosing spondylitis achieved remission of the disease with SB4 and tolerated the agent very well. All 20 patients with psoriatic arthritis achieved remission of the disease as far as arthritis and dermatologic manifestations and tolerated the agent very well. No adverse reactions were observed. Additionally, patients reported being satisfied with the use of the SB4 method of administration.
**Conclusions:** The SB4 etanercept biosimilar appears to be safe and effective for the treatment of autoimmune rheumatic disorders. In particular, remission was achieved in rheumatoid arthritis patients and ankylosing spondylitis patients. In psoriatic arthritis both articular and skin manifestations responded to the treatment. The agent was equally effective either after switch from another biologic agent or as initial treatment.

## P1076
## DIAGNOSTIC PERFORMANCE OF PINP IN IDENTIFYING CUSHING'S DISEASE

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**Objective:** N-terminal propeptide of type I procollagen (PINP) is a bone formation marker which was recommended by the IOF and IFCC for use in clinical trials for monitoring the efficacy of osteoporosis treatment. Patients with Cushing's disease (CD) have suppressed bone formation and osteocalcin can be used as a diagnostic biomarker to differentiate endogenous hypercortisolism from heathy controls and postmenopausal osteoporosis [1]. The goal of this study was to evaluate whether PINP can be used to diagnose CD.
**Methods:** We enrolled subjects with CD confirmed by routine testing (late-night salivary cortisol; 24h urinary free cortisol) and healthy controls. Fasting serum samples were taken from patients with CD and stored at -40°C. Commercially available kits ECLIA Cobas e601 Roche were used to estimate both PINP and osteocalcin values. ROC-analysis was used to determinate the diagnostic accuracy and the threshold for PINP to differentiate CD.
**Results:** The study included 29 patients with CD (39.93 years old, 95%CI 34.07-45.79) and 26 controls (34.69 years old, 95%CI 30.32-39.07) matched by sex, age and BMI ($p=0.257$, 0.155 and 0.771 between groups, respectively). Both bone formation markers, osteocalcin and PINP, were markedly decreased in patients with CD. PINP levels negatively correlated with late-night salivary cortisol: $\rho=-0.651$ ($p<0.001$). The area under the curve (AUC) for PINP - 0.808 (95%CI 0.693–0.924) was significantly lower compared to the AUC for osteocalcin - 0.925 (95%CI 0.857–0.992). The threshold for PINP at 53.4 ng/ml yielded a sensitivity of 96.55% and a specificity of 57.69% to diagnose CD among healthy subjects. At the same time the threshold for osteocalcin at 15.2 ng/ml yielded a sensitivity of 92.59% and a specificity of 77.78%.
**Conclusions:** PINP has less diagnostic accuracy vs. osteocalcin in identifying Cushing's disease. However, it can be useful as a complementary diagnostic test in CD diagnosis.
**Reference:** 1. Belaya ZE et al. Bonekey Rep 2016;5:815.

## P1077
## MUSCLE ASSESSMENT WITH DYNAMIC 2D SHEAR WAVE ELASTOGRAPHY: PITFALLS AND LIMITATIONS

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**Objectives:** Recently, many studies have been published on muscle ultrasound dynamic shear wave elastography (dSWE). However, most of them deliver very heterogeneous findings, which make them less comparable and the results less informative. Therefore, it is nearly impossible to use meta-analyses as a reliable statistical approach. The lack of standardized protocols and a very high inter- and intraobserver variability remain a diagnostic problem. How to avoid typical procedural mistakes and to deal with pitfalls and limitations of the SWE technique remains an important issue.
**Methods:** Over the past 2 y, 161 papers on muscle SWE have been publicized (PubMed). SWE still has a major variation in repeatability, especially in different muscle groups and contraction evaluation. The main reason for the variety in results is discussed in this literature review.
**Results:** Muscle architecture and force loading can be very complex. Each muscle is composed of grouped fascicles, which attach to aponeuroses and form a pennation angle. Fibre direction changes in unipennate, bipennate or multipennate muscles and muscle anatomy knowledge can be helpful. Stiffness measurements and visualization were better in longitudinal fibre and probe orientation. Stiffness values were higher in nearby arteries and deeper tissue layers, in particular over the bone. During muscle contractions, heterogeneous elastogram patterns appeared often due to force orientation and specific biomechanics, therefore inconsistencies might be expected. It might be challenging to achieve complete relaxation or to repeat the exact rate of muscle contraction. Muscle fatigue, temperature, previous physical therapy, higher probe pressure, joint and even patient position can significantly affect stiffness values. Higher measurements were also a result of many technical factors, such as larger ROI, linear probe and ultrasound presets. Measurements obtained on two separate ultrasound machines are difficult to compare. Caution is needed due to artefacts: attenuation effect (deeper

structures), reflections (bone, fascia), signal void (fluid), mirrored elastogram, and movement artefact.
**Conclusion:** As an emerging noninvasive technology, dynamic SWE of muscle is being investigated and despite numerous studies, this technique alone is still not reliable and accurate enough for routine clinical use. With the technological progress and considering muscle peculiarities, it has the potential for a good additional diagnostic tool.

## P1078
## RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY IN REHABILITATION OF CALCIFIC TENDINOPATHY OF THE ROTATOR CUFF

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**Objective:** The most common cause of shoulder pain is calcific tendinopathy of the rotator cuff. The clinical assessment of the disease is dominated by pain and limited range of movement in the shoulder. Treatment of calcific tendinopathy of the rotator cuff can be conservative and operative. In a conservative approach in the acute phase, NSAIDs and local application of corticosteroids, cryotherapy and positioning of the shoulder joint in mild abduction are provided. In the subacute and chronic phase of the disease, physical agents and exercises are used. Radial extracorporeal shockwave therapy is newer form of nonsurgical treatment with physical modalities. The aim of this presentation is to evaluate the effects of the radial extracorporeal shockwave therapy (RESWT) in rehabilitation of calcific tendinopathy of the rotator cuff.
**Materials and methods:** A 42-year-old woman comes for examination due to pain and limited range of movement in the right shoulder. The patient was treated with medication and conventional physical treatment two months before. Plain radiography of the right shoulder revealed presence of calcific rounded masses in the attachment of tendons within the rotator cuff. VAS score on the day of admission was 8. Range of movement was: elevation 85°, retroflexion 20°, abduction 40°, adduction 10°, internal rotation 30°, external rotation 40°. The patient was on RESWT treatment, number of strokes was 2000, duration of treatment - 7 min (determined by an application protocol), 5 treatments applied once a week in one session, local in the area of the right shoulder.
**Results:** 3 months after RESWT treatment VAS score was 1; range of movement was: elevation 165°, retroflexion 30°, abduction 90°, adduction 25°, internal rotation 70°, external rotation 80°; control plain radiography of the right shoulder showed completely disintegrated and resolved calcification.
**Conclusion:** RESWT is an effective alternative compared to other conservative and operative treatments of calcific tendinopathy of the rotator cuff. This treatment shows better efficiency in terms of pain relief, improved shoulder joint function, disintegration of calcification, safety, noninvasiveness and cost-effectiveness. Therefore RESWT should be the treatment of choice in this pathology.

## P1079
## EFFECTS OF ANGIOPOIETIN-LIKE PROTEINS TYPES 3 AND 4 ON ANGIOGENESIS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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**Objective:** The family of angiopoietin-like proteins actively participates in both physiological and pathophysiological, primarily inflammatory processes. The angiopoietin-like protein 3 (ANGPTL3) and the angiopoietin-like protein 4 (ANGPTL4) are of interest due to their contribution to the processes of angiogenesis and lipid metabolism. Periarticular osteoporosis (OP) in rheumatoid arthritis (RA) is accompanied by systemic bone loss and a high risk of osteoporotic fractures. The purpose is to study the influence of ANGPTL3 and ANGPTL4 on the peculiarities of angiogenesis in patients with RA and OP.
**Methods:** The study included 36 RA patients (aged from 33-64 years old, women – 100%). A control group (12 people) comprised healthy individuals aged 28-52 years old. Levels of ANGPTL3 and ANGPTL4 in serum were determined by the enzyme immunoassay using the commercial test systems from "Bio Vendor". Ultrasound examination of the wrist joints was carried out according to the standard procedure using a linear sensor with a frequency of 5-12 MHz on the ultrasound diagnostic system Accuvix V10. The features of the blood flow were studied by color and energy dopplerography (the number of color locus was visually assessed). Osteodensitometry was performed on a X-ray densitometer Lunar DPX. The assessment of the bone tissue of the proximal femur condition was carried out according to the T-criterion.
**Results:** The level of ANGPTL3 and ANGPTL4 was significantly higher in patients with RA ($p=0.043$ and $p=0.038$, respectively), than in the control group. Hypervascularization rates were significantly correlated with ANGPTL4 in patients with RA ($r=0.38$, $p=0.002$) according to Doppler data. A positive correlation was found between the level of ANGPTL4 and low T-criterion ($r=–0.842$). It has been proved that ANGPTL3 and ANGPTL4 has a pro-angiogenic activity. Apparently, ANGPTL4 can activate proliferation processes in the synovial membrane, by binding to integrin-$\alpha v\beta 3$. Besides, the concentration of mast cells is increased in the synovium of affected joints.

Mast cells significantly influence angiogenesis through the production of proangiogenic cytokines, including ANGPTL4.
**Conclusions:** The search for new serological markers that can serve as objective indicators of various pathological processes, such as neovascularization, developing in inflammatory joint diseases, is an important stage in clinical trials in RA with osteoporosis. The connection between ANGPTL4 and OP in women with RA requires further research.

## P1080
## EFFECT OF TREATMENT ON FUNCTION, MOBILITY AND LIPID PROFILE IN ANKYLOSING SPONDYLITIS

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**Objective:** Ankylosing spondylitis (AS) is a chronic systemic inflammatory disorder which affects the sacroiliac joints, the axial skeleton, peripheral joints as well as other organs. It develops in young adults causing significant mobility and functional disorders, with associated severe dysfunction or disability. Ankylosing spondylitis has serious adverse effects on the ability to work and quality of life. The aim was to follow-up a group of AS patients as far as their mobility and functional ability, as well as to evaluate comorbidities, lipid profile and cardiovascular risk and to evaluate the effect of treatment on these parameters.
**Methods:** Questionnaires were used for the estimation of function and mobility, namely BASDAI, BASFI, BASMI, health indices, namely BAS-G, ASAS-Health Index and a questionnaire of productivity and work-related productivity, namely WPAI:GH was utilized. The inflammation indices ESR and CRP were measured, as well as blood total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. The 10-y cardiovascular risk was evaluated using SCORE.
**Results:** BASDAI index decreased from 3.91±0.67 before to 2.51±0.47 (mean±SEM) after treatment in AS patients ($p<0.001$, Student's t-test), BASFI from 4.05±0.68 to 3.17 ±0.61 ($p<0.001$), BAS-G from 4.25±0.69 to 3.29±0.57 ($p<0.001$), ASAS-Health Index from 7.29±1.23 to 5.23 ±0.93 ($p<0.001$) and ESR from 16.12±3.4 mm/h to 12.41 ±2.9 mm/h ($p<0.001$). Total cholesterol increased from 113.52±20.26 mg/dl before to 193.41±8.81 mg/dl ($p<0.001$) after treatment, HDL cholesterol from 25.37±4.64 mg/dl to 54.06±4.74 mg/dl ($p<0.001$), LDL cholesterol from 69.52 ±13.02 mg/dl to 112.5±8.67 mg/dl ($p<0.001$) and triglycerides from 86.97±22.21 mg/dl to 138.65±23.91 mg/dl ($p<0.001$).
**Conclusions:** It appears that in AS indices of function and mobility as well as health indices improve after treatment, whereas the lipid profile is altered, without, however, an adverse effect on atherogenesis.
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## P1081
## RELATIONSHIPS BETWEEN CLINICAL PHENOTYPE AND PROFILE OF AUTOANTIBODIES IN RHEUMATOID ARTHRITIS

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**Objective:** The concept of rheumatoid arthritis (RA) as a heterogeneous disease with a variety of immunological options and a variety of clinical phenotype is gaining popularity. Heterogeneity of RA may explain why the similar treatment strategies do not lead to the same results in all patients with RA. The term "endotype" - a subtype of the disease, determined by a set of individual clinical and molecular biological, including immunological signs can be useful for the development of a personalized approach in the treatment of RA. The aim of the work was to study the relationship between the presence of certain autoantibodies in the patient with RA and the clinical phenotype of RA.
**Methods:** The study were included 182 patients (23 men (12.64%) and 159 women (87.36%), who fulfilled the EULAR/ACR 2010 classification criteria for RA. The mean age of patients was 52.50±14.01 y. The median age of RA onset (first symptoms) was 46 y (95%CI: 41,724 - 49,213). The disease duration in the examined patients was 48.00 months (95%CI: 36.00 - 69.05). Levels of rheumatoid factor (RF), antibodies to cyclic citrullineted peptide (anti-CCP), antibodies to Sa-antigen (anti-Sa) and antibodies to heterogeneous nuclear protein K (anti-gnpK) were evaluated by ELISA method according to the instructions of test system manufacturers. The presence of antinuclear antibodies (ANA) was determined by IIF on an automated digital system AKLIDES using appropriate reagents.
**Results:** The several clinical phenotypes of RA were distinguished. The group of the typical variant of RA without systemic manifestations included 123 patients who had a typical articular syndrome and had no systemic or spondylarthritis (SpA) signs. The typical variant of RA with systemic manifestations was determined in 40 patients who, in addition to the typical signs, had systemic manifestations. The group of RA with signs of SpA included 19 patients who, in addition to typical signs, have atypical for RA, but specific for SpA manifestations (HLA-B27-allele, axial, non-axial and extraskeletal signs of SpA). RA activity levels according to indices DAS28, CDAI, SDAI did not differ in patients depending on clinical phenotype ($p<0,05$). The frequency of occurrence of anti-CCP and RF in typical RA with systemic manifestations (95.20% and 89.70%, respectively) was

higher than in typical RA (p=0.03 and p=0.003, respectively) and RA with signs of SpA (p=0.003 and p=0.03, respectively). There were no differences between the frequency of anti-Sa and anti-gnpK antibodies between clinical phenotypes ($p<0.05$). The frequency of ANA occurrence was highest in the systemic variant of RA (65.00%) and significantly exceeded the frequency of ANA occurrence in the typical variant of RA (p=0.007). The levels of anti-CCP (p=0.003), RF (p=0.004), ANA (p=0.003) and anti-Sa (p=0.02) antibodies were significantly higher in the systemic variant of RA compared to the typical variant of RA. Anti-CCP and RF levels were higher in the systemic variant of RA than in RA with signs of SpA (p=0.0005 and p=0.005, respectively).

**Conclusions:** Thus, anti-CCP, RF and ANA are not only significant diagnostic biomarkers of RA, but also can be useful for stratification of patients and isolation of individual clinical and immunological variants of the disease. The highest incidence of anti-CCP, RF and ANA, as well as higher levels of autoantibodies in RA with systemic manifestations corresponds to the idea of the predominance of B-cell autoimmunity over T-cell in this group of patients.

## P1082
## RELATIONSHIP BETWEEN SARCOPENIA AND URINARY INCONTINENCE

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**Objective:** Urinary incontinence (UI) and sarcopenia are common geriatric syndromes. They both increase the risk of falls and fractures in older adults. Identification of factors associated with UI is necessary to identify risky individuals, to take preventive measures and to recognize commonly associated comorbidities. We suggest that sarcopenia and/or its components may be associated with stress and urgency UI through decrease in muscle mass/strength. In this study, we aimed to investigate the relationship between UI (stress and/or urgency) and sarcopenia.

**Methods:** Female older adults $^{3}$60 y that applied to geriatric outpatient clinic were analyzed cross-sectionally. Demographic data, clinical data including the presence of UI, UI types fecal incontinence, constipation were obtained. Functional status was assessed by basic and instrumental activities of daily living (ADL and IADL), nutrition by mini-nutritional assessment-short form (MNA-SF). Total muscle mass was measured by bioimpedance analysis and adjusted by three different methods (by height$^2$, BMI or weight). Hand grip strength and walking speed were assessed. The factors found significantly associated with UI in univariate analysis were further evaluated by logistic regression analysis.

**Results:** A total of 802 female adults were included. The prevalence of UI was 48.9%. Associated factors with presence of UI were higher age and BMI, presence of fecal incontinence, constipation, lower activities of ADL and IADL scores, lower grip strength, lower skeletal muscle mass adjusted by weight and BMI and presence of sarcopenia adjusted by weight and BMI in univariate analyses. In regression analysis independent factors related with UI were presence of fecal incontinence, constipation, IADL dependency, low muscle mass adjusted by weight and BMI and sarcopenia adjusted by weight.

**Conclusion:** The results of our study suggest that UI is independently associated with sarcopenia when muscle mass was adjusted by weight and also with presence of low muscle mass when muscle mass was adjusted by weight or BMI. Sarcopenia and urinary incontinence are related and both increase the risk of falls and fracture. The primary aim should be the prevention of sarcopenia in order to decrease the risk of falls.

## P1083
## HIP FRACTURES IN THE ELDERLY: OSTEOMALACIA IS AN UNDER RECOGNIZED CAUSE

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**Objective:** To assess the prevalence of osteomalacia in osteoporotic hip fractures and correlate biochemical markers of osteomalacia to the histopathology.

**Methods:** Prospective cohort study between July 2015 and June 2016. Consecutive elderly patients (aged >50 y) with proximal femur fractures were enrolled. Patients with malignancy, significant trauma or fractures of additional bones were excluded. Osteoporosis was identified by DXA scan of nonfractured hip and lumber spine. Metabolic tests including serum calcium, phosphorous, alkaline phosphate, renal and liver functions, parathormone and vitamin D levels were done. During surgery, bony tissues was taken from a site adjacent to the fracture. Histological examination was performed on nondecalcified paraffin sections using H&E, toluidine blue, elastic von Gieson, Masson's trichrome and solochrome cyanine stains.

**Results:** Out of total 45 cases, 25 were female and 20 were male patients. Mean age of patients was 68.7 y [53-85 y]. Abnormal values of serum calcium were noted in 20 patients [44.4%], serum phosphorus in 10 patients [22.2%], serum ALP in 24 patients [53.3%] and serum vitamin D in 22 patients [48.9%]. In histopathology, 30 patients out of 41 patients [73.17%] showed Osteomalacia; for the rest of 4 patients, histopathology not representative and showed dead or fibrous tissue. 3 patients (6.7%) had mild, 8 patients (17.8%) had

moderate and 19 patients (42.2%) had severe osteomalacia. Histopathological grade and prevalence of osteomalacia neither correlated well with vitamin D levels nor with any other metabolic marker such as serum calcium, serum phosphorus, alkaline phosphate.

**Conclusion:** In the majority of elderly osteoporotic hip fracture patients, osteomalacia is the cause of bone weakness and fractures occur due to minor trauma. Abnormal biochemical values may not be significantly associated with osteomalacia; hence, histopathology remains the gold standard for diagnosis of osteomalacia.

## P1084
## INCIDENCE AND RISK FACTORS INVOLVED IN THE DEVELOPMENT OF COMPLEX REGIONAL SYNDROME

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**Objectives:** The complex regional pain syndrome (CRPS) is a neuropathic disorder that involves regional disabling pain with severity that is disproportionate to an inciting event. It is usually accompanied by swelling, impaired motor function and sympathetic dysfunction (sudomotor abnormality). CRPS has three evolutionary stages acute, dystrophic and atrophic and it is classified in two types depending on the existence of nerve damage. In this study we evaluated the patient's history prior to the onset of CRPS, which might give clues to the potentially shared pathogenic or etiologic factors, as well as the risk factors for CRPS.

**Methods:** A total of 45 cases diagnosed with CRPS were assessed based on the clinical presentation (Budapest criteria 2010). Anamnestic data regarding demographics, age, sex, clinical criteria and biological samples were collected from the investigated patients, after signing the informed consent. Moreover, the visual analogue scale was used for the evaluation of pain.

**Results:** In this study, we systematically investigated the associations between medical history and CRPS occurrence with the purpose to find potential risk factors and leads towards CRPS underlying mechanisms. The mean age for CRPS onset in the study population was 50 y, its incidence increasing with age. Sex distribution was favorable to females in a ratio of 4:1. The fracture was the most common precipitating injury in 27 (60%) of the cases, while for the rest, other initiating events were incriminated, including soft tissue and tendon injuries, strokes, sprains, malignancies and postherpetic neuralgia. The role of inflammation is endorsed by the demonstration of inflammatory mediators in serum from patients with CRPS. Additionally, the sympathetic nervous system dysfunction led to mixed dyslipidemia, hyperglycemia and hyperuricemia.

**Conclusion:** This observational study revealed the predisposition of some patients to develop CRPS and are susceptible to generate abnormal reactions to painful stimuli. Early recognition of risk factors and diagnosis of CRPS, followed by occupational and physical therapies could result in decreased pain symptomatology and improved outcome.

## P1085
## THE USE OF DRUG THERAPY FOR OBESITY IN THE TREATMENT OF PATIENTS WITH THE METABOLIC PHENOTYPE OF KNEE OSTEOARTHRITIS

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**Objective:** Currently in the world there is a pandemic of obesity, which leads to an increase in diseases associated with overweight. Obesity is an important factor in the development and progression of osteoarthritis (OA). The metabolic phenotype of OA, which is directly associated with obesity, is highlighted. Due to the growing number of patients with obesity and OA, a high level of comorbidity and the lack of effectiveness of non-drug therapy, the problem of the effectiveness and safety of the therapy of obesity is very relevant. Our aim was to evaluate the efficacy and safety of drug therapy for obesity in patients with knee OA.

**Methods:** 50 female patients (45-65 y.o.) with Kellgren-Lawrence stage II-III knee OA and obesity (BMI >30 kg/m$^2$). Patients in Group 1 (n=25) took 120 mg of orlistat 3 times a day in combination with a low-calorie diet and exercise for 6 months. Patients in Group 2 (n=25) were on a low-calorie diet combined with exercise for 6 months. All patients initially received various nonsteroidal anti-inflammatory drugs (NSAIDs) in tablet form. All patients were assessed for body mass, parameters of the WOMAC index, EQ-5D quality of life index, NSAID consumption, and orlistat therapy safety assessment.

**Results:** After 6 months of drug therapy for obesity, patients from Group 1 achieved a significant weight loss by 10.07% ($p<0.05$) (Figure 1). Patients from Group 2 the use of nonpharmacological methods of treating obesity reduced body weight by 0.84% ($p> 0.05$). Patients from Group 1 improved the WOMAC index (Figure 2): pain decreased by 52.5% ($p<0.05$), stiffness by 47.98% ($p<0.05$), and functional insufficiency by 51.55% ($p<0.05$). Patients from Group 2 also showed a decrease in the WOMAC index, but these changes were worse than in patients with greater weight loss. Patients from Group 1 showed a significant improvement in the quality of life for the EQ-5D index by 52.27% ($p<0.05$). Patients from Group 2 against the background of insignificant changes in body weight, the quality of life index EQ-5D did not change. The need to take NSAIDs on the background of drug therapy for obesity and weight loss decreased by 4.6 times. On the contrary, in Group 2 of patients on the background of non-

pharmacological treatment of obesity after 3 months of observation, the need for NSAIDs was maintained in 76%. The need for NSAIDs in patients of Group 2 decreased 1.3 times. In general, the tolerability of orlistat in patients of Group 1 was good. Adverse reactions were observed in two patients in the form of steatorrhea. The appearance of an undesirable reaction was associated with errors in nutrition (eating food saturated with animal fats), which did not require discontinuation of the drug. After correcting the diet, no adverse reactions were noted in patients.

**Conclusion:** The results of our study showed a significant decrease in body weight by more than 10% in the group of patients with OA while receiving orlistat. Significant weight loss helps reduce pain intensity, improve joint function, improves the quality of life of patients with OA, reduces the need for NSAIDs, which can help stabilize other comorbid diseases in patients with OA and obesity. The study noted good safety of therapy with orlistat; no serious adverse reactions were reported. Thus, drug therapy for obesity using orlistat can be included in the management of patients with OA and obesity, who cannot achieve weight loss using non-drug methods.

Figure 1. Body mass dynamics during the study

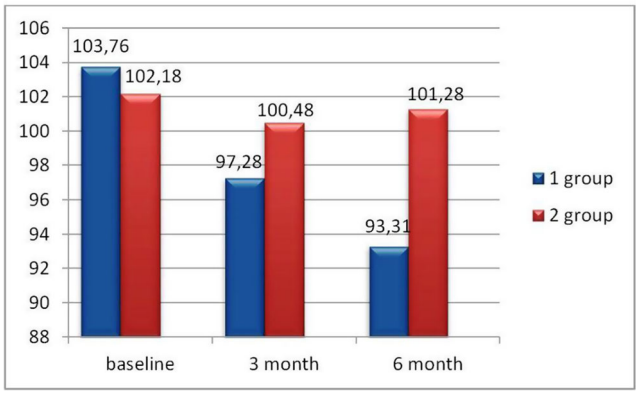
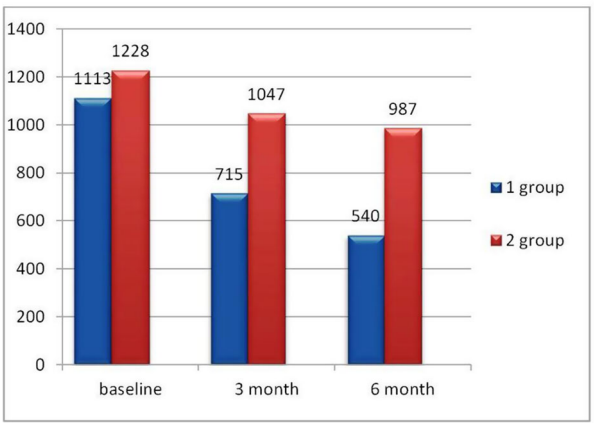



Figure 2. Dynamics of changes in the total WOMAC during the study




**P1086**

## VITAMIN D DEFICIENCY IN PATIENTS WITH LOW-ENERGY HIP FRACTURES

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**Objective:** Since the end of the last century, due to a high diagnostic level of osteoporosis using X-ray absorptiometry, there has been a decrease in interest in other metabolic bone diseases, such as osteomalacia. Pseudo-fractures, or Looser zones, are characteristic manifestations of osteomalacia as a result of vitamin D deficiency. According to statistics, the prevalence of vitamin D deficiency in patients aged 60 y and older with low-energy fractures can reach 69%, and the insufficiency rates can be as high as 98%. It is known that the appointment of specific anti-osteoporotic therapy during osteomalacia can lead to severe adverse effects. The objective was to assess the prevalence and study the peculiarities of vitamin D associated osteomalacia in patients with low-energy hip fractures.

**Methods:** 12 patients with low-energy hip fractures at the average age of 71 y (from 56-92 y) were examined. 10 of them were women (83%). Risk factors for osteoporosis and osteomalacia, symptoms of osteomalacia, history of injuries, biochemical blood tests (calcium, phosphorus, alkaline phosphatase, urea, creatinine, PTH, 25 (OH)vitamin D) were evaluated. All patients underwent hip arthroplasty. Removed bone fragments were examined histologically for signs of osteomalacia.

**Results:** In 11 cases (92%), clinical and biochemical changes characteristic of osteomalacia were found, which was confirmed by histological examination of resected bones. In 3 cases (25%) pseudofractures of other localization were found. Vitamin D deficiency was noted in 83% of cases, severe deficiency in 2 cases (17%).

**Conclusions:** Osteomalacia is a common problem especially in patients with low-energy hip fractures. Screening for vitamin D deficiency is indicated for all patients at risk. Prophylactic vitamin D supplementation will probably reduce the risk of fractures.

**P1087**

## VALIDATION STUDY OF THE BERG BALANCE SCALE AS A CLINICAL TOOL TO PREDICT FALL RISK IN NEUROLOGICAL PATIENTS IN RUSSIA

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**Objective:** Balance disorders are the significant symptoms of many neurological diseases (Parkinson's disease, multiple sclerosis, stroke, etc.). There is a need for the standardized objective clinical tool to predict fall risk in neurological patients (NP) in Russia and Russian-speaking countries as there is not validated scale for this purpose. Meanwhile in Europe

and USA Berg Balance Scale (BBS) is widely used for assessment of NP stability (Lima C. et al., 2018). The aim was to perform a validation study of Russian version of BBS.
**Methods:** 58 neurological patients included in the study had mild to moderate disability and could walk unassisted. The entire BBS validation procedure included translation by two independent medical translators and back translation by a native English speaker with fluent Russian, cultural adaptation and finally, assessment of psychometric parameters: internal and test-retest consistency, Inter-rater reliability, concurrent validity, and sensitivity. To test concurrent validity of the translated scale, Romberg Balance Test was performed in stabilometric platform Stabilan-01-2 (JSC Rhythm, Russia).
**Results:** Internal consistency of Russian version of the BBS assessed by Cronbach's alpha was 0.84 ($p<0.01$) that was higher than critical threshold (0.80). Inter-rater reliability of the scale evaluated by the Cohen's kappa was 0.92 ($p<0.001$). Test-retest consistency was also high with the Pearson's correlation coefficient $r=0.96$ ($p<0.001$), indicating the stability of patient's assessment during the observation period. The BBS scores correlated significantly ($r=0.79$, $p<0.05$) with Romberg Balance Test, indicating acceptable concurrent validity. Finally, it was revealed high enough level of sensitivity as Student's t-test showed a significant difference ($p=0.047$) between scores before and after rehabilitation treatment.
**Conclusions:** Russian version of the BBS is a valid and sensitive tool to assess fall risk in neurological patients. It is also a useful scale for entire clinical examination of NP.

## P1088
## DIABETES, URINE INFECTIONS AND CANCER PREDICT POSTOPERATIVE OSTEOPOROTIC HIP FRACTURE MORTALITY

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**Objective:** Osteoporotic hip fractures remain a major cause of mortality and morbidity in individuals above 65 y of age. The aim of this study was to determine the predictors of outcome in patients submitted to surgery for osteoporotic hip fracture.
**Methods:** All patients over 65 admitted in a secondary general hospital for a period of 1 y due to osteoporotic risk fractures were included in a cohort trial, recording their demographics, quality of life, main health indicators and comorbidities and surgical outcome up to 3 months post admission. The study was approved by the Institutional and the National Bioethics Committee and the Personal Data Protection Commissioner. All data was pseudonymized and analyzed via the SPSS 20 Statistical Package.
**Results:** In total, 206 patients were enrolled in the trial, of which 128 female and 78 male, with a mean age of 81.1 y. Overall fatality for the three month follow-up was 4.4% (9/206). Among the population, only 10 individuals were already on treatment for osteoporosis, of which none died (0% fatality, $p<0.0001$). On the other hand, fatality was increased among patients with diabetes (4/57 or 7% vs. 3.36%, $p<0.001$), history of cancer (4/17 or 23.5% vs. 2.65%, $p<0.0001$) and recent urinary tract infection (1/10 or 10% vs. 4%, $p<0.001$).
**Conclusion:** A number of comorbidities, including diabetes and urinary tract infections negatively predict the outcome of major osteoporotic fractures. Early osteoporosis diagnosis and treatment seems to improve survival even among a very high risk population group for fractures.

## P1089
## LEVELS OF IMPROVEMENTS IN BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS TREATED WITH ROMOSOZUMAB: A POST HOC ANALYSIS OF THE ARCH PHASE 3 TRIAL

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**Objectives:** To quantify the percentage of patients (pts) achieving improvements in BMD of different magnitudes with romosozumab (Romo) followed by alendronate (ALN) vs. ALN alone in the ARCH trial (NCT01631214).[1]
**Methods:** Pts with osteoporosis and fragility fractures (Fx) were randomized to receive 210 mg subcutaneous Romo monthly or 70 mg oral ALN weekly for 12 months, followed by open-label ALN. Post hoc analyses assessed proportions of pts with ≥3%, ≥5% and ≥10% BMD improvements from baseline (BL) at lumbar spine (LS), total hip (TH) or femoral neck (FN) at Months 12 and 24. Included pts had a BL BMD and ≥1 post-BL BMD. Missing values were imputed by carrying forward the last non-missing observation in the treatment period; p-values were based on a logistic regression model adjusting for treatment, age, presence of severe vertebral Fx at BL, BL BMD, DXA manufacturer and BL BMD-by-DXA manufacturer interaction.
**Results:** 3679 pts were included in the analysis. Demographics and BL T-scores were similar between groups. At Month 12, a greater proportion of Romo pts achieved ≥3%, ≥5% and ≥10% improvements in BMD compared to ALN pts at all sites measured (all $p<0.001$) (Table). At 12 months, ≥5%

gain at LS was seen in 91% of Romo vs. 48% ALN pts; at TH in 56% Romo vs. 26% of ALN pts; and at FN in 50% Romo vs. 21% ALN pts. At Month 24, after pts had transitioned to (or continued) ALN for 1 year, responder rates remained higher in Romo-to-ALN vs. ALN alone at all sites (all p<0.001) (Table).

Table. Patients meeting BMD improvement thresholds

| BMD change from BL | Month | ALN,% (n=1577–1781)[a] | | | Romo,% (n=1571–1781)[a] | | |
|---|---|---|---|---|---|---|---|
| | | LS | TH | FN | LS | TH | FN |
| ≥3% | 12 | 67.2 | 47.2 | 37.6 | 95.1 | 74.1 | 65.6 |
| | 24 | 78.1 | 56.4 | 44.6 | 94.1 | 78.9 | 73.5 |
| ≥5% | 12 | 47.7 | 25.9 | 21.3 | 91.2 | 55.9 | 49.6 |
| | 24 | 65.9 | 34.4 | 26.6 | 91.2 | 63.6 | 56.2 |
| ≥10% | 12 | 14.4 | 3.1 | 4.3 | 68.2 | 18.0 | 16.7 |
| | 24 | 29.0 | 6.7 | 5.4 | 74.5 | 26.9 | 21.6 |

[a]N numbers varied between BMD site and time period

**Conclusions:** After 1 year of Romo treatment, a significantly greater proportion of pts achieved high BMD gains at all skeletal sites compared with those seen on ALN therapy alone; these gains were maintained over 1 year of follow-up ALN therapy.

**Reference:** 1. Saag K. NEJM 2017;377:1417.

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**Disclosures:** FC: Consultant/speaker (Amgen, Radius Health); consultant (Tarsa); former consultant/speaker (Eli Lilly). EL: Consultant (Amgen, Radius Health); speaker (Radius Health); research support (Amgen, Radius Health). PE: Research support (Amgen, Eli-Lilly); honoraria for speaker fees/advisory board (Amgen, UCB, Alexion). TM: Advisor (Amgen, Chugai, Daiichi Sankyo, Teijin). MR and WY: Employees and stockholders (Amgen).

## P1090

## HOW ARE PATIENTS MONITORED FOLLOWING ASSESSMENT BY FRACTURE LIAISON SERVICES: A GLOBAL AUDIT OF CURRENT PRACTICES

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**Objectives:** Despite robust evidence for the effectiveness of secondary fracture prevention, uptake in the real-world setting remains disappointing. One barrier to implementation is the effectiveness of monitoring strategies. There are few guidelines for this, and we here describe the current methods used to monitor patients by an FLS to inform a minimal global set of monitoring questions.

**Methods:** We used organisation audit returns from FLSs to the Capture the Fracture programme, International Osteoporosis Foundation. For every FLS that apply to join the CTF programme, a Best Practice Framework questionnaire is completed. In this questionnaire, questions on 13 standards, including patient monitoring (or "long-term management") standard are posed. The long term management standard consists of 8 items that assess how an FLS follows up with their patients in the short and long term.

**Results:** 323 FLSs from 41 countries completed this standard. 278/323 (86%) reported a pathway for evaluating patients. Of those FLS with a monitoring pathway, 74% were delivered by FLS, 4% by primary care and 22% by other clinical services. The content of the monitoring evaluation differed between FLSs: 96% included a measure of adherence, 89% asked about unwanted medication effects, 90% further fractures, 84% further falls and 77% risk factors for fracture. 66% of FLSs included all of the above components. Other components included DXA (6%), nutritional assessment (4%), function (4%) and turnover markers (3%). The timing of the monitoring visits varied. 62% of FLSs re-evaluated patients within 6 months, 46% between 6 and 12 months, 22% between 1 and 2 years and 18% after 2 years. 71% of services only re-evaluated patients once, 12% twice, 10% three times and 5% four times. 16% of services included re-evaluation before and after 6 months. Where the FLS conducted the monitoring, 96% of services used more than one method, with 81% used the clinic setting, 53% prescription records, 51% telephone calls and 6% postal questionnaires.

**Conclusion:** FLSs use a variety of content and methods for monitoring assessments. Further work is needed to link the observed variation in monitoring pathways to the effectiveness, efficiency and improved patient experience of FLSs to close the secondary fracture prevention care gap.

## P1091

## BONE DENSITOMETRY BY REMS TECHNIQUE REDUCES THE RISK OF BONE DENSITY OVERESTIMATION IN SUBJECTS AFFECTED BY OSTEOARTHRITIS

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**Objective:** To evaluate the predictive value of the radiofrequency echographic multispectrometry (REMS) [1] technique in detecting bone fragility in patients affected by osteoarthritis.
**Methods:** The lumbar and femoral T-score values of postmenopausal women (mean age 70.6 y, range 50-90 y, average BMI 24.2) measured by DXA were compared with those obtained by REMS technique, performed in the same anatomical sites within a month from DXA examination.
**Results:** In 30 subjects with clinical-radiological signs of osteoarthritis of the spine, lumbar (LS) T-score obtained with DXA were significantly higher than that measured at the femoral neck (FN). In the same subjects, REMS outcomes in femur and spine were more similar to each other (average T-score LS: -2.6±1.6 vs. T-score FN: -2.4±0.6), and significantly lower than the corresponding DXA measurement (significant difference between DXA and REMS T-score for both LS ($p=0.006$) and FN ($p=0.010$).
**Conclusions:** Osteoarthritis of the spine may reduce the accuracy of lumbar DXA examination, resulting in an overestimation of LS T-score with respect to FN one [2]. The densitometric parameters detected in the same subjects on spine and femur by REMS technique are more similar each other, than as results by DXA. REMS, which showed a strong correlation with DXA in a multicentric comparison study [1], is not affected by the presence of altered soft tissues composition. These data suggest a major predictive value of REMS in detecting osteoporosis in presence of osteoarthritis.
**References**:
1. Di Paola M et al. Ost Int 2018; doi:10.1007/s00198-018-4686-3
2. Blake GM and Fogelman I. J Bone Min Res 2008;23:457

## P1092
## PREDICTING PERSISTENT PAIN TWO YEARS AFTER WHIPLASH INJURIES

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**Objectives:** The aim of this population cohort study is to determine the 2-y persistence of neck pain after whiplash injuries in Greece and Germany and to explore socio-demographic, health-related, occupational, physical, and lifestyle factors that might be linked to such persistence.
**Methods:** Details of age and gender, questions relating to psychosocial, health-related, occupational, physical, and lifestyle factors estimated. Sociodemographic factors included social class, which was categorized according to the Standard Occupational Classification, marital status (married/partner or other) and number of children. Other health-related factors included current and past smoking status and daily alcohol intake. The measure of psychological distress was version of the HADS and BECK scales, which has been validated in general population samples. Finally, physical and lifestyle factors included SF-36 quality of life related scale, were measured. All that questionnaires used in 6**,** 12 months and 2 y after injury.
**Results:** There were 344 responders to the baseline questionnaires There were 254 replies to the 2-y follow-up, a response of 73.83%. A total of 16.6% reported having neck pain in 6 months after injury. 12.7% reported neck pain 12 months after injury and 9.6% reported neck pain 2 y after injury. Mean age was 35 y in nonresponders, mean age 54 years in responders. There were statistically significant differences in the reporting of persistent neck pain across different age categories with the highest likelihood of pain being among those 40-59 y of age. Sociodemographic and health-related factors: social class, marital status, BMI, smoking status, and number of children were not linked to the likelihood of chronic neck pain. Health-related factors were significant risk factors for persistence: poor general health (SF-36), poor psychological health (HADS, BECK). Among the occupational, physical activity, and lifestyle factors investigated, there were few predictors of persistent neck pain. The significant predictors included employment status and physical activity.
**Conclusion:** The message is to achieve a secondary prevention which focus more on treating in those at elevated risk of persistent pain.

## P1093
## MAJOR RISK FACTORS OF POSTMENOPAUSAL WOMEN OSTEOPOROSIS IN TAIWAN

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**Objective:** To detect the major risk factors of postmenopausal women osteoporosis in Taiwan.
**Methods:** A bus, equipped with DXA, serving for Taiwan country-wide BMD test was available between 2008-2011. Participants must complete a questionnaire regarding risk factors of osteoporotic fracture in FRAX® tool before BMD test. The risk variables comprised age, body height, body weight, postmenopausal age, previous fragility fracture, parent fractured hip, current smoking, alcohol consumption, glucocorticoids use, rheumatoid arthritis, and secondary osteoporosis. The participants are postmenopausal women. Osteoporosis was defined as lowest T-score≤-2.5 at any sites, including lumbar spine(L1 ~ L4), total

hip, femoral neck. We performed regression coefficients through the univariate and multivariable analysis to detect the major risk factors of postmenopausal women osteoporosis.

**Results:** A total of 12175 postmenopausal women (mean age: 66.0±9.6 y) were enrolled in this study. Of the study subjects, 5027 met the WHO definition of osteoporosis (41.3%). Through the univariate and multivariable analysis, we identified 7 major risk factors of osteoporosis, including age, body height, body weight, postmenopausal age, previous fracture, current smoking, and glucocorticoids use ($p<0.05$), especially in age, body weight and smoking. The index weights of the final 7 variables which derived from multiple variable regression are listed in Table 1. The regression coefficients for the univariate and multivariable analysis of postmenopausal women osteoporosis risk factors are showed in Table 1.

Table 1. The regression coefficients for the univariate and multivariable analysis of postmenopausal women osteoporosis risk factors

| | Univariate analysis | | | Multivariable analysis | | | |
|---|---|---|---|---|---|---|---|
| Variable | β | SE* | P | β | SE* | P | Index weight |
| Age (*vs.*10 y younger) | -0.433 | 0.009 | <0.001 | -0.364 | 0.011 | <0.001 | -2 |
| Height (*vs.*10 cm shorter) | 0.573 | 0.016 | <0.001 | 0.175 | 0.019 | <0.001 | 1 |
| Weight (*vs.*10 kg lighter) | 0.439 | 0.010 | <0.001 | 0.343 | 0.012 | <0.001 | 2 |
| Postmenopausal age (*vs.*10 y younger) | 0.145 | 0.021 | <0.001 | 0.161 | 0.022 | <0.001 | 1 |
| Previous fracture (*vs.* no) | -0.464 | 0.032 | <0.001 | -0.228 | 0.028 | <0.001 | -1 |
| Smoking (*vs.* no) | -0.227 | 0.102 | 0.026 | -0.293- | 0.090 | 0.001 | -2 |
| Glucocorticoids (*vs.* no) | -0.122 | 0.046 | 0.008 | -0.198- | 0.039 | <0.001 | -1 |
| Parent hip fracture (*vs.* no) | 0.018 | 0.039 | 0.634 | - | - | - | |
| Rheumatoid arthritis (*vs.* no) | -0.026 | 0.044 | 0.552 | - | - | - | |
| Secondary osteoporosis (*vs.*no) | 0.064 | 0.041 | 0.124 | - | - | - | |
| Alcohol (*vs.* no) | -0.002 | 0.140 | 0.987 | - | - | - | |

*SE: standard error

**Conclusion:** Under the WHO definition of osteoporosis, this study revealed that the major risk factors of postmenopausal women osteoporosis in Taiwan are age, body height, body weight, postmenopausal age, previous fracture, current smoking, and glucocorticoids use, especially in age, body weight and smoking.

**Acknowledgements:** The authors would like to thank Taiwan Osteoporosis Association for offering the data and authorizing the data management.

## P1094
## TREATMENT METHODS AND OUTCOMES OF HIP FRACTURE IN LITHUANIAN HOSPITALS

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**Objective:** To analyze the inpatient treatment methods and outcomes of hip fractures in Lithuania during 2001-2010.

**Methods:** This is a retrospective study of patients aged 60 and over, hospitalized with primary hip fracture. Data was collected from 47 orthopedic-traumatology inpatient departments. Treatment was categorized as: 1) surgical (including screws, plates, DHS – dynamic hip screws, DCS – dynamic condylar screws and intramedullary nails); 2) arthroplasty; 3) conservative. The outcomes were rehabilitation, long-term care hospital, discharge home, and death.

**Results:** Overall, 20368 patients over 60 y with hip fracture were hospitalized during 2001-2010. Mean hospitalization duration was 12 d. Strong correlation between age and the duration of hospitalization was found ($r=0.997$; $p<0.05$). During hospitalisation, 72.8% of patients were treated surgically (95%CI:72.1–73.3%), arthroplasty was used in 19.9% (95%CI:18.9-20.1%), conservative treatment in 7.3% (95%CI:6.9–7.6%) of patients. The vast majority of the patients have been discharged home: 78.8% of patients after surgical treatment (95%CI:77.9–79.7%), 11.7% after arthroplasty (95%CI:11–12.4%), and 9.5% after conservative treatment (95%CI:8.9–10.1%). Inpatient rehabilitation has been performed (95%CI: 45.3–48%) in 46.7% of patients after surgical treatment and in 52% of cases after arthroplasty (95%CI:50.6–53.4%). After surgical treatment, 80.8% of patients were sent to the facility of outpatient rehabilitation (95%CI: 79.4–82.2%); outpatient rehabilitation was received by 13.3% of patients after arthroplasty (95%CI:12.2–14.5%) and 5.9% patients after conservative treatment (95%CI:5.1–6.7%). More patients (78.3%) were moved to long-term care hospital after surgery (95%CI:76.7–79.9%), than after arthroplasty (9,1%; 95%CI:7.9–10.2%). Strong correlation between method of treatment and the duration of hospitalization has been found ($r=1$; $p<0.05$) suggesting that the more invasive and aggressive treatment is applied, the time of hospitalization is longer. Patient gender was not related to the hospitalization duration.

**Conclusions:** In patients with hip fracture, the duration of hospitalization was mostly dependent on age and the treatment method applied. The most common treatment method was surgery, the vast majority of patients have been discharged home despite the treatment method applied.

## P1095
## VITAMIN D-PTH STATUS AND BMD ADJUSTED FOR TRABECULAR BONE SCORE (TBS) IN TYPE 2 DIABETIC PATIENTS

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**Objectives:** Recent studies showed that TBS has advantages over BMD to assess bone quality for type 2 diabetic patients.

We examined patients with type 2 diabetes and calculated 10-y probability of fracture using standard FRAX® tool and FRAX tool adjusted for TBS.
**Methods:** A total of 252 type 2 diabetic patients aged 36 to 86 years (mean 61.0±8.8, 172 females) were examined. DXA (Lunar Prodigy, USA) was performed in 124 subjects (110 females). Serum 25(OH)D (AbbottArchitect 8000) and iPTH (Biomerica, USA) levels were performed in 70 pts, HbA1c was determined by standard method.
**Results:** The study results showed that only 20 (7.9%) subjects had normal BMI, while 232 (92.1%) subjects were overweight or obese. Mean HbA1c was 8.8±1.7%, diabetes duration was 1-30 years (13.1±6.4). Approximately 50% of diabetic subjects were treated by insulin only or in combination with antihyperglycemic drugs. Serum 25(OH)D level was between 7.5 and 44.5 ng/ml (22.7±9.4). Only 22.9% had normal vitamin D status and 77.1% were insufficient or deficient. We found negative correlation between 25(OH)D and iPTH (r=-0.37, p=0.002). We did not find association between 25(OH)D and HbA1c level in study population. Twenty four (9.5%) patients had fractures in their medical history. DXA results showed low BMD in 39 (31.5%) diabetic female. BMD in patients with or without fractures was the same. Results of 10-y probability of fractures showed major osteoporotic fracture risk was from 0.4 to 24.0% (6.9±3.8) and hip fracture risk - from 0 to 15.0% (0.9±1.5). Fracture risk was associated with age (r=0.40, p=0.0001) and BMI (r=-0.20, p=0.001), and did not associate with diabetes duration, HbA1c, 25(OH)D or iPTH levels. BMD adjusted for TBS was performed in 33 (10 male) diabetic patients. TBS was from 1.02 to 1.53 (mean 1.28±0.1). 22 (66.7%) patients, including 5 men, had BMD lower then 1.35 g/cm$^2$. Hence, two-thirds of diabetic pts had impaired bone quality. However, 10-y probability of hip fracture or major osteoporotic fracture risks did not clinically differ when we used or did not use TBS for these patients (0.8% & 0.6%; 8.5% & 7.4%).
**Conclusion:** Our results showed that patients with type 2 diabetes have low serum 25(OH)D level and normal BMD, according to DXA results, in most cases. Using BMD adjusted for TBS identified 67% of type 2 diabetic patients with decreased bone quality.

## P1096
## TIBOLONE EFFECT ON BONE COMPONENTS USING 3D SHAPER TECHNOLOGY COMPARED TO HORMONE REPLACEMENT THERAPY AND PLACEBO IN POSTMENOPAUSAL WOMEN

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**Objective:** Tibolone, a selective estrogen receptor modulator, has been used for the management of postmenopausal symptoms and protect BMD. Yet, the effect on separate components of bone (i.e., trabecular and cortical) has not been widely analyzed. 3D Shaper, a software algorithm that assesses the proximal femur in 3D from a standard hip DXA scan provides an advanced characterization of cortical and trabecular structures. Our objective was to analyze the effect of tibolone on bone at 6, 12 and 18 months of treatment compared to estrogens and placebo using 3D Shaper.
**Methods:** 90 postmenopausal women aged 45-59 diagnosed based on FSH and LH levels were randomized to receive either 1) tibolone 2.5 mg/d, 2) conjugated estrogens 0.625 mg + medroxiprogesterone 5 mg or 3) placebo (30 per group). DXA scans were performed at recruitment, 6, 12 and 18 months. For the purpose of this preliminary analysis 56 women were included (18 tibolone, 23 estrogens, 15 placebo).
**Results:** Three main results were obtained: Cortical surface BMD (cortical sBMD), in mg/cm$^2$: calculated as cortical thickness (in cm) multiplied by the cortical volumetric density, associated with cortex strength. Trabecular volumetric BMD (trabecular vBMD), in mg/cm$^3$, a measure of the mean density in the trabecular compartment. And Integral volumetric BMD (integral vBMD), in mg/cm$^3$, a measure of mean density in the integral (cortical and trabecular) compartment.
Relevant differences among groups were only detected by 18 months:

| | Cortical sBMD (mg/cm$^2$) | Trabecular vBMD (mg/cm$^3$) | Integral vBMD (mg/cm$^3$) |
|---|---|---|---|
| Tibolone | 182.39±22.6 | 200.89±36.4 | 387.99±48.1 |
| Estrogens | 167.51±20.0 | 187.52±34.1 | 362.97±49.3 |
| Placebo | 172.64±20.4 | 192.84±41.8 | 370.27±49.3 |

Differences were not statistically significant, however.

**Conclusions:** Tibolone seems to have a more significant effect on cortical sBMD and integral vBMD, although at this moment of the study the data results are to be confirmed by expanding the number of measurements.

## P1097
## IS DIABETES AT RISK OF DEVELOPING OSTEOPOROSIS?

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**Objective:** Inflammation is an important part of the pathogenesis of diabetes and osteoporosis. Diabetes might be a risk factor for the development of osteoporosis due to it is pathogenesis. The study is aiming to seek if diabetes is a prone condition for osteoporosis.

**Methods:** The study, a prospective one, is focusing on two groups: patients with diabetes and osteoporosis and patients with diabetes without osteoporosis, which were included in the study. We monitored the following variables: bone densitometry at the lumbar and both femoral neck site, the treatment (corticotherapy, antiosteoporotic drugs, classical DMARDs) and the subclinical activity of the disease (ultrasound evaluation of the small joints – the wrist, the MCPs and PIPs).
**Results:** A total of 30 diabetic patients were included in the study. 60% (n=18) out of 30 patients diagnosed with diabetes were diagnosed with osteopenia and 40% (n=12) out of 30 with osteoporosis. Patients with classical DMARDs developed less osteoporosis ($p<0.05$), r: 0.56. The group of patients diagnosed with diabetes presented an increased prevalence of the synovitis at the level of the small joints of the hand. The presence of tenosynovitis was noted at the level of the radiocarpal joints. A surprise reveals us the group of patients with diabetes on antiosteoporotic treatment: they presented synovitis at the level of the radiocarpal joints which is associated with osteoporosis.
**Conclusion:** Due to their mechanism of action classical DMARDs might protect patients with diabetes from osteoporosis.

## P1098
## FALLS PREDICT OSTEOSARCOPENIA IN CHILEAN OLDER PEOPLE

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**Objective:** Fear of falling is an important cause of physical inactivity in older people, leading to sarcopenia and osteoporosis. The objective of this study is to determine if falls predict osteosarcopenia in older people
**Methods:** Follow-up of ALEXANDROS cohorts designed to study disability associated with obesity in community-dwelling people 60 y and older living in Santiago, Chile. At baseline 1123 (68.5% women, mean age 72y±6.7) had DXA scan and the measurements for the diagnosis of sarcopenia. WHO standards for BMD classified them in normal, osteopenia and osteoporosis. Sarcopenia was identified using the algorithm from the EWGS validated for Chile. Osteosarcopenia was defined as having sarcopenia plus osteoporosis. Report of last year falls, history of chronic diseases self-reported disability/functional limitations, ability to walk was registered. Anthropometric measurements were performed. Logistic regression models for osteosarcopenia according to baseline falls were built.
**Results:** At baseline 23.2% of the sample had osteoporosis, 19.5% had sarcopenia and 8% osteosarcopenia. Osteosarcopenia was found in 34.4% of osteoporotic people and 40.8% of the people with sarcopenia. From the total sample, 65.6% were free of both conditions. Osteopenia was found in 49.8% of the total sample. After a median follow-up of 4.5 y (RIQ 4.0-4.8 y) a second evaluation was done in 410 people. The adjusted OR of osteosarcopenia according to baseline falls was 2.39 (95%CI:1.02-5.58).
**Conclusions:** Besides fractures, falls pose an important risk for future osteosarcopenia. The prevention of sarcopenia and osteoporosis is compulsory in people experiencing falls.
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## P1099
## QUALITY OF LIFE AND GERIATRIC SYNDROMES IN ELDERLY PEOPLE IN THE REPUBLIC OF MOLDOVA

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**Objective:** Recent demographic trends in the Republic of Moldova are characterized by increased life expectancy. The phenomenon requires concrete medical and social actions increasing autonomy of the elderly and ensuring appropriate quality of life. We aimed at establishing the frequency and types of geriatric syndromes in elderly and assessing their quality of life.
**Methods:** 1158 patients aged 65 y and over were included in the study. All the patients were examined consecutively as they were admitted to geriatric department during 2017-2018. The research included investigation, clinical and paraclinical examination, geriatric scores (Katz, Lawton, Tinetti, MMSE, Nottingham). All the data were processed using Statistics 7.
**Results:** The average age of the patients was 71.64±0.17 y, men 41.45% and women 58.54%. 56.3% of the surveyed lived in the rural area and 43.7% lived in the city. 32.38% of people live alone, 50.77% with their spouse, 1.12% with older parents, and 15.71% with children. Most of people are retired 1007 (86.96%) and their average monthly income is 1460±21.86 lei (appr. €75). 95.76% (F - 59.06% and M - 40.93%) had one or more geriatric syndromes. They were: falls 33.63%, frailty 28.4%, urinary incontinence 20.82%, constipation 15.68%, dehydration 7.12%, malnutrition 3.33%, depression 7.12%, pain 90.8% and cognitive disorders 23.62%. According to geriatric evaluation results KatZ-score constituted 11.37±0.04, Lawton score – 14.62±0.07, Tinetti score – 22.89±0.13 and MMSE score – 24.65±0.09. The results of quality of life evaluation showed reduction of energy value 59.99±1.09, of emotional reaction – 36.50±0.82, increase of pain – 53.74±0.88, impaired sleep – 54.37±1.06, social isolation - 29,58±0.88, and reduction of physical abilities – 47.96±0.82.
**Conclusions:** Geriatric syndromes were diagnosed in 95.76% of patients, predominantly women 59.06% vs. 40.93% men. Out of the total geriatric syndromes determined in the elderly patients in the study pain syndrome prevailed - 90.80% followed by the fall syndrome - 33.63%, the fragility

syndrome - 28.40%, mild cognitive impairments - 23.62% and depression syndrome - 22.36% of cases. Elderly patients with geriatric syndromes have a poor quality of life. The most affected items were social isolation, emotional reaction and physical ability.

## P1100
## FRAILTY IN ELDERLY MAINTENANCE HEMODIALYSIS PATIENTS

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**Objective:** The population in Kazakhstan is rapidly aging, as a result the number of geriatric patients on maintenance hemodialysis (MHD) has been increasing. Frailty is prevalent in dialysis patients and is one of the common factors that can lead to increased morbidity and mortality. The primary objectives of this study were to evaluate the prevalence of frailty in elderly patients on MHD by using Edmonton Frailty Scale and assess their association with clinical and laboratory measurements. A secondary objective was to investigate the relationship between nutritional status and frailty.
**Methods:** From July to September 2018, a total of 65 elderly patients undergoing HD in 7 dialysis facilities in Almaty, Kazakhstan were enrolled in this cross-sectional study. All participants were evaluated for the cognitive status through Mini-Mental State Examination (MMSE), nutritional status by using Mini Nutritional Assessment (MNA), Malnutrition-Inflammation Score (MIS), and anthropometric measurements (BMI, triceps skinfold (TSF), midarm muscle circumference (MAMC)), functionality (Handgrip strength), as well biochemical data were collected from medical records. Frailty was defined in accordance with the Edmonton Frail scale (EFS).
**Results:** The study participants' median age was 69 (range: 65-88) years old, and median dialysis vintage was 36 (IQR 15–60) months, 53.8% were female. The main comorbidities were hypertension (69.2%) and diabetes (35.4%). The prevalence of frailty assessed by the EFS was 23.1% (men: 13.3%; women: 86.7), 43.1% patients were nonfrail (men: 64.3%; women: 35.7%), 33.8% patients were vulnerable (men: 45.5%; women: 54.5%). Based on MIS the prevalence of PEW was 73.8% and, according to MNA, the risk of malnutrition was detected in 47.7%, and 9.2% had malnutrition. No significant difference was observed between genders in the frequency of PEW. Mean body weight was 69.1±11.3 kg, the mean BMI was slightly overweight 25.6±4.29 kg/m$^2$, while hand-grip strength was 21.33±3.36 in men and 15.5 ±5.51 in women, p=0.008, and it is lower than the normal population standard values. The frail patients group had a higher proportion of women 86.7% (p=0.001), worse nutritional status (93.3% and 86.7% had PEW evaluated by MIS (p=0.018) and MNA (p=0.035), respectively), more frequency of falls (p=0.01), anemia (p=0.038) when compared to group of non-frail and vulnerable patients. 66.7% of frail patients were widowed (p=0.005). The mean MMSE in this group of patients was 26.7±1.9.
**Conclusion:** The prevalence of frailty among elderly hemodialysis patients in this study was 23.1%, and we detected that 86.7% of them were female, as well PEW increased in frail patients. Also the study showed that protein-energy wasting is common among elderly hemodialysis patients. Its prevalence varies between 73.8% and 56.9% depending on the measurement tool used to evaluate the nutritional status. In our country with limited resources, EFS, MIS and MNA could help to follow elderly hemodialysis patients.

## P1101
## DISCREPANCIES IN TRABECULAR BONE SCORE AND BONE MINERAL DENSITY IN PATIENTS WITH T2DM

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**Objective:** The enormous prevalence and heterogeneity of subjects with T2DM suggest different mechanisms of bone fragility in a various T2DM patient groups. Patients can have ordinary postmenopausal osteoporosis with coexisting T2DM or conditions when bone quality changes greater than BMD – diabetosteoporosis, or independent alteration of bone by diabetes – diabetic bone disease [1]. In order to investigate whether this concept can be supported using routine DXA, we evaluated BMD and trabecular bone score (TBS) values in subjects with T2DM.
**Methods:** We enrolled 126 consecutive patients (91 women and 35 men) with T2DM who were routinely referred for BMD measurements. All enrolled patients were without known history of osteoporosis and its treatment. BMD and TBS measurements were done on iDXA (GE) with TBS iNsight software v2.1 (Medimaps, Merignac, France). The data on diabetes complications and known medical history of fracture was taken from the electronic database of our clinic.
**Results:** The median age (Q25-Q75); of enrolled subjects was 71 (62-77) years; BMI – 30.2 kg/m$^2$ (28.5-35.6). Vertebral fracture were found in 7 cases; nonvertebral in 14 cases. Among the 126 enrolled patients, in 15 (11.9%) cases (11 female and 4 male) the T-score at the L1-L4 and/or femoral neck was <-2.5. In this group of patients the median L1-L4 T-score was -1.7 (-2.7 - -0.7); neck T-score was -2.9 (-3.6 - -2.7). These patients also had degraded TBS – 1.24 (1.11-1.39) with a TBS T-score of -2.4

(-4.0 - -0.9) and lower BMI compared to other patients p=0.009; in 3 cases they had nonvertebral fractures, but there were no cases of vertebral fractures. In 26 (20.6%) subjects (23 female and 3 male) there was degraded TBS (1.20 (1.17-1.22); TBS T-score -2.9 (-3.3- -2.5) without osteoporosis as measured by BMD (L1-L4 T-score -0.5 (-1.0 – 1.2); neck T-score -1.4 (-1.9 – 0.1); total hip -0.5 (-0.8 – 0.75). Patients with discrepancies between TBS and BMD values had higher HBA1c 8.4% (7.6-10.0) vs. other subjects 7.7 (6.15-8.65%) p=0.009 and had significantly higher prevalence of vertebral fracture (n=4) including multiple vertebral fractures (n=2) p=0.028 vs. other subjects. In this group nonvertebral fractures were found in 5 patients, in 2 cases multiple. In one male patient there were vertebral and multiple nonvertebral fractures, without evidence of low BMD (neck -1.4 T-score) or TBS -1.422. This subject suffered from diabetes for 13 y and had diabetic retinopathy which may explain microvascular complications in other organs including bone and his predisposition to fall.

**Conclusion:** A discrepancy between BMD and TBS seems to be evident in patients with T2DM and this is associated with an increased rate of vertebral fractures and higher HbA1c. However the number of these patients is relatively small and may be diluted in the epidemiological studies.

**Reference:** 1. Ferrari S. Calcif Tissue Int 2017;100:107

## P1102
## OLDER WOMEN WITH REDUCED KIDNEY FUNCTION ARE AT INCREASED RISK OF FRACTURE

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**Objective:** The extent to which the typical age-related functional decline of kidney function contributes to fracture risk is unclear. In a longitudinal study of older community dwelling women, we investigated the association between kidney function and fracture.

**Methods:** In the OPRA (Osteoporosis Risk Assessment) cohort cystatin C based estimations of kidney function were available at age 75 (n=981), 80 (n=685) and 85 (n=365). Kidney function was categorized as normal (CKD stage 1-2), mild-moderate (stage 3a), poor (stage 3b-5) and association with imminent, short and long term fracture risk investigated (adjusted for weight, smoking, vitamin D). Women were also categorized by both kidney function (stage 3-5) and osteoporosis (T-score ≤-2.5), and fracture risk assessed.

**Results:** Mild-moderate kidney dysfunction was associated with increased risk of hip fracture ($HR_{adj}$ 2.00, 95%CI 1.00-3.98) and osteoporotic fractures ($HR_{adj}$ 1.51, 1.04-2.18) over 5 y between 75-80 y. Risk attenuated with increasing age and over a 10-y time frame. Fracture risk was not increased among women with the worst kidney function. Even without osteoporosis, reduced kidney function was associated with higher osteoporotic fracture risk between age 75-80 ($HR_{adj}$ 1.66, 95%CI 1.08-2.54). Having both osteoporosis and reduced kidney function conferred an additional risk increase ($HR_{adj}$ 2.53 (95%CI 1.52-4.23).

**Conclusion:** Older women with even mild-moderate reduction of kidney function are at increased fracture risk and DXA measurement is clinically valuable for risk assessment.

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## P1103
## ATHEROSCLEROTIC DISEASE IN SYSTEMIC SCLEROSIS: A CASE REPORT

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**Objectives:** Scleroderma is an autoimmune, connective tissue disease of unknown cause, characterized by excessive tissue fibrosis with typical skin distribution and multisystemic involvement. Progressive vascular fibrosis leads towards chronic ischemia particularly in the peripheral tissues. Macrovascular changes tend to occur often in scleroderma patients, however, coronary artery disease (CAD) and important generalised atherosclerosis have a scarce occurrence, as inflammation in scleroderma tends to be less important when compared to other connective tissue diseases. Our case report aims to present a possible association between atherosclerosis and scleroderma.

**Methods:** We report the case of a 60 years old woman with basal cell carcinoma, hypertension, left ventricular failure NYHA II, important CAD, generalised atherosclerosis with carotid artery stenosis, atherosclerosis of the abdominal aorta, chronic obliterating diseases of lower limb arteries and an unremarkable dyslipidemic profile. At presentation. the patient had xerosotomia, dysphagia, pyrosis, asthenia, inflammatory arthralgia of the small joints of the hands, extensive skin fibrosis, hyperpigmentation areas alternating with depigmentation over the entire skin surface and Raynaud's phenomenon. She was evaluated by spirometry, capillaroscopy, computed tomography scan, echocardiography, upper gastrointestinal series and gastroscopy. Laboratory tests were positive for

antinuclear antibodies and negative for specific scleroderma and other rheumatic disease antibodies. Nonetheless, she did present important inflammatory markers.

**Results:** The investigations lead to the suspicion of scleroderma with Raynaud's phenomenon, interstitial lung disease and esophageal dysmotility.

**Conclusions:** Our case report emphasises on the involvement of scleroderma spectrum of diseases on atherosclerosis progression, particularly in patients lacking notable traditional risk factors. Scleroderma is not recognised as an important atherosclerotic risk factor, however macrovascular disease and peripheric tissue necrosis are frequently reported in association with this pathology. The underling mechanism is suspected to be fibrosis however little emphasis has been placed on a possible contribution form atherosclerotic disease.

## P1104
## 10-YEAR EXPERIENCE OF ACUTE ARTICULAR SYNDROME MANAGEMENT SYSTEM

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**Objective:** 10 y ago we established acute articular syndrome (AAS) management system in Saint-Petersburg. We use possibility of one of the leading emergency care hospitals to provide emergency hospitalization of AAS patients instead planned one with waiting period. AAS is a heterogeneous group of diseases, common to which is the articular apparatus involvement into the pathological process. Saint-Petersburg Scientific Research Institute of Emergency Care named after I.I. Dzhanelidze in 2008 began to be on duty 24/7 for AAS patients. There was developed and implemented a special program of AAS management. Emergency indications patients with preliminary AAS diagnosis are admitted to began diagnostic and treatment processes simultaneously.

**Methods:** The performance of this project at the 24/7 on duty multidisciplinary emergency medicine hospital allows using all diagnostic capabilities of the emergency department, to ensure the consultation of different medical specialists. We realize the possibility of patient hospitalization with AAS diagnosis as a preliminary one, not with the specific nosological diagnosis. This approach provides a purposeful route for these patients from outpatient centers and ambulances directly to the Institute of Emergency Care with a goal to their concentration in the multispecialty hospital for differential diagnostics procedures with simultaneous beginning of symptomatic and pathogenetic therapy. There were two different groups of patients: naïve AAS patient with unknown rheumatological diagnosis and previously examined patients with known diagnosis, but having AAS as a worsening or relapse of their disease.

**Results:** Recommendations on optimizing the algorithm of examination of patients were revealed. The main principles of differential diagnostics of AAS and groups of nosological forms were presented. Initial symptomatic therapy purpose was to speedy pain relief. This approach greatly improves the compliance of patients, so subsequently assigned pathogenetic therapy to be more effective. The main groups of medications and key features of their usage were considered. The stages of pathogenetic therapy, the most commonly occurring drug interactions and side effects were reflected. We summarized the 1874 rheumatic patients' treatment experience in our Institute from a cohort of AAS patients. The distribution features of the patients with recurrence of articular syndrome Main features in previously verified diagnosis and newly diagnosed disease patients were described. The most frequent diagnosis was osteoarthritis, rheumatoid arthritis and goat attack.

**Conclusion:** We recommend widespread introduction of our successful experience of such medical care system for AAS patients.

## P1105
## SEPTIC OR ASEPTIC THE OSTEITIS FROM SAPHO SYNDROME?

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**Objective:** The SAPHO syndrome "Synovitis, Acne, Pustulosis, Hyperostosis, and Osteitis" is a term, include a variety of musculoskeletal disorders associated with skin conditions, mainly palmoplantar pustulosis and acne. Osteitis typically is the most prominent skeletal lesion seen in this syndrome and the most authors consider this osteitis as aseptic. Our purpose was to present the physical history of the patients and our experience in treatment of SAPHO syndrome.

**Methods**: We present 18 patients from 3 different orthopaedic centers with femoral osteitis and sternocostal hyperostosis. The classic clinical, radiographic, and histologic features of this syndrome and physical history of our patients are described. Two patients had no past or current history of skin disease, although they met the criteria for the SAPHO syndrome.

**Results:** The mean interval between the onset of cutaneous or musculoskeletal symptoms and the final diagnosis of SAPHO syndrome was 9.2 y. This interval was not influenced by patient age. The skin manifestation following the skeletal manifestation in all cases. Diagnosis of SAPHO syndrome is difficult. The lesion often confused with suppurative osteomyelitis because of similar clinicopathologic findings. The diagnosis is more difficult if atypical sites are involved and there is no skin disease {Table-1}.

**Conclusion:** Although the optimal treatment is unclear and the most authors consider the osteitis as aseptic, it is important

in our cases with SAPHO syndrome, long-term antibiotic therapy with clindamycin.

Table 1. Diagnostic criteria proposed by Kahn for SAPHO syndrome diagnosis, 1994

1. Chronic recurrent multifocal sterile and axial osteomyelitis, with or without dermatosis
2. Acute, subacute, or chronic arthritis associated with palmoplantar pustulosis, pustulous psoriasis, or severe acne
3. Any sterile osteitis associated with palmoplantar pustulosis, pustulous psoriasis, or severe acne

## P1106
## EFFECTS OF COMBINED CRYO-ULTRASOUND THERAPY IN PATIENTS WITH MUSCULOSKELETAL CONDITIONS

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**Objective:** Therapeutical ultrasound is a physical therapy modality commonly used in the rehabilitation of different musculoskeletal conditions for its important physiological and therapeutical effects. In the acute and early post-acute phase of musculoskeletal conditions, especially posttraumatic or in inflammatory osteoarthritis, the thermal effect of the therapeutical ultrasound may increase inflammation or the risk of other adverse effects in these patients. Combining the benefits of ultrasound with cryotherapy may be helpful in these patients, preventing thermal complications. We want to analyze the effects of cryo-ultrasound therapy in a group of patients with different musculoskeletal conditions.
**Methods:** In our study we included 117 patients with different musculoskeletal conditions, such as posttraumatic hand dysfunction, shoulder pain with inflammatory reaction, posttraumatic lower limb, posttraumatic muscle spasms and gonarthrosis in inflammatory phase. 51.3% of patients experienced nociceptive pain, 20.5% had neuropathic pain and 28.2% had mixed pain. All patients were included in a rehabilitation program in our clinic for functional improvement. For the control of musculoskeletal symptoms the patients were treated with cryo-ultrasound therapy. The patients were evaluated from clinical point of view, analyzing the evolution of pain, inflammation (thermography) and oedema at the admission, after one week of therapy and at the end of the two weeks rehabilitation program. Also, they were evaluated from functional point of view.
**Results:** Our patients showed good results in improving pain and inflammation after one week as well as after two weeks of therapy. The improvement was better in the group of patients with nociceptive pain. Also, cryo-ultrasound therapy helped improving soft-tissue oedema, thus increasing mobility and patient's participation in daily living activities. The improvement of symptoms correlated with the functional improvement.
**Conclusion:** Combining therapeutical ultrasound with cryotherapy may be helpful in posttraumatic patients and in patients with osteoarthritis in the inflammatory acute phase, preventing the inconvenience of the thermal effect of ultrasound. Also it may enhance the therapeutical benefits of ultrasound related to the improvement of pain and inflammation and the control of soft-tissue oedema. For a better control of the symptomatology and functional improvement, cryo-ultrasound should be associated with other proper physical therapy modalities.

## P1107
## USE OF PROXIMAL FIBULAR OSTEOTOMY WITH PLATELET RICH PLASMA FOR THE MANAGEMENT OF GRADE 3 OA KNEE

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**Objective:** Total knee replacement (TKR) has become the dictum of management of advanced osteoarthritis (OA) of knee. New procedures like proximal fibular osteotomy (PFO) and the use of platelet rich plasma (PRP) have gained popularity in recent years for OA management. This study was done to see the effect of PRP combined with PFO for the management of Grade 3 OA knee. This combined therapy may prove to be a good alternative line of management to TKR which should be restricted to Grade 4 OA knee.
**Methods:** A total of 100 patients were included in this prospective study. Post-traumatic or secondary OA cases were excluded from the study. Only cases of Grade 3 OA (Kellgren-Lawrence grading) were included in the study. After an informed consent and preoperative evaluation 40 ml of the patients' blood was taken and PRP was processed (nonleucocyte reduced). Preoperative functional evaluation was done by VAS scoring and WOMAC scoring system. Following this, all the patients underwent PFO and intra-articular injection of PRP injection. Standard postoperative care was given. Patient was allowed standing and walking from the next day onwards. Postoperative functional scoring was assessed by VAS and WOMAC scoring on $2^{nd}$, $10^{th}$, $30^{th}$ and $180^{th}$ postoperative day (POD) and compared.
**Results:** Out of the 100 patients included in the study 62 were females and 38 were males. Mean age was 62.3±3.5 y. The preoperative and postoperative mean VAS and WOMAC score are given in Table 1.

Table 1: Preoperative and Postoperative functional assessment of OA patients.

| | VAS | WOMAC | p value |
|---|---|---|---|
| Preoperative | 4.5 ± 1.2 | 81.2 ± 5.1 | |
| $2^{nd}$ POD | 5.3 ± 0.9 | 83.5 ± 3.2 | |
| $10^{th}$ POD | 2.3 ± 1.7 | 52.5 ± 7.2 | p<0.05 |
| $30^{th}$ POD | 1.1 ± 0.5 | 28.9 ± 5.1 | p<0.05 |
| $180^{th}$ POD | 0.4 ± 0.2 | 17.4 ± 3.2 | p<0.05 |

**Conclusion:** The result of this study clearly indicates that this combined therapy maybe of use in Grade 3 OA knee however, larger studies with longer follow-up period are required.

## P1108
## EFFICIENCY OF TOTAL HIP ARTHROPLASTY FOR PATIENTS WITH TUBERCULOUS COXITIS

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**Objective:** Total hip arthroplasty (THA) is quite widespread operation in general orthopedics, but it has not been studied enough in the treatment of tuberculous coxitis. Some authors point to the complete safety of the operation in combination with antituberculosis drug therapy (ADT), others say that the operation can be performed only 10 y after the last exacerbation of the tuberculous infection in the joint. The aim of the work was to evaluate the effectiveness of THA in the surgical treatment of advanced active tuberculosis of the hip joint.
**Methods:** We analyzed the results of the complex treatment of 103 patients (44 men and 59 women, age range 19-74 years old) who underwent THA in our clinic. Verification of the diagnosis was based on the results of histological and bacteriological examinations of surgical specimens. Group 1 consisted of 24 patients with advanced active tuberculous coxitis who underwent ADT for 1 month before and 8-12 months after the radical surgical debridement. Only then the patients underwent THA with ADT for 4-6 months. Group 2 consisted of 37 patients with healed tuberculosis of the hip who underwent THA. 42 patients with advanced active tuberculosis of the hip joint (group 3) underwent bone plastic operations using autobonegraft from iliac crest. Based on gender, age, comorbidity, the groups were comparable for analysis. The results of surgical treatment were traced from 3 to 94 months (the average was 57 months).
**Results:** The most severe bone defects of the hip joint (type 2C and 3A) by Paprosky W.G. and types II and III of congenital hip dislocations by Hartofilakidis G. were diagnosed by 17.9% and 39.5% respectively frequently in patients with healed tuberculosis of the hip compared in comparison to the patients with advanced active tuberculous coxitis. Before the surgery the average results of Harris Hip Score in group 1, 2 and 3 were 34, 47 and 42 points respectively. The ratio of good and excellent results of Harris Hip Score after THA in group 1, 2 and 3 were 79.2%, 51.4% and 28.6% respectively. The inclusion of THA in the surgical treatment of advanced active tuberculosis of the hip joint reduces the period of complete restoration of joint function by 9.8 months and reduces the treatment time of the diseased by 1.5 times.
**Conclusions:** Severe bone defects of the hip joint in patients with healed tuberculosis cause high anatomical and functional impairment of the affected joint and make the operation more difficult. Surgical treatment with the inclusion of THA of patients with advanced active tuberculous coxitis in comparison to the bone plastic operations using autobonegraft from iliac crest is characterized by shorter period of functional rehabilitation and better social adaptation of patients.

## P1109
## OSTEOPOROSIS AND SARCOPENIA IN PATIENTS WITH LIVER CIRRHOSIS

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**Objective:** In an internal medicine department, there are many patients with liver cirrhosis of different etiologies. It would very important to evaluate them for the presence of osteoporosis and/or sarcopenia, in order to improve their survival rates and to decrease the risk of complications.
**Methods:** Our study included 42 patients admitted in Internal medicine department over a period of 6 months diagnosed with liver cirrhosis, either of alcoholic or viral (B or C) etiology. They have been evaluated for osteoporosis with DXA and for sarcopenia with handgrip test - Jamar dynamometer, measurement of arm circumference and timed up and go test. We also measured the levels of 25-hydroxyvitamin D.
**Results:** From the 42 patients, 18 (42.8%) were female and 24 (57.2%) male. From the women group, 38.8% were of alcoholic.61.2% of viral etiology and from the male group, 58.3% were alcoholic, 41.7% of viral etiology. The T-score <-2.5 (osteoporosis) was identified predominantly in postmenopausal women with alcoholic cirrhosis. sarcopenia was diagnosed predominantly in men aged between 60-70 y who had alcoholic cirrhosis . We found both osteoporosis and sarcopenia (osteosarcopenia) in 23.8% (10) patients, mostly in patients with advanced liver cirrhosis (Child C). Vitamin D deficiency and insufficiency was found in 78.5% of all patients.
**Conclusions:** It is very important to diagnose the presence of osteoporosis and/or sarcopenia in patients with liver cirrhosis, because early intervention may prevent further muscle loss and bone fractures, for a better quality of life and survival rate.

## P1110
## ASSOCIATION BETWEEN BONE MINERAL DENSITY AND INCIDENCE OF BREAST CANCER: A POPULATION BASED STUDY

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**Objectives:** Estrogen may have contrasting effects in postmenopausal women on breast cancer incidence (increasing risk) and on bone health (higher BMD). The objective of this study was to assess DXA- BMD in the female population of southern Israel treated at Soroka University Medical Center (SUMC); comparing women with new diagnosis of breast cancer and matched controls without breast cancer.
**Methods:** Women with new diagnosis of breast cancer treated at SUMC between 4/2012 and 10/2017 were prospectively enrolled in the study. Women who received radiotherapy or chemotherapy prior to screening were excluded. Controls were recruited at the mammography unit following a breast mammography or breast ultrasound that were reported as normal. Patients and controls were excluded if they had other oncologic, hematoncologic, autoimmune, other bone disease or if they were on chronic steroid therapy. Cases and controls were matched 1:1 by age, BMI, Parity and use of HRT. All study population had DXA BMD (GE Lunar Prodigy) and lab assessment at baseline.
**Results:** Of 869 women with newly diagnosed breast cancer 464 signed informed consent; 387 completed study protocol, of these 284 were matched to controls. Mean age of cases and controls was 58 y. At baseline breast cancer patients had lower vitamin D levels compared to controls (48.9±19 and 53.8±24.8 nmol/L p=0.016). Total hip BMD was significantly higher in breast cancer patients compared to controls (0.95±0.14 and 0.92±0.12 p=0.002 g/cm$^2$; T-score 0.32±1.09 and 0.01±0.88 p<0.001 and Z-score 0.32±1.09 and 0.01±0.88 p<0.001). Among breast cancer patients, no correlation was found between baseline BMD and tumor size, grade, nodal involvement or stage.
**Conclusions:** Women with newly diagnosed breast cancer have higher BMD than controls, this may imply that BMD can serve as a surrogate for breast cancer risk.

## P1111
## SARCOPENIA IN DIALYSIS PATIENTS

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**Objectives:** Sarcopenia is the loss of skeletal muscle mass and its function that occurs with aging. These modifications lead to greater morbidity and mortality as a result of falls, hospitalization, depression and dependence among others. Chronic kidney disease (CKD) and hemodialysis (HD) produce a favorable environment for the development of sarcopenia. Our aim was to describe the prevalence of sarcopenia and determine the degree of commitment of each component (muscle mass, strength and physical performance).
**Methods:** Cross-sectional study. A total of 100 HD adult patients were evaluated. The criteria proposed by EWGSOP 2018 were used. The samples with normal distribution were evaluated by Student's Test and Wilcoxon for independent samples. Correlation analysis and multiple linear regression were used to evaluate associations. Statistical significance was considered with p<0.05.
**Results:** 59 male (M) and 41 female (F). The prevalence of sarcopenia was 10% in M and 20% in F. Patients with lower muscle strength had a higher prevalence of falls in the last year (40% two or more falls) p<0.05. The average age of the M were 54 y and F 58 y. 35% of M showed low grip strength (GP) and 25% low appendicular lean mass (ALM). In M the ALM correlated with weight r 0.75, height r 0.64 and GS r 0.46 (p<0.05). The regressor variables (M) that were associated with GS: ALM, Albumin and weight R $^2$0.41(p<0.05). 54% of F had low ALM, 27% low GS and 17% poor physical performance. ALM in F correlated positively with weight r 0.78, height r 0.66, GS r 0.59 and sit-stand r 0.40 (p<0.05). GS correlated positively with ALM in M and F. The time of dialysis adjusted was associated with measures of physical performance.
**Conclusion:** We observe the important compromise of muscle mass and its function in this population. Understanding their pathophysiology and recognizing those patients at risk would allow us to develop strategies to prevent this condition and its complications

## P1112
## CHOOSING THE OPTIMAL TREATMENT OF OSTEOPOROSIS IN A PATIENT WITH OSTEOGENESIS IMPERFECTA WHICH ASSOCIATES AGRAVANTS RISK FACTORS FOR BONE DEMINERALIZATION

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**Objective:** We present the case of a female patient, 57 year old, who is hospitalized in the rheumatology clinic in February 2018 for tenderness and swollen joints.
**Methods:** This is the first presentation in our clinic and from patient history we note osteogenesis imperfecta (diagnosed in childhood), seropositive rheumatoid arthritis (2007), osteoporosis with multiple vertebral compressions, repeated episodes of fracture (in 2015 right ankle and right hip fractures). From the

time of diagnosis with rheumatoid arthritis she followed initial treatment with leflunomide, then associated methotrexate and adalimumab from 2010. In the 2010-2014 period, there were no pain or swollen joints. After 4 y, symptoms reappeared and she switched adalimumab treatment with rituximab. Also, in 2014 her physician started treatment with corticosteroids (methylprednisolone 8 mg/d) and introduced bisphosphonate therapy, along with calcium and alpha D3. On this background, joint symptoms are controlled, but the patient had 2 episodes of spontaneous fractures (right ankle, then right hip). We recommend stopping methylprednisolone and changing biological treatment, but the patient refused.

**Results:** At this patient, there are multiple causes of osteoporosis: postmenopausal osteoporosis, osteogenesis imperfecta, prolonged immobilization due to fractures, rheumatoid arthritis, corticosteroids treatment.

**Conclusion:** In a case of noncompliant patient, who refuse stopping corticosteroids, under important immunosuppressive therapy (leflunomide, methotrexate and mabthera), denosumab represents a safe alternative? Do we have other therapeutic options?

## P1113
## ONE-YEAR RETROSPECTIVE STUDY OF HOSPITALISED PATIENTS ON PARENTERAL THERAPY WITH BISPHOSPHONATES AT THE UNIVERSITY CLINIC OF ENDOCRINOLOGY IN SKOPJE, MACEDONIA

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**Objective:** To evaluate hospitalised patients with diagnosed osteoporosis for a 1-y period at the university clinic of endocrinology, diabetes and metabolic diseases in Skopje, Macedonia.

**Methods**: National electronic database was searched during the period January-December 2018. The retrospective study was performed including all hospitalised patients on parenteral form of bisphosphonates addressing gender, age, duration of disease, risk factors as well as other comorbidities.

**Results:** A total of 59 patients were analysed. 54 were females (91,5%) and only 5 were males (8,5%). The average age of hospitalised patients was 65.13 y; only 2 of analysed patients were below 40 y of age (females, 34 years old and 25 y respectively). 6 of patients were having familiar anamnesis for osteoporosis (10.15%). Study shows that 17 of patients are smokers (28.8%). All 59 patients have other comorbidities, mostly with hypertension, gastrointestinal problems and diabetes. 31 patients who were hospitalised had bone fractures (52.54%). The cause for osteoporosis in 43 of 59 patients (72,88%) was early menopauses. Other cause was primary hyperparathyroidism and use of corticosteroids.

**Conclusions:** Most of the patients in our country (around 74%) who are on parenteral therapy with bisphosphonates are treated at university clinic of endocrinology, diabetes and metabolic diseases. This retrospective study shows that more than 90% of patients are females, every second patient had a bone fracture and almost every third patient is a smoker. In every 10 patients, 7 of them had an early menopause as a main cause for osteoporosis.

## P1114
## INFLUENCE OF REHABILITATION THERAPY ON EVOLUTION IN PATIENTS WITH FIBROMYALGIA

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**Objective:** To evaluate a group of patients with fibromyalgia for wellbeing and quality of life.

**Method:** We assessed a group of 52 patients with fibromyalgia. The patients were divided in two groups. The first group included a number of in 26 patients who underwent a physical rehabilitation program three times per week for 12 months and the second group consisted in 26 sedentary patients. All the patients from the study were evaluated with Fibromyalgia Impact Questionnaire Index for fibromyalgia, Short Form 36 for quality of life, Hamilton Anxiety Rating Scale for anxiety. Patients were recruited from ambulatory system Bihor county, Romania. The mean age in the first group was 58.19 ±2.54, and in the control group of 57.93±4.32. We found BMI and educational level almost similar in both groups. The inclusion criteria were: age over 18, fulfilling the ACR criteria for fibromyalgia, possibility of evaluation and reevaluation at 6, 12 month, complying with the principles of medical ethics. The exclusion criteria were: age under 18, severe diseases, noncompliance.

**Results:** We noticed a small improvement for Fibromyalgia Impact Questionnaire Index in the group who underwent physical rehabilitation program at six months, and a mild improvement at 12 months, vs. the sedentary group with no improvement at all. Quality of life improved also in the active group at six and at 12 months, than in the sedentary group where we noticed no improvement. Anxiety, rated with Hamilton Anxiety Rating Scale, proved a mild diminishing in anxiety score at six and at 12 months in the group with therapy than in the sedentary group with the same grade of anxiety till the end of the study. We also noticed correlation between Fibromyalgia Impact Questionnaire Index and Short Form 36 for quality of life and Hamilton Anxiety Rating Scale for anxiety.

**Conclusion:** Even if fibromyalgia is a chronic syndrome, a proper management and follow-up could improve its evolution and also improve patients quality of life.

## P1115
## ACUTE NONGONOCOCCAL SEPTIC ARTHRITIS OF THE ANKLE IN HIGH RISK PATIENT WITH DIABETIC FOOT AND RHEUMATOID ARTHRITIS

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**Patient history:** A 70-year-old male patient, with congestive heart disease, recent diagnosis of seropositive rheumatoid arthritis (RA) and long-standing diabetes mellitus with multiple vascular and neurologic complications, is admitted for acute pain and swelling in the left ankle. The ankle joint is enlarged on both anterior and retromaleolar aspects, with local tenderness and erythema. He reports the occurrence of infected mal perforans ulceration 6 month prior, positive for Staphylococcus aureus, with unsuccessful surgical interventions, and poor outcome with persistent open plantar lesion evident on present examination.
**Investigations:** On admission, blood work shows increased acute-phase reactants, normocytic anaemia, increased ferritin, normal liver and kidney function tests. He does not display fever or shivers and has a normal bowel habits. Imaging tests for the affected ankle include musculoskeletal ultrasonography (US), x-ray and MRI. US evaluation showed features of tibiotarsal synovitis with overall inhomogeneous joint effusion, peroneus tenosynovitis and marked irregularities of distal tibial and fibular bone cortical. Synovial fluid drawn through US guided arthrocentesis had purulent features and was sent for bacteriology tests. Structural changes seen on x-ray and MRI support a possible underlying Charcot arthropathy.
**Outcome:** Fluid samples yielded positive results for Staphylococcus aureus infection which could have been linked to the previous infection site on the plantar surface. He underwent an initial 2 weeks intravenous antibiotic course with fluoroquinolones, to whom, the pathogen showed sensitivity on antibiogram, which was then continued orally. Drainage through a surgical approach was postponed at that point. Initially, the patient reports a slight recovery in joint mobility and stability, with relative reduction in pain. Although swelling of the ankle displays a small improvement, US follow-up exams detected the persistence of infiltrate in joint space and peroneus peritendinous sheet. Outcome after one week was unfavourable, with acute bladder globe and acute decompensated heart failure with massive pleural effusion. The patient was referred on discharge to an orthopaedist to assess the opportunity for surgery.

## P1116
## CIRCULATING MIRNAS MIR-31-5P AND MIR-203A PREDICT INCIDENT FRAGILITY FRACTURES INDEPENDENTLY OF FRAX IN TYPE 2 DIABETIC POSTMENOPAUSAL WOMEN AND SIGNIFICANTLY IMPROVE FRAX′S ACCURACY FOR FRACTURE RISK PREDICTION IN DIABETIC BONE DISEASE

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**Objective:** Type 2 diabetes mellitus (T2D) is characterized by an increased skeletal fracture risk which is only incompletely captured by standard tools such as the FRAX. Novel, ubiquitously available biomarkers are therefore needed that can improve FRAX′s accuracy of fracture prediction in diabetics. MicroRNAs (miRNAs) have emerged as key players in bone health and disease including osteoporosis. They are easily accessible via blood draw as they are released into the blood stream from cells of various tissues proportional to local disease severity. Recently, serum miRNA classifiers including miR-203a were found to discriminate T2D women with and without prevalent fragility fractures with high accuracy (AUC>0.90). However, to date, it is unknown if such serum miRNAs can predict fracture independent of FRAX and if they can be used to improve FRAX′ accuracy for diabetic patients.
**Methods:** The AGES-Reykjavik cohort encompasses 330 T2D postmenopausal women. After excluding all women with bone-impacting medications/conditions, 171 remained for analysis.

Thereof, 71 women sustained an incident fragility fracture during the 10-y follow-up. Baseline serum miR-31-5p and miR-203a levels were measured by qPCR-arrays in all 171 participants. Cox proportional hazard models, ROC Analysis and Delong´s AUC comparisons were used for statistical analysis.
**Results:** Baseline serum miR-31-5p and miR-203a were each significantly associated with a higher risk of incident fragility fractures (miR-31-5p: HR 1.29 (95%CI 1.12 to 1.49), miR-203a: HR 1.28 (95%CI 1.08 to 1.53). HRs remained significant after adjustments for total femoral vBMD or/and clinical FRAX. We next created a 4-feature diabetic fragility signature (consisting of miR-203a, miR-31-5p, clinical FRAX and femoral integral vBMD). This combined signature performed with an AUC of 0.87 (95%CI 0.81 to 0.92) significantly better than clinical FRAX (AUC 0.77, $p<0.01$) or vBMD alone (AUC 0.72, $p<0.001$), or than both combined (AUC 0.82, $p=0.032$).
**Conclusion:** Our results show that serum microRNAs can be used to predict fracture risk independently of clinical FRAX and/or vBMD in T2D women and may significantly improve fracture risk prediction in diabetics once added to the traditional fracture risk prediction tools such as clinical FRAX and femoral vBMD.
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## P1117
## ONSET SYMPTOMS OF PRIMARY MALIGNANT BONE TUMORS: A RETROSPECTIVE STUDY

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**Objective:** Primary malignant bone tumors cause remarkable morbidity and mortality in both children and adults, even if it is a rare type of neoplasm. The primary symptom that occurs in a patient with malignant primary bone tumor is pain. Other symptoms that can appear are pathological fractures, joint swelling, bone swelling or systemic symptoms like fever or weight loss.
**Methods:** We retrospectively evaluated the patients charts from the Department of Orthopedics and Traumatology of Emergency Clinical County Hospital of Cluj-Napoca, Romania, for a period of 6 y, from June 2012 until May 2018. Charts were reviewed to collect data on patient's demographics, diagnosis of primary malignant bone tumor, type of tumor, localization and clinical symptoms. There were excluded from our study the cases with metastatic or benign bone tumors. The onset symptoms were divided into 7 groups: pathological fractures, pain, swelling, arthritis, osteomyelitis, incidental finding and unknown onset symptoms.
**Results:** Out of the 37 patients with malignant primary bone tumor, 20 were female and 17 were male, with a mean age of 46.95±17.45 y [16-78]. The most frequent onset symptom was pain in 37.83%, followed by pathological fractures in 27.02%, arthritis in 10.81%, swelling and unknown onset symptoms in 8.10%, incidental finding in 5.40% and osteomyelitis in 2.70% cases. Moreover, the patients with pathological fracture onset were older than the other group of patients (51.73 vs. 44.26 y, $p=0.23$). Most pathological fractures were localized in the femur (70%), followed by the tibia (20%) and the radius (10%).
**Conclusions:** Due to the high morbidity and mortality of the primary malignant bone tumors, even if they represent a rare encountered pathology, it is important to suspect this pathology in patients of all ages with progressive bone pain that gets worse during night or with fractures after low energy trauma.

## P1118
## NEUROPATHIC COMPONENT OF PAIN IN PATIENTS AFTER SURGICALLY TREATED OSTEOPOROTIC HIP FRACTURE

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**Objective:** Pain in patients after surgically treated osteoporotic hip fracture is a consequence of the lesion of somatosensory structures and contains nociceptive and neuropathic components. The study was to determine the neuropathic component of pain in patients who had an osteoporotic fracture of the hip joint and who are surgically treated.
**Methods:** This study covered 60 male and female patients, aged 32-81 y, with osteoporotic fracture of the hip joint, who were treated at the Clinic for Medical Rehabilitation of the Clinical Center of Vojvodina. For each patient a pain intensity was investigated, a neuropathic pain component, quality of life and functional recovery with PainDETECT questionnaire, visual analog scale (VAS), Harris hip score (HHS), WOMAC scale and SF-36 questionnaires.
**Results:** In our study of 60 patients, 27% is male and 73% female. The average age is 65 y. The average value of VAS is statistically significant, $p<0.001$ Based on HHS, 76% of the respondents had a low level of disability, 20% were regular functional findings, and 4% had a good level of functioning. Using the PainDETECT questionnaire, following results were obtained: 26% of the patients had a little chance of developing neuropathic pain, with 26% requiring additional testing to determine the exact neuropathic pain component, 46.8% of the subjects had the basis for neuropathic pain. Based on the WOMAC scale, 54.4% of respondents had higher functional limitations, 46.6% had less functional constraints. Based on the overall health assessment with the help of the SF-36

questionnaires, 46.6% had poorer results, 54.4% of the respondents had better results. There is a correlation between the age variables and SF scale of SF-36 questionnaires, and ages with total SF-36 questionnaires.

**Conclusion:** Identification and adequate treatment of neuropathic pain components are essential to a functional recovery and quality of life in patients after surgically treated osteoporotic hip fracture were better.

## P1119
## IGG4 RELATED DISEASE: A RARE ENTITY WITH MULTIPLE SHAPES

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**Objective:** Hyper IgG4 syndrome is a rare immune fibro-inflammatory condition, first discussed in 2001, which can involve basically any organ. The most common clinical presentation is the enlargement of one (40% of the cases) or multiple organs caused by masses of IgG4 infiltrates, that produce plasma cells, lymphocytes and fibrosis. In most of the cases the differential diagnosis with malignancies is necessary. Ocular involvement is identified in a small amount of cases, leading to usually bilateral exophtalmia.

**Method:** We present the case of a 32-year-old male patient, with diamine oxidase deficiency, and severe bilateral exophtalmia for the past 3 y, unaccompanied by pain and normal visual acuity. Previous investigations excluded hypothyroidism or any other form of cancer and the response to low doses of glucocorticoids was insufficient. In the process of establishing the etiology, the patient has been investigated echographically, which has revealed enlarged, inhomogeneous lacrimal glands, with no involvement of the salivary glands and local lymph nodes, and an imagistically normal thyroid gland. An orbital angio-RM has been performed showing an orbital idiopathic inflammatory process involving both orbits. The blood tests showed no significant modifications. The clinical presentation, the negative cancer screening and the normal biological results conducted to the suspicion of an autoimmune disease, the IgG4 related disease being the pathology that causes orbitopathy the most frequent. Seric IgG4 was >135 mg/dl.

**Results:** Despite the patient's medical history, we decided to start the treatment with a methylprednisolone pulse therapy and to continue with a higher dose of prednisone (40 mg/d), as it is considered the first line of therapy. The response was only partial once again, concluding that the patient was corticoresistant. Taking this into consideration, rituximab was the next best choice of therapy. The patient followed two doses of rituximab (2000 mg), concomitant with GCs with a good result.

**Conclusion:** The IgG4 related disease is an under recognized condition, which affects males more than females. Is has a variety of clinical implications and there is no reliable biomarker for its diagnosis. Careful investigation and monitoring of the patient are the only certain path for a correct diagnosis.

## P1120
## INVOLVEMENT OF THE MAP KINASE PATHWAY IN OSTEOBLASTS AND OSTEOCLASTS GENE EXPRESSION UNDER DIFFERENT GRAVITATIONAL CONDITIONS

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**Objectives:** Presentation of osteoblast and osteoclast gene expression alterations in the MAP kinase (MAPKs) pathway under microgravity (0g) and hypergravity (2g) conditions compared to normal gravity (1g).

**Methods:** We retrieved raw genomic data from the Gene Expression Omnibus (GEO) Database, regarding gene expression of stromal cells, osteoblastic (2T3 mouse preosteoblasts, MLO-Y4 osteocytes, osteoblasts) and cells of the macrophage lineage (RAW264.7) under different gravitational conditions and performed bioinformatics analysis. Genes whose expression levels showed statistical significance ($p<0.05$) were analyzed using the KEGG Pathway Analysis in order to identify signaling pathways that they were involved in.

**Results:** Our study revealed a cluster of genes related to the MAP-kinases pathway that showed significant difference in expression levels ($p=2.26*10^{-7}$). MAPK8IP3 was upregulated in microgravity (0g) compared to normal gravity in all cell types. The difference in expression levels was even greater when compared with hypergravity (2g) conditions, where overexpression was noted(p=0.0158/ false discovery rate=0.073).

**Conclusions:** The family of MAPKs (ERK, JNK, p38) consists of signal molecules that respond rapidly to cellular stress and alter gene expression in the cell's nucleus. They regulate cellular proliferation, differentiation and apoptosis via intricate and complex pathways. Changes in gravitational conditions are perceived by cells of the osteoblastic/ osteoclastic lineage and respond rapidly by altering gene expression in the nucleus. Part of this process is mediated by the MAPK pathway. Both in 0g and

2g cells upregulated MAPK8IP3, with hypergravity having a greater impact, thus suggesting a significant involvement of the MAPK family early in the process of achieving homeostasis in the cellular level, when exposed to different gravitational forces.

## P1121
## VITAMIN D REGULATES NF-κB DEPENDENT SIGNALING IN EXPERIMENTAL OSTEOPOROSIS ASSOCIATED WITH TYPE 1 DIABETES

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**Objective:** Secondary osteoporosis is a common clinical complication related to type 1 diabetes mellitus (DM1), however precise cellular and molecular mechanisms are not fully clarified. Proinflammatory processes and deregulation of the vitamin D-endocrine system in diabetes can lead to an abnormal transactivation of the nuclear factor κB (NF-κB) and cause unbalanced bone formation and resorption. The study was performed to find out the role of NF-κB in the development of secondary osteoporosis associated with experimental DM1 and to assess the potential of vitamin $D_3$ ($VD_3$) for the treatment of diabetes induced bone loss.
**Methods:** DM1 was induced in male Wistar rats by single i.p. injection of STZ (55 mg/kg b.w.). Two weeks later, diabetic rats were treated with or without selective NF-κB inhibitor BAY 11-7082 (1 mg/kg b.w., i.p for 10 d) or 100 IU of vitamin $D_3$ (orally, for 30 d). The protein levels of RANK, RANKL, osteoprotegerin (OPG), total and phosphorylated at Ser 311 p65 subunit of NF-κB, vitamin D receptor (VDR) and 25-hydroxyvitamin D 1α-hydroxylase (CYP27B1) were assayed by western blot analysis. Changes in the mRNA levels of VDR and CYP27B1 were measured by real-time quantitative PCR. 25OHD content was assayed by ELISA.
**Results:** DM1 induced elevation of RANK and RANKL protein levels in bone tissue with a significant decrease in the OPG expression, indicating an intensification of bone resorption. Diabetes also led to 25OHD deficiency and insufficient VDR expression in bone tissue, while CYP27B1 mRNA level was elevated. DM1 was accompanied by an increase in total and phosphorylated NF-κB/p65. BAY 11-7082 treatment resulted in partial normalization of bone remodeling, 25OHD and CYP27B1 levels. It also blocked NF-κB/p65 phosphorylation in bone tissue of diabetic animals but increased the level of total NF-κB. $VD_3$ treatment restored parameters of RANKL/RANK/OPG axis as well as mRNA and protein levels of VDR and CYP27B1. Significant decrease in both total and phosphorylated NF-κB/p65 was also seen after $VD_3$ treatment.
**Conclusion:** Selective NF-κB inhibition and $VD_3$ treatment partially reversed DM1-associated impairments of bone remodeling, which highlights the role of vitamin D-deficiency and NF-κB transcriptional activation in elevated bone tissue resorption.

## P1122
## PATTERNS OF CLINICAL MANIFESTATIONS INVOLVEMENT IN PATIENTS WITH OVERLAP SYNDROME

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**Objective:** Overlap syndrome (OS) is a clinical condition that meets the criteria for diagnosis of at least two connective tissue diseases that occur at the same time or at different times in the same patient. It may include systemic sclerosis (SSc), dermatomyositis or poly/dermatomyositis, (PM/DM), Sjögren's syndrome (SS), rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE). Any association between diseases may be possible, with certain associations being encountered more frequently. The clinical picture is often complex, often making the diagnosis and treatment difficult. The combined pathology of these conditions has a major impact on clinical development, diagnosis and treatment. Clinical manifestations depend on affected organs, degree of inflammation and disease progression. The study proposed the evaluation of clinical and biological correlations, with the identification of frequent associations in overlap syndrome, compared to SLE patients.
**Methods:** The study included20 patients with SLE and 18 patients with OS (different overlapping between systemic lupus erythematosus, systemic scleroderma, RA, mixed connective tissue disease, or dermatomyositis), which were clinically and paraclinically evaluated. The clinical information included type of systemic involvement, such as kidney or hematological (anemia, leukopenia, thrombocytopenia) involvement and serositis. The inflammation markers and immunological changes (rheumatoid factor, antibodies profiles) were noted too.
**Results:** The most important finding was that in the OS of SLE with any other disease, compared to SLE patients, was reducing to approximately half of the renal manifestations in patients with OS (SLE-RA) compared to the latter ones (27% vs. 50%) ($p<0.05$), while cytopenia and serositis are more common in patients with RA-SLE (63.64% vs. 55% and 45% vs. 35%) ($p<0.05$). Patients with OS (SLE-BMTC) had

renal manifestations and cytopenia in the same percentage as SLE patients but did not have serositis. Patients with OS (SLE-SSc) had only cytopenia in the same percentage as SLE patients but did not have serositis and kidney involvement.

**Conclusions:** This study demonstrated that there is a different pattern of involvement in patients with overlapping syndromes, according to compounding diseases, suggesting that carefully assessment of all systems and structures could lead to accurate diagnosis, optimal treatment and prevention of complications.

## P1123

## METABOLIC SYNDROME IN PATIENTS WITH GOUT ATTENDED IN A SPECIALIZED OUTPATIENT UNIT IN SPAIN: COMPARISON WITH GENERAL POPULATION AND CARDIOVASCULAR IMPLICATIONS

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**Objective:** Metabolic syndrome (MS) is a cluster of interrelated components: central adiposity or higher waist circumference, high values of triglycerides (TG), elevated blood pressure (BP), impaired fasting glucose and decreased HDL-cholesterol (HDL-c). It is associated with a higher incidence of developing diabetes (DM), as well as with other cardiovascular diseases (CVD). A direct relationship between serum uric acid (sUA) and the risk of develop MS has been reported in several studies of patients with hyperuricemia and gout. Our aim was to study the prevalence of MS and associated CVD in patients with gout attended in a specialized outpatient unit, comparing with other local and national studies.

**Methods:** Retrospective observational study with consecutive patients diagnosed with gout according to EULAR/ACR criteria between August and December 2018. We analyzed the presence of MS according to the 2015 International Diabetes Federation (IDF) criteria (central obesity as BMI ≥30 kg/m$^2$ or BP ≥94 cm (≥80 in women), with ≥2 of the following: TG ≥150 mg/dl, HDL-c <40 mg/dl (<50 in women), hyperglycemia ≥100 mg/dl (or T2DM previously diagnosed or hypoglycaemic treatment), arterial hypertension (HT; ≥130/85 mmHg or use of antihypertensive drugs). Treatments received and family history (FH) of gout an CVD were recorded. Demographic, anthropometric, clinical and analytical variables were analyzed. All data were compared with those obtained in three Spanish studies of the general population: DARIOS 2012, ENRICA 2014, SIMETAP 2018.

**Results:** 57 patients with gout were included. Average age 62 y (39-90), 48 y (18-90) at the time of gout onset. 94.7% males. 40.3% with FH of gout, tophi in 52.6%. Clinical pattern: monoarticular 15.8%, oligoarticular 56.1%, polyarticular 28.1%. 68.4% received urate-lowering therapy: 45.6% allopurinol, 22.8% febuxostat. SUA at the time of inclusion 6.7 mg/dl (2.6-11.3). Total cholesterol 186 mg/dl (96-350). TG 185 mg/dl (68-742). BMI 31.8 kg/m$^2$ (24-58.1). MS was found in 66.7% and pMS (MS without DM or CVD) in 26.3%. Obesity 57.9% and overweight 38.6%. HT 80.7%; 10.5% diagnosed in our unit. DM 22.8%. Dyslipidemia (DL: hypercholesterolemia and/or high levels of TG) 64.9%; 14% diagnosed in our unit. 29.8% smokers, 49.1% formers. Alcohol consumers 54.4%. Chronic kidney disease (CKD) 42.1%; 12.3% diagnosed in our unit. Ischemic heart disease (IHD) 14%. Stroke 24.6%. FH of CVD 24.6%. Comparing with the general population the prevalence of MS and pMS was higher (DARIOS 2012: 31% and 24%, respectively; ENRICA 2014: 22.7% and 16.9%; SIMETAP 2018: 41% and 25%), as well as with the presence of CKD (11.5% in SIMETAP) and CVD (SIMETAP: HT 38%, T2DM 16%, obesity 28%, IHD 4.8% and stroke 3.8%).

**Conclusions:** There is a very significant percentage of MS and pMS in patients with gout compared to the general population, with important presence of CKD and CVD, sometimes underdiagnosed. Nursing guidelines were established healthy lifestyle and periodic controls directed at all patients, with special emphasis on those newly diagnosed of HT or DL, as well as those of higher cardiovascular risk.

## P1124

## MUSCULOSKELETAL DISORDERS AMONG ELITE GREEK YOUTH SOCCER PLAYERS

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**Objectives:** Participation in soccer practice and games has been shown to favor the development of asymmetries[1].Youth players had a higher incidence of training injuries than professionals[2]. The purpose of this study was to record the musculoskeletal symptoms per anatomical body region in adult Greek elite youth soccer players.

**Methods:** The Greek version of Nordic Musculoskeletal Questionnaire (NMQ)[3], was given to participants during the 2017-2018 soccer season. Participants in NMQ were asked whether they had pain/discomfort in 9 different anatomical regions (neck, shoulders, elbow, wrists/hands, upper back, lower back, hips/thighs, knees and ankles/feet) during the preceding 12 months and if those symptoms prevented their normal activity during the last year as well as the 7 previous days. Analysis consisted of descriptive statistics.

**Results:** 51 (19 in U-15, 15 in U-17 and 17 in U-20) elite Greek youth soccer players (age:16.8±1.6 y, height: 1.75 ±0.07 m, weight: 64.6±12.4 kg, BMI: 21.0±3.6 kg/m$^2$,

training age: 10.3±3.0 y, training h/week: 9.9±2.5 h) completed the NMQ. The 12-month prevalence rate of pain/discomfort was 17.6% in ankles/feet, followed by the knees (15.7%), wrists/hands (9.8%), shoulders (9.8%), the neck (7.8%), lower back (7.8%) and hips/thighs (7.8%), elbows and upper back (0%). Those symptoms prevented athlete's normal activity (functionally) during the last 12 months with different prevalence rate per anatomical body region (ankles/feet: 13.7%, shoulders: 9.8%, knees: 9.8%, lower back: 7.8%, hips/thighs: 5.9%, wrists/hands: 2.0%, neck: 0.0%, elbows: 0.0% and upper back: 0.0%).

**Conclusion:** The incidence rates of musculoskeletal pain/discomfort in elite Greek youth soccer players, highlights the need for specific injury prevention programs.

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## P1125

## DECREASE RISK OF FALLS AFTER THE BALANCE TRAINING ON A STABILOMETRIC PLATFORM IN NEUROLOGICAL PATIENTS

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**Objective:** Balance is an essential skill for everyday life. Patients with many different neurological diseases (Parkinson's disease, multiple sclerosis, stroke, etc.) suffer from balance disorders what leads to increase risk of falls and fractures. Moreover corticosteroids what are widely applied in neurological clinical practice effecting on induce bone loss and immobility determine the importance of balance training in prevention of fall risk in neurological patients (NP) The aim was to assess the effectiveness of the stabilometric platform training via Russian version Berg Balance Scale (BBS).

**Methods:** 58 neurological patients (stroke n=18, multiple sclerosis n=14, Parkinson's disease n=14, syndrome Guillain-Barré n=10) included in the study had mild to moderate disability and could walk unassisted. All of them had the balance training on the stabilometric platform (Stabilan-01-2, JSC Rhythm, Russia; duration 30 min, n=20 procedures). Romberg Balance Test and BBS were performed before and after treatment.

**Results:** After 20 trainings on a stabilometric platform BBS scores and Romberg Balance Test results increased significantly in all groups ($p<0.05$). The BBS scores correlated significantly ($r=0.79$, $p<0.05$) with the Romberg Balance Test. The best results had Stroke patients (+6.3 scores, $p<0.01$), least multiple sclerosis patients (+2.4 scores, $p=0.048$) after rehabilitation treatment.

**Conclusions:** Balance training on a stabilometric platform in neurological patients is effective for decrease risk of falls.

## P1126

## PRIMARY HYPERPARATHYROIDISM COMPLICATED WITH SEVERE OSTEOPOROSIS AND RENAL FAILURE

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**Objective:** Osteoporosis is a common complication of primary hyperparathyroidism (PHPT) along with kidney stones and nephrocalcinosis. Severe osteoporosis associated with multiple vertebral and nonvertebral fractures is relatively rare in elderly females patients with primary PTHP.

**Method:** We aim to present a case of an elderly woman diagnosed with PTHP and renal failure. Endocrine assessment related to PHPT is provided. The patient was followed in different tertiary centres of endocrinology. The informed consent was obtained.

**Case report:** A 71-year woman diagnosed 6 y ago with chronic renal failure of unspecified etiology, currently in G4 KDIGO stage, was admitted for diffuse osteoarticular pain, moderate difficulty in walking and high blood pressure. She has medical history of posttraumatic fracture of straight lamb four years ago and straight hip fracture one year ago. Phosphocalcic metabolism assessment showed elevated PTH of 1072.7 pg/mL (normal: 12-88 pg/mL), hypercalcemia: ionic calcium of 6.31 mg/dL (normal: 4.4-5.4 mg/dL), total calcium of 11.36 mg/dL (normal: 8.8-10.6 mg/dL) with low urinary calcium of 59 mg/24h (normal:100-300 mg/24h), normal serum phosphorus of 4.21 mg/dL (normal: 2.5-4.5 mg/dL) with low urinary phosphorus of 0.23 g/24h (normal: 400-1300 mg/24h), low 25-hydroxyvitamin D(25OHD) of 8.76 ng/mL (normal >30 ng/mL). Ultrasound suggest an inferior left mass of 14 mm confirmed at computed tomography. Osteoporosis was highlighted at lumbar DXA: BMD of 0.72 g/cm$^2$, T-score of -3.9SD, Z-score of -2.3 SD, total hip BMD of 0.7 g/cm$^2$, T-score of -2.4 SD, Z-score of -1.1 SD. Radiographs revealed thinning of bone cortices and a cystic lesions of the left humeral head of 25/28 mm and bilateral distal clavicular erosions. She received vitamin D and parathyroidectomy was indicated.

**Conclusion:** Parathyroidectomy is indicated in all forms of PHPT associated with renal failure due to increased risk of morbidity and mortality. The choice of medical treatment for osteoporosis is difficult for patients with advanced renal failure stages.

## P1127

## ASSOCIATION OF CLINICAL PARAMETERS AND FEATURES OF ULTRASOUND OF THE KNEE IN A CONSECUTIVE GROUP OF PATIENTS

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**Objective:** To determine the relationships between clinical parameters and features of ultrasound (US) of the knee.
**Methods:** This was a cross-sectional study, recruiting 47 consecutive patients aged 47 (36-54), 60.42% (n=29) were female. Those with recent trauma, rheumatic diseases were excluded from the study. Patients underwent assessment for knee pain (visual analog scale (VAS)), US examination of the knee joints according to the 4-point scale (synovial proliferation, joint effusion, power Doppler signal (PD), patellofemoral joint cartilage (PFJ), medial femoral cartilage (MF), medial (MM) and lateral meniscus (LM), osteophytes, Baker cysts). US staging of knee OA was also performed.
**Results:** Patients were divided into 2 groups: those with knee pain (n=28) and asymptomatic patients (n=19). Pathological US features were found in both groups (Table). In 5 out of 19 asymptomatic patients, degenerative changes of different degree of the joint structures were identified (PFJ, MF, osteophytes, MM, LM), in 4 patients – joint effusion. Prevalence of PFJ, MF, MM, LM changes, osteophytes and Baker cysts did not differ between groups. Groups differed in PD signal expression in the synovia ($p=0.07$). Functional association between VAS score and PD expression ($R=1.0$, $p<0.05$) was revealed; moderate correlation between VAS score and joint effusion ($R=0.47$, $p<0.05$), PFJ ($R=0.58$, $p<0.05$), osteophytes ($R=0.66$, $p<0.001$), OA US stage ($R=0.58$, $p<0.001$) was observed.
**Conclusion:** In the patients under study, degenerative and inflammatory findings were common in the symptomatic group, but were also identified in the asymptomatic patients. Clinical parameters were more strongly associated with active inflammation (as verified by US) rather than with degenerative changes.

| Parameter | Prevalence in patients with knee pain, n=28 | Prevalence in asymptomatic patients, n=19 | P |
|---|---|---|---|
| Synovial proliferation | 0 (0%) | 0 (0%) | 1,0 |
| Joint effusion | 10 (35,71%) | 4 (21,05%) | 0,34 |
| Power Doppler signal | 5 (3,57%) | 0 (0%) | 0,07 |
| Patellofemoral joint cartilage | 5 (17,86%) | 1 (5,26%) | 0,38 |
| Medial femoral cartilage | 3 (10,71%) | 2 (10,53%) | 1,0 |
| Osteophytes | 9 (32,14%) | 3 (15,79%) | 0,31 |
| Medial meniscus | 9 (32,14%) | 5 (26,32%) | 0,75 |
| Lateral meniscus | 2 (7,14%) | 2 (10,53%) | 1,0 |
| Baker cysts | 6 (21,43%) | 4 (21,05%) | 1,0 |

## P1128
## TERIPARATIDE: THE FIRST THERAPEUTIC OPTION FOR SEVERE POSTMENOPAUSAL OSTEOPOROSIS

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**Objective:** Severe osteoporosis with multiple fractures are common in postmenopausal women leading to high morbidity and mortality. For patients with very low BMD associated with multiple spine fractures teriparatide may be the first therapeutic approach.
**Methods:** A case of severe postmenopausal osteoporosis associated with multiple vertebral fractures is introduced. Bone was evaluated by central DXA, bone scintigraphy and bone radiography. Phosphocalcic metabolism assay including the bone turnover was performed. The informed consent was obtained.
**Case report:** A 58-year-old female with no prior significant medical history is admitted for further investigation after multiple vertebral fractures located at L2-L5 level have been revealed at the radiological examination performed for diffuse vertebral pain associated with walking difficulties. The biochemical parameters revealed: alkaline phosphatase of 119 U/L (normal: 35-104 U/L), normal levels of ionized calcium, normal blood phosphorus and decreased levels of circulating osteocalcin of 9.66 ng/mL (normal: 15-46 ng/mL) with normal β-CrossLaps of 0.075 ng/mL (normal:0.104-1.008 ng/mL). Hormonal profile showed normal PTH of 40.8 pg/mL (normal: 15-65 pg/mL) and 25OH D (25-hydroxyvitamin D) values of 37 ng/mL (normal >30). Wholebody scintigraphy revealed no metastasis. DXA showed decreased BMD of 0.52 g/cm$^2$, T-score of -5.6SD, Z-score of -4.8 SD, total hip BMD of 0.760 g/cm$^2$, T-score of -1.7 SD, Z-score of -1 SD. The normal value of serum cortisol and thyroid hormones have excluded another endocrine pathology as the cause of osteoporosis. Teriparatide in a once daily dose of 20 μg subcutaneous was initiated in combination with orally vitamin D. A slight improvement of BMD (of 0.66 g/cm$^2$) and T-score (of -4.4 SD) was obtained after 2 y of treatment, which is why risedronate 75 mg, 2 doses per month was introduced.
**Conclusion:** Treatment of severe osteoporosis with multiple vertebral fractures is still a challenge for clinical practice. Because there is insufficient data regarding the risk of fracture in severe osteoporosis, bisphosphonates or denosumab remain the therapeutic alternatives at the end of teriparatide treatment.

## P1129
## RELIABILITY OF SOFT TISSUE ULTRASONOGRAPHY IN IDENTIFYING AN INFECTIOUS THIGH MASS

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**Objective:** Imaging methods are lately gaining more and more importance in the diagnosis and management of inflammatory joint diseases, but sometimes, their role in the differential with septic causes of the illness is crucial. Our aim was to underline the usefulness of soft tissue ultrasonography (US) in septic patients with localized purulent mass.
**Patient history:** A 58-year-old male patient presented to the emergency room in a general poor state, with fever, fatigue and intense pain in the right upper thigh. He is diabetic and has a history of viral liver cirrhosis with a current decompensated status. On clinical examination, the patient displayed a very tender upper right thigh, on the medial aspect, with evident swelling of the right lower leg. An US examination was prompted in order to get some insight into the etiology of the present symptoms. Ultrasound evaluation showed an inhomogeneous hypoechoic fluctuant well delineated mass, that was localized between the pectineus and adductor longus muscles. An aspiration manoeuvre was considered necessary for diagnostic purpose. We used an ultrasound guided spinal 18G needle and 10ml of brown, purulent fluid was withdrawn and sent to bacteriology test, which came positive for Staphylococcus aureus.
**Outcome:** The patient was referred to the surgery department. Diagnosis of infectious etiology was confirmed, with successful evacuation of 300 ml of purulent fluid. Samples obtained both from US-guided aspiration and during surgery yielded positive results for Staphylococcus aureus infection. Postoperatory tomography confirmed the absence of residual infectious infiltrate in the affected thigh. US evaluation was a reliable tool with significant aid in initial diagnosis, as it can help the clinician in differentiating between an infectious and a lymphatic mass, and also provides precise anatomical references for a guided fluid sample aspiration or eventual surgical approach.

## P1130
## SEVERE OSTEOPOROSIS COMPLICATED WITH RADIOULNAR FRACTURE IN A TYPE 2 DIABETES MELLITUS PATIENTS

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**Objective:** Like type 2 mellitus diabetes, osteoporosis is a silent condition associated with increased morbidity and mortality. The relationship between these two entities is still controversial. Although hyperinsulinemia and obesity seem to have a beneficial effect on bone mass, persistent hyperglycemia decreases bone formation and interferes negatively with calcium and vitamin D metabolism.
**Method:** A case report is introduced regarding a female patient with type 2 mellitus diabetes and nodular goiter. Endocrine evaluation performed in different departments included thyroid stimulating hormone (TSH), free thyroxine (FT4), anti-thyroglobulin (TGAb) and anti-thyroid peroxidase antibodies (TPOAb), calcitonin, parathormone (PTH) and 25-hydroxyvitamin D (25OHD), biochemical tests like total calcium, ionic calcium (Cat/i), β-CrossLaps (ß-CTx), osteocalcin, glycated haemoglobin (HbA1c) and imagery assessment: thyroid ultrasound (TUS), central DXA.
**Case report:** A 68-year patient diagnoses with osteoporosis 5 y ago after radioulnar fracture by falling from the same level is admitted for further assessment with market asthenia, fatigue and multiple joints pain. In the last 3 y the patient has been treated with bisphosphonates and vitamin D. Biochemical tests revealed normal Cat/i, low osteocalcin (of 8.8 ng/mL, normal 15-46 ng/mL), normal ß-CTx, hyperglycemia (of 131 mg/dL, normal of 74-106 mg/dL) and high HbA1c (of 7.29%, normal 4-6%).The endocrine assays highlighted normal PTH with slightly decreased 25OHD (of 29.7 ng/mL, normal 30-100ng/mL), normal TSH, FT4, calcitonin, and negative TgAb, TPOAb in addition to a TUS finding of a large parenchymal nodule without intra and perinodular vascular signal. DXA showed still decreased BMD of 0.683 g/cm$^2$, T-score of -3.9 SD and Z-score of 2.7 SD, total hip BMD of 0.576 g/cm$^2$, T-score of -2 SD, Z-score of -1.6 SD. Monthly bisphosphonates was recommended together with vitamin D. Also, the patient continued oral antidiabetic therapy for prevention of additional metabolic complications.
**Conclusions:** The radioulnar fracture may be the first manifestation of osteoporosis in a patient with type 2 mellitus diabetes. Microvascular events, peripheral neuropathy and metabolic complications associated with inadequate glycemic control are the main factors involved in increasing the risk of fracture in the diabetic patient.

## P1131
## ATYPICAL FEMORAL FRACTURE: THE PRICE FOR LONG TERM BISPHOSPHONATES ADHERENCE?

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Bisphosphonates are the most widely prescribed drug therapy for osteoporotic fracture prevention, often considered, first line therapy for postmenopausal osteoporosis. The association

between atypical femoral fractures and bisphosphonate therapy is complex and controversial; bisphosphonate therapy appears to increase risk of atypical fractures, with greater risk associated with longer durations of treatment. Suppression of bone turnover with long durations of bisphosphonate treatment could cause a loss of material toughness or microdamage accumulation, but the pathophysiology of atypical femoral fracture is not completely understood. Although atypical femoral fractures in bisphosphonate-treated patients is a rare complication, the case reports over the last years have raised concerns about long-term safety of antiresorptive therapy.

We report the case of a 66-year-old woman, who was referred to our clinic by the orthopedic service, for a nontraumatic right femoral diaphysis fracture, intramedullary full length nail reconstructed. The patient had a medical history of type 2 diabetes mellitus treated with oral antidiabetic agents, and with a osteoporosis diagnosis established 13 y ago, for whom oral bisphosphonates treatment was recommended, she states that the bisphosphonates therapy has gone uninterrupted for the last 13 y. No significant abnormalities were observed at clinical exam, lab tests suggested a well controlled diabetes mellitus with no other notable changes, but, the osteoresorption markers were highly suggestive for decreased bone remodeling (osteocalcin=9.2 ng/ml); DXA: L1-L4 T-score=-1.9(BMD=0.955); left hip T-score=-2.6 BMD=0.683; the comparisson with previous DXAs suggested that BMD was.rather, stationary CT scan revealed, besides the right femoral diaphysis fracture, a small, incomplete fracture at the side wall of the left femoral diaphysis. As a therapeutic approach, we recommended the replacement of antiresorptive treatment with anabolic therapy, with VitD supplementation, aiming to restart the bone remodeling procces, and to decrease the risck of further nontraumatic fractures.

Although bisphosphonates are generally considered safe, long term therapy should be monitored with biochemical markers of bone turnover and should be discontinued in patients without a clear indication for antiresorptive therapy. It is necessary to follow-up the patients who have suffered an atypical fracture of the femur because an incipient stress fractures in the contralateral limb may propagate when weight bearing is reduced in the fractured limb. Given the previous case reports and rat models, teriparatide appears to be the appropriate postoperative treatment for healing atypical femoral fractures, future research into the pharmacological treatment of atypical femoral fractures being needed.

## P1132
## FALLS AND RELATED FACTORS IN DIABETIC ELDERLY PEOPLE

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**Objective:** Diabetics develop the conditions necessary for sarcopenia and falls earlier than other aging individuals. Falls are an important health problem in the elderly population. Being diabetic and sarcopenic is even more risky for falls. In this study, we aimed to investigate the relationship between sarcopenia and fall in the elderly who admitted to the diabetes outpatient clinic.

**Methods:** Design: prospective, cross-sectional study. Setting: diabetes outpatient clinic (August- December 2018). Participants: Older adults aged ≥60 y. Measurements: Sarcopenia was evaluated by SARC F questionnaire. Patients' data about number of chronic diseases and prescribed drugs, falls (in the preceding year), BMI were recorded. SPSS (statistical package for social sciences) v21 program was used for statistical analysis.

**Results:** 164 patients were enrolled. Mean age was 72.1±7.3 y and 110 (% 66) were women and 54 (34%) were men. SARC F questionnaire was answered by all. SARC F score >4 points was regarded as sarcopenia. 32.9% of men and 67.1% of women were sarcopenic. The nonsarcopenic group experienced a 25.7% falling, while the sarcopenic group had a 62.5% falling. There was a statistically significant difference about falls and falling fear between this two groups ($p<0.001$). The total number of diseases and medications was higher in sarcopenic and falling group (respectively $p=0.009$ and $p=0.017$). In logistic regression analyses, recurrent falls were found to increase sarcopenia 3.9 times.

**Conclusion:** Falls is associated with sarcopenia in the diabetic elderly population. These patients should be considered in terms of fall because of the increased risk of fracture in the diabetic elderly. In the routine evaluation, the falls should be questioned because the falls is very frequent in diabetic elderly people.

## P1133
## FOLLOW-UP AFTER 2 YEARS OF DAILY TERIPARATIDE IN DIABETIC PATIENT

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Teriparatide represents an anabolic therapy for bone status with a single life time administration for 2 years. Despite daily injections, a patient may also have daily insulin therapy for diabetes. This is a case report of a menopausal female with severe osteoporosis and type 1 diabetes mellitus. DXA T-score is provided (GE Lunar Prodigy device).

**Case data:** This is a 73-year-old female with more than 2 decades in menopause, also diagnosed with insulin dependent diabetes mellitus, mild arterial hypertension and bilateral

coxarthrosis. She was diagnosed with osteoporosis and weekly alendronate was offered to her for 3 y. Lumbar L1-4 T-score was stationary of -3.1 SD but she suffered a spontaneous vertebral fracture at low thoracic level. Bisphosphates were switched to daily 20 μg of subcutaneous teriparatide which she followed for 2 y. By the end of the first year lumbar T-score reached -2.1 SD and after the second -1.9 SD. No new fracture was detected and soon after she had two times bilateral hip prosthesis surgery because of arthrosis. After Teriparatide she started subcutaneous denosumab every 6 months. After one more year T-score was -1.9 SD, and after another -1.3 SD.

**Conclusion:** BMD increase at lumbar spine under Teriparatide continues after the drug is stopped in addition to antiresorptive treatment that follows bone building medication.

## P1134
## DOES THE GAIT PATTERN IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS AT EARLY STAGES OF DISEASE DIFFER FROM HEALTHY CONTROLS? A CROSS-SECTIONAL STUDY

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**Objective:** Axial spondyloarthritis (axSpA) is a chronic inflammatory rheumatic disease characterized by a progressive mobility reduction of the rachis. The postural changes associated may cause balance problems in advanced stages with gait repercussions. However, although we have a detailed picture of the disease at later stages, we lack an in-depth description of the early stages of the disease, which can impact the understanding of the mechanisms generating movement impairment. This study aimed to evaluate the progressive movement decay in young patients in early stages of axSpA based on 3D gait kinematics.

**Methods:** A cross-sectional study was conducted on 46 participants (18-50 years old), 23 patients with axSpA (according to ASAS criteria, with <10 y since symptoms onset) and 23 healthy controls, matched by gender and age. Subjects' movement was reconstructed using a 3D full-body kinematic model fed by 15 inertial sensors placed in the head, arms, trunk, pelvis, thighs, shanks and feet. The primary outcomes comprise the general gait parameters regarding gait deviation index, speed, cadence, stance duration, body vertical regularity (sample entropy), step length, range of movement and peak velocity of the different joints. Physical activity was controlled by the international physical activity questionnaire (IPAQ).

**Results:** A total of 23 patients and 23 controls were included with a mean age of 37±7.5 y, predominantly males (60%). The patients with axSpA had 5±3.2 y of disease duration, with BASDAI and BASFI of 3±2.2 and 2±2.9, respectively. No statistically significant differences between groups were found for physical activity. However, gait analysis showed statistically significant differences between axSpA and healthy controls on gait deviation index (median 83 vs. 87%, p=0.022, with higher score values representing similar performance to normal movement), speed (median 0.79 vs. 0.85 m/s, p=0.015), stance duration at the left side (median 68 vs. 67 s, p=0.027), left step length (median 0.47 vs. 0.49 m, p=0.008), and vertical regularity (median 0.39 vs. 0.33, p=0.029, with higher values representing a less regular and predictable movement pattern). At the sagittal plane, patients showed higher values of left arm maximum flexion (median 14 vs. 10°, p=0.011), lower lumbar extension peak velocity (median 45 vs. 60°/s, p=0.016) and higher ankle angular peak velocity on right side (median 330 vs. 299°/s, p=0.020).

**Conclusion:** These results provide evidence for a particular gait pattern in young axSpA patients at early stages of disease progression, consistent with a gingerly pattern. The observed speed reduction and increased time in stance phase and in vertical regularity could result in a compensatory mechanism leading to an increase in the maximum flexion of the arm and in the ankle angular peak in order to achieve a more stable and balanced locomotion. A better understanding of the gait features may allow the development in the future of a specific rehabilitation and intervention approaches to the impairment of movement.

## P1135
## TERIPARATIDE-RELATED TRANSITORY HYPERCALCEMIA

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Teriparatide is an option for severe osteoporosis. Hypercalcemia is reported in some cases especially after the first few weeks of therapy. This is a case report of two menopausal female diagnosed with severe menopausal osteoporosis and treated with Teriparatide. We analysed the patients' profile while developing transitory hypercalcemia. GE Lunar Prodigy provided BMD and associated T-score.

**Cases data:** This is a 64-year-old female who was treated for 8 y with oral bisphosphonates and teriparatide was introduced because of her lumbar T-score (of -2.9 SD). After 12 months of therapy, the yearly assessment as required by National Protocol revealed a valued of total calcium of 10.4 mg/dL (normal levels between 8.5-10.2 mg/dL) and a confirmation based on ionic calcium. At that time she was under calcium supplements of 500 mg/d in addition to 1000 UI of cholecalciferol every day. The calcium supplements were stopped. Adequate oral hydration

was also recommended. Within one month the total calcium decreased to 10.18 mg/dL.
This is an 80-year old female with a history of 7 y of therapy with oral bisphosphonates. At the end of this period of time, lumbar T-score was -3.9 SD and Teriparatide was recommended. After first year of daily injections the total calcium was 10.4 mg/dL (the same normal values as above) with a confirmation based on ionic calcium. Supplements with calcium were stopped (but not the daily dose of 1000 UI/d of vitamin D) and after two months total calcium was high normal (of 10.2 mg/dL).
**Conclusion:** Transitory hypercalcemia introduced in these cases did not require teriparatide stop and lifestyle intervention seemed enough to control it.

## P1136
## RISK OF CANCER INCIDENCE AMONG PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)

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**Objective:** Cancer is considered a major cause of morbidity and mortality in SLE patients(1). Several studies recently reported a higher prevalence of malignancy in SLE patients compared to the general population. Our aim was to determine the incidence of different types of cancer in SLE patients and to identify the associated risk factors.
**Methods:** The study was conducted on a cohort of SLE patients, diagnosed according to the updated American College of Rheumatology classification criteria(2), who attending the Rheumatology and Rehabilitation department, Zagazig University in the period between January 2018 and July 2018. We used a screening questionnaire to screen patients who were diagnosed with cancer. We collected demographic and laboratory data on all screened patients and their disease activity using the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI). For the patients with cancer, we recorded the age at onset of lupus, the age at diagnosis of cancer, the type of cancer, treatment received, immunosuppressive regimen (dose and duration) and cancer outcomes.
**Results:** We recruited 118 patients (97 female, 21 male), mean age (25.7±7.5) y with mean SLE duration of (7.28±6.26) y with a mean SLEDAI score (8.93±8.94). Most of them (86.4%) had lupus nephritis, (72.4%) had hematological abnormalities and (17.8%) had neurophsycatric lupus. Majority (91%) were on corticosteroid with either a steroid sparing agent like mycophenolate mofetil (33.1%), azathioprine (43.2%) or cyclosporin (14.4%). 67 of them (56.8%) were either receiving or had received intravenous cyclophosphamide with mean cumulative dose of (7.5±4.7) gm. 18(15.3%) patients(14 female and 4 males) were diagnosed with cancer during the course of their SLE with mean age at onset (31±3.7), mean age at diagnosis of cancer (39.28±10.77). SLE duration (18.17±6.02) and mean SLEDAI (7.39±4.19). Majority of patients with cancer had lupus nephritis (88.9%) and all cancer patients were on a median dose of prednisolone 10 (2.5- 20) mg daily with median of 10 (4-24) years of steroids. Four patients (22.2%) had a family history of cancer with majority developing cancer after the diagnosis of SLE. 15(83.3%) of them had received intravenous cyclophosphamide prior to the development of cancer with mean total dose of 6.7±4.6, 12(66.7%) had received MMF, 6 (33.3%) had received cyclosporine and 9(50%) had received azathioprine. Four patients had lymphoma (22.2%), 3 had cervical cancer (16.7%), 3 had cancer breast (16.7%), 2 had colorectal cancer (11.1%), 2 had squamous cell carcinoma(11.1%), 1 had leukemia (5.6%), 1 had bronchogenic carcinoma (5.6%), 1 had prostate cancer(5.6) and one had cancer thyroid (5.6%). 12 (66.7%) of them had been treated and improved, 5 (27.8%) of them had metastasis, 1 (5.6%) died from serious infection. There is no significant difference in SLEDAI between patients with malignancy and patient without. We found that malignancy is correlated to longer disease duration and older age at onset of disease with significant difference (p value=0.01. 0.001 respectively).
**Conclusion:** We found an increasing incidence of cancer in SLE patients (15.3%) with high risk of cervical cancer in comparison to normal population. The risk of cancer in SLE patients is higher with older age at onset of SLE and longer disease duration with no risk of higher disease activity by SLEDAI. Up to the best of our knowledge, our study is the first study to concentrate on the risk of cancer in Egyptian SLE patients.
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## P1137
## VITAMIN D (25OHD) IN PATIENTS WITH CHRONIC RHEUMATIC DISEASES RECEIVING TREATMENT WITH ADALIMUMAB: DESCRIPTIVE STUDY OF A COHORT

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**Objective:** Patients with chronic rheumatic diseases (CRD) have lower levels of 25OHD, inverse correlation has been described and greater severity between the different CRD with 25OHD deficit. Most scientific societies recommend levels >30 ng/mL. Patients with refractory disease to conventional therapy have a higher inflammatory load, require optimal levels of 25OHD and often needs biological disease-modifying antirheumatic drugs (bDMARD) in order to prevent structural damage. The aim of this study was to describe the epidemiological, clinical and therapeutic characteristics of patients receiving adalimumab (ADL) in which 25OHD levels were determined in 2018.

**Methods:** Transversal, retrospective study in a hospital setting. We analyzed data from patients included in a study to determine levels of ADL at Hospital Universitario Cruces, in whom the serum level of 25OHD was determined at least once during the last year. Among 104 patients, 74 with 25OHD determination were included.
**Results:** 74 patients selected, 45.9% were men and 54.1% women. The mean age was 54.9 y (SD±13.6). 41.9% (31) had rheumatoid arthritis, 36.5% (27) spondyloarthritis, 17.6% (13) psoriatic arthritis and 4.1% (3) juvenile idiopathic arthritis. 35.1% (26) had deficit (<20 ng/mL) of 25OHD, 31.1% (23) insufficiency (20-30 ng/mL) and only 33.8% (25) optimal levels (>30 ng/mL). The 62.2% (46) of the patients received oral supplementation, of these 67.4% maintained levels >20 ng/mL and 32.6% <20 ng/mL. 37.8% (28) did not receive supplementation, despite this 60.7% within this group had levels >20 ng/mL. No statistical differences were found regarding vitamin D deficit and oral supplementation (p>0.05). 13.5% (10) of the patients also had osteoporosis (OP); in this group 6 had deficit of 25OHD, 1 insufficiency and only 3 optimal levels, all of them received 25OHD supplementation. Without differences between the groups in relation to the DMARD treatment.
**Conclusions:** Vitamin D levels were determined in 71.2% of patients and not in all of them as it would be advisable. Among the patients with 25OHD determination, 62.2% received oral supplementation, however only 33.8% of the patients reached optimal levels (>30 ng/mL) without statistical differences regarding supplementation. 13.5% of the patients who received supplementation also had OP. Despite the weakness of the study in terms of design and sample, we can assume that it is necessary to obtain levels of 25OHD >30 ng/mL with adequate supplementation, if necessary, due to the positive effects known in CRD.

## P1138
## THE ORTHOGERIATRIC PREVENTION SERVICE IMPROVES AUTOMATIC CAPTURE AND OUTCOMES AMONG FUNCTIONALLY RESILIENT OLDER PERSONS

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**Objective:** Hip fractures are associated with high mortality (20-25% by the year), severe and permanent disability (80% of survivors are dependent on at least one basic activity of daily life). The prevention of re-fractures in high-risk individuals, such as patients with a previous femur fracture, may help to improve the functional recovery process and, by reducing the recurrence of falls and fractures, promotes the maintenance of the maximum level of functional autonomy. Numerous organizational models have been developed in order to offer the most appropriate diagnostic and therapeutic pathway to such high risk persons. The aim of this study is to evaluate the effectiveness of an orthogeriatric outpatient service in the prevention of refracture and health-related outcomes.
**Methods:** Observational study conducted on 762 over-65 persons with hip fracture between February 2016 and February 2017. All patients received at discharge an outpatient visit at the orthogeriatric outpatient service. The visit was scheduled via a centralized server and carried out within 30-40 d after the hip fracture. 271 persons reached the orthogeriatric service (cases) and 283 received usual care (controls). Cases received pharmacological and non-pharmacological therapeutic indications. A 3, 6 and 12 months from outpatient visits, a telephone follow-up was conducted for both groups. The percentage of patients who receive therapeutic indications aimed at preventing falls and refractures, those who adhere to these indications at follow-up and those who develop complications, including falls, refractures and use of social and health services were estimated.
**Results:** 79% women and 21% men, with a mean age of 84 y, which preserved a good level of functional autonomy before the fracture (71% ADL≥4), despite of previous falls and fractures (42%). Compared to controls, 97% of cases started vitamin D and diet integration of calcium, while 66% were on the most suitable drugs for fracture prevention. Cases were more likely to be disabled at three months, while less likely at 12 months, with mortality reduced by almost half, lower rate of refractures and lower use of health-care services. Cases were more adherent to calcium/vitamin D supplementation and antifracture therapy than controls at 3, 6 and 12 months. Cases received more appropriate prescriptions of antifractures treatments than controls, with persons functionally independent showing a high rate of adherence.
**Conclusions:** The orthogeriatric outpatient service has the potential to identify and manage clinical and care needs of frail older adults at high risk of falls, fractures, and adverse events. It is necessary to better validate this model of care and verify its effectiveness for fracture prevention.

## P1139
## RAMAN SPECTROSCOPY DETECTION OF COLLAGEN TYPE I PRODUCTION IN HUMAN OSTEOBLAST-LIKE CELLS INDUCED WITH INTERLEUKIN 1β PRO-INFLAMMATORY CYTOKINE

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**Objective:** IL-1β is one of the major pro-inflammatory cytokines implicated in the pathogenesis of inflammatory bone loss through altered bone homeostasis. Raman spectroscopy is an emerging non-invasive diagnostic tool that can provide useful information on key biochemical markers within cells and tissues for monitoring diseases. The aims of this study were i) to evaluate the effect of IL-1β pro-inflammatory cytokine on collagen type I production in osteoblast-like cells and ii) to determine Raman spectroscopy chemical fingerprint of collagen type I produced.
**Methods:** Osteoblast-like MG63 cells were grown on osteogenic media in the absence (control) or presence of the recombinant human IL-1β (1 ng/ml or 10 ng/ml) for 48 h. Cell viability was assessed by PrestoBlue while collagen type I production was evaluated by Picro-sirius red assays. Immunofluorescence staining was performed using antibody against collagen I α1 (COL1A1). Raman spectroscopy was used to determine collagen type I biochemical fingerprints.
**Results:** Within 48 h exposure, IL-1β significantly ($p<0.05$) reduced collagen type I production in the MG63 *in vitro* culture, in dose-dependent manner. The suppression of collagen type I in the IL-1β stimulated cells did not statistically affect changes in cell viability. Immunofluorescence of COL1A1 antibody confirmed the dose-dependent effect of IL-1β in collagen type I production in MG63. Raman spectra showed changes in collagen intensity represented by amide I, amide III, C-C stretching, $CH_2$ deformation and $CH_2$ wagging peaks in IL-1β treated cells compared to control. Hydroxyproline band did not change relative to control suggesting that decreased in collagen production resulted from less synthesis rather than increased degradation.
**Conclusions:** These results highlight that one of the mechanisms by which IL-1β inhibits bone formation in inflammatory bone diseases is by suppressing production of collagen type I in bone matrix. Raman spectroscopy is capable of recognizing changes in collagen type I produced by osteoblasts and represents a promising nondestructive tool to study chemical changes in the bone extracellular matrix observed in inflammatory bone loss.

## P1140
## TERIPARATIDE-RELATED TBS CHANGES

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**Objective:** Teriparatide works as a BMD increaser and new data suggest a TBS (trabecular bone score) improvement. Type 2 diabetic females represent a particular group of patients to whom TBS is a useful tool. Nevertheless, the data of teriparatide dependent TBS values represents a relatively new topic.
**Method:** This is a case report regarding TBS in a female with severe osteoporosis treated with daily 20 μg teriparatide by self-administration through subcutaneous route. We introduce lumbar T-score in association with TBS under therapy (GE Lunar Prodigy device and TBS Insight software).
**Case data:** This is a 61-year-old female known with type 2 diabetes mellitus (treated with both oral medication and insulin) and high blood pressure. She had noncomplicated osteoporosis and weekly alendronate was offered to her for 3 y reaching a lumbar L1-4 T-score of -2.3 SD. Drug holiday was started but after 1 y she had thoracic T6 and T12 vertebras fractures while T-score decreased to -2.7 SD. After 2 y of teriparatide the value become -1.9. TBS at the baseline teriparatide therapy was 1203 and at the end 1303.
**Conclusion:** More data are necessary to use the initiation of osteoanabolic therapy based on TBS in cases when BMD does not adequately reflect fracture risk as seen in type 2 diabetic postmenopausal women.

## P1141
## EFFECT OF TREATMENT ON DISEASE ACTIVITY, MUSCULOSKELETAL MANIFESTATIONS, SKIN MANIFESTATIONS AND LIPID PROFILE IN PSORIATIC ARTHRITIS

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**Objective:** Psoriatic arthritis (PsA) is a chronic systemic autoimmune disorder affecting the joints and the skin. It develops in patients of all age groups and it has significant adverse effects on quality of life. Currently, various biologic agents are administered in PsA patients, improving significantly the musculoskeletal and skin manifestations of the disease as well as quality of life. The aim was to follow-up a group of PsA patients as far as disease activity, musculoskeletal manifestations, skin manifestations and to evaluate comorbidities, lipid profile and cardiovascular risk and the effect of treatment with biologic agents on these parameters.
**Methods:** The BMI of the patients was calculated at baseline before treatment and after treatment over the course of 9 months at 3-month intervals. Disease activity was estimated using the DAPSA before and after treatment over the course of 9 months, at 3-month intervals. Blood total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides were measured at baseline and after treatment at 3, 6 and 9 months. The 10-y cardiovascular risk was evaluated using the Heart score Greece, at baseline and after 3, 6 and 9 months on treatment with biologic agents.

**Results:** The BMI of the patients was 29.01±0.65 before treatment and 28.63±0.6, 28.37±0.6 and 29.39±0.87 after treatment at 3, 6 and 9 months, respectively. Disease activity decreased very significantly after treatment with biologic agents in PsA patients, the DAPSA score decreasing from 27.56±0.65 (mean ±SEM) before treatment to 12.56±0.40, 5.76±0.38 and 4.43 ±0.57 at 3, 6, and 9 months after treatment, respectively ($p<0.001$, Student's t-test). Musculoskeletal manifestations improved significantly after treatment in PsA patients. Total cholesterol decreased from 231.56±6.23 mg/dl before treatment to 202.91±3.96 mg/dl, 188.38±4.48 mg/dl and 171.29±6.89 mg/dl after treatment at 3, 6 and 9 months, respectively ($p<0.001$). HDL cholesterol increased from 50.62±2.07 mg/dl before treatment to 55.26±1.09 mg/dl, 56.03±0.98 mg/dl and 57.57±1.04 mg/dl after treatment, at 3, 6 and 9 months, respectively ($p<0.001$). LDL cholesterol decreased from 154.47±5.74 mg/dl before treatment to 139.61±4.90 mg/dl, 128.21±5.15 mg/dl and 92.71±5.96 mg/dl after treatment at 3, 6 and 9 months, respectively ($p<0.001$). Triglycerides were 152.03±9.26 mg/dl before treatment and decreased to 132.32±5.42 mg/dl, 121.05 ±4.52 mg/dl and 95.65±8.14 mg/dl after treatment at 3, 6 and 9 months, respectively ($p<0.001$). The Heart score Greece decreased from 4.35±0.006% before treatment, to 3.71±0.005%, 3.5±0.004% and 2.8±0.005% after treatment, at 3, 6 and 9 months, respectively ($p<0.001$).

**Conclusions:** It appears that in PsA disease activity decreases very significantly after treatment with biologic agents, whereas the lipid profile and the heart disease risk is significantly improved.

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## P1142
## FRACTURES RELATED TO OSTEOPOROSIS IN UMBRIA REGION: THE FROST- UMBRIA STUDY

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**Objective:** Several validated algorithms, based on clinical risk factors and BMD, have been developed to identify people at high risk of fracture. They have been developed in a subgroup of the population and often they show low sensibility and specificity in the general population. In addition, they remain unknown to general practitioners (GPs), who consider these tools far from their clinical practice and hard to apply. Therefore, this study aims to describe the prevalence of low BMD, major fragility fractures and clinical risk factors in the general population visiting the GPs in the main district of the Umbria region. In addition, the issue of prescription of antifracture treatments is investigated.

**Methods:** This is a prospective observational study conducted in persons aged 30 or more years, visiting the outpatient GP setting. Participants were randomly selected from the database of GPs, at the time of GP visit they underwent comprehensive evaluation including fracture risk, fracture history, diseases, drugs, functional status, and lifestyle.

**Results:** A sample of 1356 participants has been recruited, mainly women (n=756, 55%) with 63% (n=847) of them with more than 50 years old. A diagnosis of low BMD was detected in 10% of the sample (n=139), and history of fragility fractures in 9% (n=109). Of note, 56% (n=62) of persons with previous fragility fractures missed the diagnosis of low bone strength because BMD was not over the WHO threshold. Major clinical risk factors in both groups were: female gender (95% and 72%, respectively), family history of osteoporosis (22% and 21%), gait disorders (14% and 26%) and falls (14% and 25%). Disease-causing bone disorders were detected in 5% (n=7) and 9% (n=10), while drug affecting bone metabolism in 9% (n=13) and 9% (n=10) of persons with low bone density and previous fragility fractures, respectively. Antifracture drugs and vitamin D are prescribed to 34% and 43% of persons with low BMD, but to 24% and 22% of those with previous fragility fractures. A combination therapy is prescribed in 14% of persons with BMD and 9% of those who sustained a fragility fracture.

**Conclusions**: Older adults are confirmed as high risk of fractures in the general population, with only 9% of persons being affected by diseases and taking drugs with deleterious effects on bone. The GPs should start identifying persons at high risk of fractures based on validated algorithm, the evidence of previous fragility fractures, limiting the exclusive use of the BMD.

## P1143
## 1° COLOMBIAN CONSENSUS OF OSTEONECROSIS OF THE JAW (ONJ) ASSOCIATED WITH DRUGS

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**Objectives:** To provide management guidelines using algorithms that guide health professionals (dentists and doctors) to prevent, diagnose and treat ONJ in the different clinical scenarios.

**Methods:** It was selected a technical team with specialists from multiple areas and extensive experience in bone health from Healthy Bone Group of the Fundación Santa Fe in Bogotá city, and the Colombian Association of Osteoporosis and Mineral Metabolism (ACOMM), divided into work groups. The development of each theme was based on the posing of questions. After a review of the scientific literature in working meetings, the definitions and recommendations were generated and presented in this document, focused in doctors and dentists by using algorithms.

**Results:** The incidence of ONJ in patients treated with bisphosphonates (BP) is 0.01- 0.04% and 0.8-11% for osteoporosis and cancer respectively. The risk of ONJ induced by BP increases with the use of powerful antiresorptives (zoledronate and denosumab), high doses and higher frequencies, and duration of therapy >4 y. This consensus includes physiopathology and risk factors like infection in mouth, comorbidities, genetic mutations, type of dental procedures and medications as BP, denosumab and antiangiogenic agents. The use of bone biomarkers and their relation with ONJ in subjects with osteoporosis is controversial. This document allows give a guideline in different clinical scenarios of prevention and treatment of ONJ.
**Conclusions:** Although the risk of ONJ associated with drugs is very low in the patients with osteoporosis, this Consensus of ONJ allows guide the dentist and the physician in different scenarios in the context of dental procedures in patients receiving antiresorptives for osteoporosis or cancer to obtain the benefit in prevention of fragility fractures. The algorithms for prevention or treatment for ONJ could be multidisciplinary, taking in to account the risk-benefit balance in each situation.

## P1144
## TERIPARATIDE: BETWEEN YES AND NO

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Teriparatide is recommended based on national protocols in cases with severe osteoporosis and low T-score at the end with at least 3-5 y of bisphosphonates. However, the new fracture or BMD low may in fact be associated with secondary causes of osteoporosis which actually do not indicate osteoanabolic medication.
**Case data:** This is a 77-year-old female known with type 2 diabetes mellitus, chronic heart angina, high blood pressure, atrial fibrillation and polynodular goiter. She had been treated for a decade with oral bisphosphonates (alendronate and risedronate). She did not develop secondary negative effects but T-score remained low. She associated a forearm fracture. So her GP referred the patient for teriparatide. The clinical evaluation indicates a mammary tumour which was confirmed as carcinoma. Mammogram showed an infiltrative left breast neoplasia of 7 cm with a solid part of 3.5 cm. The patient refused surgery, chemotherapy was started in addition to intravenous zoledronic acid.
**Conclusion:** In severe cases of osteoporosis, menopausal screening of breast cancer is useful to exclude secondary caused of bone loss

## P1145
## THE COST OF HIP FRACTURE IN ELDERLY: TIME SERIES ANALYSIS ON THE ECONOMIC IMPACT OF THE PUBLIC HEALTH SYSTEM

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**Objective:** To identify the profile of costs related to hip fracture in patients over 60 y hospitalized in public hospitals in Brasília, Brazil.
**Methods:** Ecological study, in a time series (2008-2016), population-based (Brasília is the capital of Brazil and seat of government of the Federal District). Data from hospital morbidity of hip fractures (ICD-10 S72 code) were collected through the Hospital Information System of the Brazilian National Health System (SIH-SUS), and the population measured/estimated through the Brazilian Institute of Geography and Statistics (IBGE).
**Results:** Between 2008-2016, 3721 hospitalizations for hip fracture in the elderly were registered in the public health services of the Federal District. It was observed an ascending pattern, with a 42% increase in minimum trauma fractures, between 2008-2016, in agreement with a growth of 81.52% referring to the population over 60 y in the Federal District (2008=184.423 → 2016=334.772), representing a geometric mean annual growth rate of 7.74%. The total cost in the period was R$ 8,180,600.70 mi, which represented about 2.15% of the total cost in the Federal District with hospitalizations of elderly patients (R$ 378,780,084.82); Average of R$ 908,955.63/y for this pathology only. Average value for hospitalization of R$ 2,198.50*. The mean number of hospitalized days was 18.2 and the mean duration of other pathologies in FD in the elderly was 10.3 d. 2428 cases were female (65%) with cost of R $ 5,428,512.20 mi; The age group above 80 y was the most affected age group, with 41% of hospitalizations.
**Conclusion:** Population projections indicate a considerable increase in the cost related to hip fracture in the elderly, whose attention of the health authorities due to individual and governmental losses should be to invest in the prevention of this type of fracture and in the early diagnosis of osteoporosis.

## P1146
## ADULT ONSET STILL'S DISEASE – DIAGNOSTIC AND THERAPEUTIC APPROACH: LONG-TERM FOLLOW-UP

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Adult onset Still's disease is a systemic autoinflammatory disorder characterized by fever, arthritis and a characteristic skin eruption. The etiology of the disease remains unknown, genetic and infectious causes being discussed. The course of the disease may be monophasic, intermittent or chronic. The aim was to describe a cohort of patients with adult onset Still's disease, including course of the disease, therapeutic approach as well as long term follow-up.

**Cases description**: The cases of 3 patients with adult onset Still's disease are described. The first was a female patient, aged 40, who presented 7 y ago with fever, arthralgias, bilateral pleural effusion, splenomegaly, lymphadenitis, a salmon like rash and a sore throat. Laboratory investigations revealed elevated liver function tests, leukocytosis (WBC 20.500/mm$^3$, poly 77.1%), thrombocytosis (PLT 608.000/mm$^3$), ESR 83mm/1h, CRP 19.8 mg/dl (normal values <0.5 mg/dl), ferritin >1.000 ng/dl, ANA (-), and RF (-). The diagnosis of adult onset Still's disease was made and methylprednisolone 32 mg/d was administered, which was tapered, methotrexate and later on anakinra (an IL-1 receptor antagonist) with partial response. Two years later canakinumab was introduced (a fully human monoclonal antibody to IL-1b). After three years of successful treatment with canakinumab, the drug was withdrawn. However, 5 months later the disease recurred. Thereafter, canakinumab was administered again successfully. The second case was a male patient, aged 23 with juvenile idiopathic systemic arthritis, [ANA(-) and RF(-)], diagnosed at age 6.5 y. At the age of 21 the patient developed fever, leukocytosis (WBC 15.400/mm$^3$, poly 83.3%), ESR 82 mm/1h, CRP 20 mg/dl, anemia, ferritin 1.313 ng/dl, chest pain, arthralgias and serositis affecting multiple organs. Pulse methylprednisolone was administered being followed by the successful administration of canakinumab. The third patient was a male patient, aged 15 y, who was hospitalized with fever 39$^o$C, arthritis of the right ankle and both knees, a sore throat, WBC 26.400/mm$^3$ (poly 86,6%), ESR 90mm/1h, CRP 14.9 mg/dl and ferritin 1.027 ng/dl. The diagnosis of Still's disease was mad and methylprednisolone, followed by canakinumab were administered successfully.

**Conclusions:** A cohort of patients with adult onset Still's disease is described. The disease responded to canakinumab and long-term remission was induced. In conclusion, the systemic characteristics and chronicity of adult onset Still's disease as well as the response of the disease to agents suppressing the activity of autoinflammatory disorders is described.

## P1147
## LEVELS OF FOLLICULAR STIMULATING HORMONE ARE ASSOCIATED WITH BONE MINERAL DENSITY AND BONE TURNOVER IN POSTMENOPAUSAL WOMEN

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**Objectives:** To explore the association between follicle stimulating hormone (FSH) and BMD as well as markers of bone turnover, in a large sample of postmenopausal women, not on antiosteoporosis treatment. Materials and methods: This cross-sectional study evaluated a total of 2576 postmenopausal women, aged 56±6.4 y (range 34-80 y, menopausal age 1-39 y). Blood samples were obtained for hormonal assessment as well as for determination of serum levels of markers of bone formation (e.g., osteocalcin; serum type 1 procollagen (PINP)) and bone resorption (e.g., C-telopeptide (CTX)). BMD was evaluated using DXA, at both the lumbar spine (LS) and femoral neck (FN).

**Results:** Serum levels of FSH correlated with values of bone turnover at lumbar spine (BMD, r=-0.128, p-value<0.001; T-score, r=-0.116, p-value <0.001; Z-score, r=-0.128, p-value<0.001) and at the femoral neck (BMD, r=-0.121, p-value<0.001; T-score, r=-0.105, p-value=0.001; Z-score, r=-0.120, p-value<0.001). Women with osteopenia/osteoporosis had significantly higher levels of FSH compared with women presenting with normal BMD values (LS: 75.8 ±30.7mU/mL vs. 67.1±28.8 mU/mL, p-value<0.001; FN: 73.1±29.1mU/mL vs. 68.1±28.4 mU/mL, p-value=0.008). Multivariate analysis confirmed that LS-BMD values were predicted by FSH (b-coefficient=-0.105, p-value=0.006), in combination with age, YSM and BMI. Similar results were observed for LS T-score and Z-score values. Logistic regression analysis showed that FSH levels predicted LS osteopenia/osteoporosis (OR 1.011, p-value<0.001), in models adjusted for age, BMI and YSM. On the other hand, FSH values did not predict FN-BMD or FN-osteopenia/osteoporosis. Finally, the multivariate analysis confirmed a direct association between FSH levels and markers of bone formation as well as bone resorption (FSH levels, osteocalcin: b-coefficient=0.278, p-value=0.001; CTX, b-coefficient=0.271, p-value=0.003; PINP, b-coefficient=0.264, p-value=0.003), adjusting for age and YSM.

**Conclusions:** Higher levels of FSH are associated with lower BMD, an effect particularly pronounced in the lumbar spine, and which was independent of age, BMI and YSM. Moreover, FSH is affecting both bone formation and bone resorption. Further studies are required to estimate the precise mechanisms mediating the observed associations.

## P1148
## VITAMIN D LEVELS IN PATIENTS WITH OSTEOPOROSIS IN NEIVA, COLOMBIA

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**Objective:** The city of Neiva in Colombia is located in the torrid zone, 600 m above sea level, with an average temperature of 35°C/d and with solar exposure 365 d a year. Under these conditions it is important to know the status of vitamin D levels in patients with osteoporosis. Our aim was to determine the prevalence of vitamin D levels in patients diagnosed by bone densitometry for osteoporosis in Neiva, Huila-Colombia.
**Methods:** Patients older than 50 y were included for a period of one year, with a diagnosis of osteoporosis by densitometry and reporting of 25-OH vitamin D by chemiluminescence, who attended the university hospital Neiva. Measures possible association between qualitative variables (odds ratio) is established and a linear regression model in which the independent variable that best predicts the outcome of the dependent variable, and observe the correlation was determined. Statistical analysis was performed on SPSS version 19 package.
**Results:** Hypovitaminosis D is a very common disorder in the study population (89%) and in 55% of cases is associated with secondary hyperparathyroidism. Prevalence of deficiency levels of 35.5% (n=20), insufficiency of 53.5% (n=30) and optimal11% (n=6) were found. When performing a bivariate analysis of the levels of BMD and vitamin D levels, we found that BMD down simultaneously with the fall in serum levels of vitamin D. This association was statistically significant at the level of lumbar spine p=0.0063.
**Conclusion:** Insufficiency and deficiency of vitamin D is very common even in areas where sun exposure is daily throughout the year, making it necessary to perform testing in all patients with osteoporosis.

## P1149
## IMPACT OF GASTROINTESTINAL DISORDERS ON BONE QUALITY: DESCRIPTION OF TWO CASES

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Disorders of the gastrointestinal tract may have an impact on bone quality which may manifest as either osteomalacia or osteoporosis. Gastritis may have an impact on the bone as it demands the chronic administration of proton pump inhibitors. Malignant neoplasms of the gastrointestinal tract may be accompanied by malabsorption of nutrients and micronutrients. The aforementioned disorders may also be related to vitamin D deficiency. With the abovementioned mechanisms gastrointestinal disorders may cause either osteomalacia or osteoporosis. The aim was to describe two cases of patients with gastrointestinal disorders, namely, chronic gastritis and cancer of the large intestine who developed osteoporosis.
**Cases description:** The cases of two patients with gastrointestinal disorders who developed vitamin D deficiency and osteoporosis are described. The first patient was female, aged 84 and presented with gastric pain. Gastroscopy was performed and chronic gastritis was diagnosed. Laboratory investigations revealed $25(OH)D_3$ levels of 15 ng/ml and bone density of the left femur showed a T-score of -3.9. The second patient aged 85 y presented with pain in the left loin. Laboratory investigations revealed severe anemia. Gastroscopy revealed chronic gastritis. Abdominal radiology revealed a large malignant neoplasm in the area of the sigmoid colon. Bone density measurement in the area of the left femur showed a T-score of -3.1. In the first case gastritis was managed with proton pump inhibitors. Vitamin D along with drugs for the treatment of osteoporosis were also administered. In the second case the neoplasm was surgically excised and treatment for osteoporosis was initiated.
**Conclusions:** The cases of two patients with gastrointestinal disorders who developed vitamin D deficiency and osteoporosis are described. Gastrointestinal disorders have an impact on bone quality. They may be accompanied by vitamin D deficiency, malabsorption of nutrients and may demand long-term treatment with proton pump inhibitors, known for an adverse effect on bone density. Additionally, the management of osteoporosis in such patients should be carefully planned as medications used for osteoporosis may be accompanied by gastrointestinal adverse effects, such as gastritis. In conclusion, in patients with gastrointestinal disorders bone density should be measured and if osteoporosis is revealed, it should be accordingly treated.

## P1150
## DIAGNOSIS OF MCCUNE ALBRIGHT SYNDROME IN A PATIENT FOLLOWED ON A RHEUMATOLOGY CONSULT OF OSTEOPOROSIS

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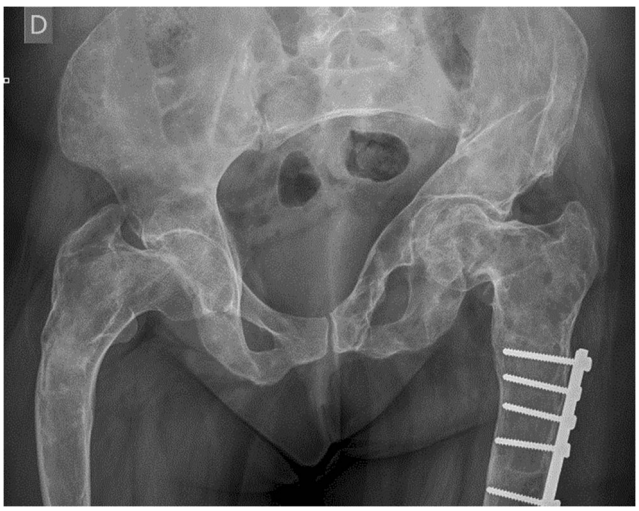
The follow-up of patients in an osteoporosis unit treated with antiresorptive treatment is, on occasion, cause for surprise. Bone fibrous dysplasia is a metabolic bone disease that

requires treatment with bisphosphonates for pain relief and reduction of disease outbreaks. This disease is associated with numerous syndromes, among which is that of McCune Albright.

We report a case of a 36-year-old woman under treatment with bisphosphonates, who had a history of precocious puberty and skin changes, and finally diagnosed of McCune Albright syndrome in our rheumatology department.

**Conclusions:** Clinicians should be aware of this and other types of atypical and serious syndromes associated with bone dysplasia and other bone metabolic disorders.




## P1151
## PERIOPERATIVE MORTALITY FOLLOWING FEMORAL NECK FRACTURES: THE EFFECT OF IMPROVEMENTS IN MULTIDISCIPLINARY CARE OVER TWO DECADES

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**Objective:** This study aims to analyze changes in perioperative mortality and length of hospital stay in patients with femoral neck fractures over two decades in the USA (US): a time during which multidisciplinary perioperative fracture care became a standard across the US.

**Material and Methods:** The National Hospital Discharge Survey was used to identify all patients who were admitted to US hospitals with femoral neck fractures from 1990 to 2010. A cohort of 1,891,857 patients was identified over the study period. Trends in and mortality and length of hospital stay over the 20 year period were analyzed and logistic regression was used to isolate independent variables associated with mortality.

**Results:** Perioperative mortality decreased from 3.0% in 1990 to 1.2% in 2010 (P<0.001). When comparing the study group by decade, mortality decreased from 2.9% in the 1990-1999 group, to 2.1% in 2000-2010 group (P<0.001), despite an increase in comorbidities in the latter group (53.7% in 1990-1999 vs. 68.9% in 2000-2010). Length of hospital stay decreased from 14.4 d in 1990 to 5.3 d in 2010 (P<0.001), (8.9 d in 1990-1999 to 6.2 d in 2000-2010, P<0.001). When controlling for confounders, multivariable logistic regression showed that patients with COPD, CHF and those undergoing dialysis were at greatest odds for mortality. Pulmonary embolism and acute myocardial infarction were complications associated with the highest odds of mortality.

**Conclusions:** Perioperative mortality and length of hospital stay for patients with femoral neck fractures has decreased over the study period despite an overall increase in comorbidities. During the 20 years of this study, multidisciplinary perioperative fracture care was implemented and became widespread. This study highlights the importance of multidisciplinary care, both preoperatively with risk stratification and medical optimization, and postoperatively with improved therapy and pain management protocols for patients with femoral neck fractures.

## P1152
## QUANTIFYING MUSCLE FATTY INFILTRATE IN PEOPLE WITH OR AT RISK OF HAVING KNEE OSTEOARTHRITIS

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**Objective:** Osteoarthritis (OA) affects 35 million people in the US. Muscle characteristics have been identified as possible contributors to the development and progression of OA. There has been some exploration of the relationship between muscle fat infiltrate (MFI) and OA but most studies are limited by sample size. We aimed to investigate the methods of quantifying MFI in the muscles of the thigh using conventional MRI available from the Osteoarthritis Initiative (OAI) dataset.

**Methods:** MR imaging of adults from the Osteoarthritis Initiative cohort. MFI was calculated as the proportion of mean signal intensity value of each muscle to fat signal intensity. Fat signal intensity was captured in 3 ways: MFI V1 used mean fat signal intensity from a standardized location, V2 used max signal intensity from a standardized location, V3 used max signal intensity from entire image.

**Results:** MRI data of 49 adults, 13 males and 39 females with mean age 70 (range 49-81). Comparing MFI calculations for each of the measurement

methodologies resulted in ICC values indicating good to excellent levels of reliability between four investigators. The ICC for using mean FSI from standardized location (SL) ranged from 0.88-0.96 (95%CI). The ICC for using maximum FSI from SL ranged from 0.82-0.98 (95%CI). The ICC for maximum FSI of entire image ranged from 0.95-1.00 (95%CI). The V2 and V3-based MFI estimates of recuts femoris were correlated with the Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP) score for constant knee pain.

**Conclusion:** MFI may provide useful insight into the presentation of patients with knee OA, such as those with high levels of constant pain. Choice of fat signal intensity values in the MFI calculation results in significantly different fat values. This study provides evidence that further investigation into the use of fat intensities in MFI calculation is warranted in order to produce consistent estimations of MFI in patients. Continued research on the relationship between MFI and progression of knee OA is warranted with larger sample sizes and inclusion of other disease-modifying variables.

## P1153
## SECONDARY OSTEOPOROSIS SCREENING IN FRACTURE LIAISON SERVICE: IS IT NECESSARY?

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**Objective:** Fracture liaison service (FLS) is a secondary fracture prevention program implemented to provide screening and treatment for post fragility fracture care. We reviewed labs performed at the time of FLS enrollment and evaluation at mayo clinic Florida to determine if workup for secondary causes of osteoporosis is of any utility in post fracture care.

**Methods:** Mayo clinic Florida FLS protocol consist of a Cerner data base registry, that registers patients with a diagnosis of fracture coming to the emergency room or admitted to the hospital. FLS nurse will review each chart and include and exclude patients into FLS program based on criteria's. Inclusion criteria is age >50, GFR>35, fractures occurring from a standing position. Exclusion criteria is fracture of face, fingers, toes and non-fragility fractures, hospice patients and severe dementia. Patients are contacted within 90 d of post discharge from hospital or emergency department by phone call. If a patient agrees to participate in the program, then appropriate labs and imaging consisting of BMD spine, hip and or distal radius, 24-h urine calcium, 24-h urine creatinine, total 25 hydroxyvitamin D, TSH, PTH, calcium, phosphorus, tissue transglutaminase, serum electrophoresis and alkaline phosphorus will be obtained.

**Results:** 175/343 patients met criteria to be included in Mayo Clinic Florida FLS program 1/2017-1/2018. 52/175 patients chose not to follow-up with mayo clinic. 19 could not be reached by phone. 104/343 were agreeable to be evaluated at mayo clinic. 50/104 seen by endocrinology, 25/104 seen by primary care physician at mayo clinic, and 24/104 did not show up, or canceled their appointments. The remaining were seen by other specialties rheumatology, oncology, orthopedics. 2/50 patients have low vitamin D (<20 ng/dl) with elevated PTH consistent with secondary hyperparathyroidism. One patient had primary hyperparathyroidism with kidney stones and hypercalciuria which was not previously recognized. Few had mild abnormality of TSH which was mildly elevated and not of significance. Only 6/50 had total 25-hydroxyvitamin D level <20 ng/dl. No other significant abnormality was detected.

**Conclusion:** Implementing and sustaining a successful FLS program is challenging due to a high level of time and funding required to sustain such a program. In addition, many of these tests and imaging for workup of osteoporosis are not reimbursed at a high rate; therefore brings another challenge to the healthcare system. Therefore, simplifying osteoporosis care and evaluation is important. Our data shows serum PTH, serum calcium, serum phosphorus, creatinine and 25-hydroxyvitmain D are the most essential diagnostic tests needed for evaluation and treatment of these patients.

## P1154
## OSTEOSARCOMA SURVEILLANCE PROGRAM ESTIMATING THE INCIDENCE OF OSTEOSARCOMA AMONG TERIPARATIDE USERS BY LINKING STATE CANCER REGISTRY DATA TO PHARMACY DATABASE DATA (USA)

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**Objective:** To estimate the incidence of osteosarcoma (OS) among teriparatide patients and unexposed matched comparator patients.

**Methods:** Data from IQVIA LRx, a commercial pharmacy database (aged 18+), or the Medicare Part D database (aged 65+) were used to create teriparatide-exposed cohorts and unexposed comparator cohorts (general population (GP) and osteoporosis (LRx only)). These cohorts were then linked with state cancer registry (SCR) data containing OS diagnosis information. Patients were followed from their index date to the earliest of either OS diagnosis, death (Medicare only), or the end of study period. Primary analysis included estimation of incidence rate ratio with an adjustment to the person-time of observation using a coverage fraction (70% for LRx and 68% for Medicare).

**Results:** In the LRx database, 335,191 teriparatide patients matched to 637,387 unexposed osteoporosis patients and 379,283 teriparatide patients matched to 1,428,943 unexposed GP patients. A total of 29 SCRs participated, covering 70% of all expected US OS cases aged 20+ during the study period. A total of 18 OS cases were observed, the same 3 in both teriparatide cohorts, 6 in the osteoporosis cohort, and 9 in the GP cohort. In the main analysis, the IRR (per 1,000,000

person-years) was 1.0 (95%CI: 0.2, 4.5) for the teriparatide osteoporosis comparison and 1.3 (95%CI: 0.2, 5.1) for the teriparatide GP comparison. In the Medicare Part D database, 153,316 teriparatide patients matched to 613,247 unexposed general population patients. A total of 26 SCRs participated, covering 68% of all expected US OS cases aged 65+ during the study period. There were no cases of OS observed in the teriparatide cohort and the rate observed in the GP cohort was consistent with the expected rate in the background population (exact rate not reported due to privacy policy of CMS). In the main analysis, the IRR (per 1,000,000 person-years) was 0.0 (95%CI: 0.0, 3.2) for the teriparatide GP comparison.

**Conclusions:** The findings from this study suggest that the point estimates for OS among teriparatide-exposed patients is consistent with what is expected in the background population though the confidence intervals are wide.

## P1155
## DALBERGIA SISSOO LEAF EXTRACT ATTENUATES FURTHER PROGRESSION OF MIA INDUCED OSTEOARTHRITIS IN RAT MODEL

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**Abstract:**

**Objective:** To check effect of *Dalbergia sissoo* leaf extract (DSLE) on MIA induced model of Osteoarthritis. Previously our study reported the positive effects of the leaves Extract of *Dalbergia sissoo* (DSE) on cartilaginous cells to enhance the fracture healing in rats however its positive effects on MIA induced osteoarthritis model remains unknown. The purpose of this study was to evaluate its anti-osteoarthritic and Chondro-protective effects in MIA induced OA model.

**Material and Methods:** Histology and staining, ELISA, u-CT, H&E, Toluidine blue, CTX-II and COMP ELISA.

**Introduction:** Osteoarthritis (OA) is highly prevalent and debilitating disorder of the joints. OA surgery model in rats were developed by injecting MIA (Inhibitor of glycolysis pathway) in knee joint by fine syringe. *In-vivo* doses of DSLE 250 $mg.kg^{-1}day^{-1}$ and 500 $mg.kg^{-1}day^{-1}$ were given orally for 28 days daily. We assessed the chondro-protective effect of DSLE by micro-CT analysis of knee joint, gross appearance of knee joint, Histology of tibia sections and their staining by H&E and Toluidine blue.

**Result:** Serum analysis indicated that DSLE down regulated cartilage oligometric matrix protein (COMP), and CTX-II expression which were increased in MIA model of osteoarthritis. DSLE prevented further progression of osteoarthritis in MIA model.

**Discussion:** Data showed that DSLE acts as a strong anti-oxidant and an anti-inflammatory. MIA induced loss of articular cartilage and changes in thickness of calcified cartilage and loss in sub-chondral bone were significantly prevented by DSLE.

**Key Words:** Osteoarthritis (OA), *Dalbergia sissoo* leaf extract (DSLE), Micro-CT (u-CT), Mono-sodium Iodoacetate (MIA).

**Statistics:** One way ANOVA test done between all the group Control, MIA, MIA +DSLE 250 $mg.kg^{-1}day^{-1}$ and MIA +500 $mg.kg^{-1}day^{-1}$

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## P1156
## HYPERURICEMIA AND GOUT IN PATIENTS WITH PAGET´S DISEASE OF BONE

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**Objective:** To analyze the frequency of hyperuricemia and gout in patients with a diagnosis of Paget's disease of bone (PD) and to establish the correlation between the activity of Paget's disease and its treatment in the fluctuations of uric acid levels.

**Methods:** Patients with Paget's disease and with scintigraphic uptake suggestive of activity were included. A database was created including demographic information, the presence of symptoms associated with PD, its type (monostotic or polyostotic), alkaline phosphatase (AP) and uric acid (UA) levels at diagnosis and the treatment received. AP and UA levels after treatment were also collected as well as the presence of possible hyperuricemic risk factors (HRF), history of gout and levels of AP and UA during gout attacks, if any. Finally data was analyzed using SPSS v21.

**Results:** A total of 95 patients were included with a mean age of 70.59 years (range 45-89), with 56% of them being women. The mean values of AP and UA at diagnosis were 178.05 mg/dL ±82.81 and 5.84 mg/dL ±1.74 respectively. 58.9% of the patients had monostotic involvement (56/95) and only 53.12% had associated symptoms (51/95), whereas in the rest of the patients PD was an incidental finding. 70.83% did not present HRF and 56 patients (58.9%) had received treatment for their PD (41% of them with zoledronic acid). Pearson correlation between PA and UA levels was found moderatly positive (0.710 with $p<0.0005$) and 50.52% of the patients (48/95) had UA levels above 6mg/dL at the time of diagnosis, with a mean of 7.10 mg/dl ±1.74. In 93.5% of the cases there was a decrease in UA levels after the treatment for PD, with a mean decrease of 0.78 mg/dL ±1.3 over the baseline value at one year of follow-up. Only 11.57% of the patients in our cohort presented gout symptoms during their follow-up, with an increase in AP levels at the time of the attack in 63.63% of the cases.

**Conclussions:** In our cohort, there was a moderate positive correlation between the elevation of AP and UA in patients with active Paget's disease. Treatment for PD produced a decrease in UA levels from baseline in most patients. Similarly, during gout attacks, an increase in AP levels could be detected but, although there may be an association between flares and the activity of Paget's disease, no correlation was found in our study.

## P1157
## IN VIVO ASSESSMENT OF THE ANTIRESORPTIVE ACTIONS OF RESOLVIN D1: RELEVANCE TO OSTEOPOROSIS

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**Objective:** Resolvin D1 (RvD1), an important member of resolvins, exerts a *wide* spectrum of biological *effects*, including resolution of inflammation, tissue repair and preservation of cell viability. The aim of the present study is to investigate the bone protective actions of RvD1 *in vivo* using an experimental model of osteoporosis.
**Methods:** Fifteen days after bilateral ovariectomy (OVX) or sham surgery, 4-months old mice were randomly separated into 4 groups: Group 1: sham mice; Group 2: OVX + vehicle, Groups 3 and 4 OVX mice received a daily i.p. injection of 100 and 500 since day 1, respectively. Animals were sacrificed after 3-months post-treatment and biomarkers related to bone resorption were determined in serum. Bone density and microarchitecture were evaluated by microcomputed tomography (micro-CT) 3D.
**Results:** After 3-months post-treatment, we showed that RvD1 reduced significantly the serum levels of parameters related to bone resorption, such as tartrate-resistant acid phosphatase (TRAP), receptor activator of NF-KB ligand (RANKL), and C-terminal peptides of type I collagen (CTX-1). The activity of alkaline phosphatase was also normalized by RvD1 and reached control levels. In contrast to the serum biomarkers, we observed no changes in micro-CT 3D bone parameters.
**Conclusion:** Our preliminary data suggest a promising novel therapy for osteoporosis treatment and prevention through reducing the early changes in bone resorption. These changes precede those of bone microarchitecture and density.

## P1158
## RATES OF FRACTURES IN ADULTS OVER 50 YEARS OF AGE IN BRAZIL: A RETROSPECTIVE ANALYSIS OF THE HOSPITAL ADMISSION DATABASE FROM 2004 TO 2012

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**Introduction:** Epidemiological studies in Brazil on fragility fractures are scarce. Most of them were done in specific population. Few were done considering all Brazilian population. Until now, there is no data concerning the secular trend of fractures in Brazil. To evaluate the rate of hospitalization related to major and hip fractures in individuals aged over 50 years, according to Brazilian public health system hospitalization database.
**Methods:** This is an ecological study with a temporal tendency including men and women enrolled from 2004 to 2012, according to their ICDs. It was included only those with low trauma fracture. All of them were classified concerning fracture type and by age and the data were calculated per 100,000 inhabitants.
**Results:** Hospitalization rate for major fractures was stable from 2004 to 2009 in both sex. However, there was an increase after 2010, especially in women after 60 years (44/100.000 population). Regarding hip fractures, women had higher rate, especially in those aged over 80 years (463/100.000 population). In both men and women, there was a slight reduction of hip fractures absolute number from 2004 to 2012. Major and hip fractures were more frequently observed in the South and Southeast region, showing some epidemiological differences.
**Conclusions:** Although the rate of hospitalization for hip fracture has been 5 times higher than major fractures from 2004 to 2012, there was slight decline of hip fractures and an increase of major fractures, highlighting secular trends differences between them, as well among Brazilian regions.
**Keywords:** osteoporosis, secular trends, fragility fractures, hip fractures, major fractures

## P1159
## PULSED ELECTROMAGNETIC FIELD IN REHABILITATION OF PROXIMAL HUMERAL OSTEOPOROTIC FRACTURES

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**Objective:** The aim of the study was to assess the effects of Pulsed Electromagnetic Field (PEMF) on pain, range of movement and functional performance in patients with proximal humeral osteoporotic fractures.
**Material and Methods:** 62 women (68.7 ± 6.3 years) with proximal humeral osteoporotic fractures,

conservatory treated by reduction and immobilization, were included (after the end of immobilization) in a prospective randomized controlled study. Osteoporosis was confirmed by dual-energy X-ray absorbtiometry (DXA) method. Patients were randomly assigned to either PEMF (36 patients) or control group (26 patients). PEMF therapy or sham therapy (in the control group) was applied 10 minutes / day, for 10 days. Patients from both groups received a standard exercise programme. Parameters assessed on the first and on the last day of treatment were: pain (visual analogue scale - VAS), range of motion (goniometry), function (Disabilities of the Arm, Shoulder and Hand score - DASH).

**Results:** After the rehabilitation programme, improvement of all measured parameters was recorded in both groups, but with constant significant differences in favour of PEMF group: pain ($p< 0.01$), range of motion ($p<0.05$), function ($p<0.05$).

Conclusion: PEMF provided important additional benefits in rehabilitation of patients with proximal humeral osteoporotic fractures.

## P1160

## MANDIBULAR BONE MINERAL DENSITY IN PATIENTS WITH EHLERS-DANLOS SYNDROME

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The Ehlers-Danlos syndrome (EDS) is a hereditary disorder with several types that affect the connective tissue and collagen structures in the body. EDS patients are high risk for oral and mandibular disorders include implant failure. There is some evidence of peri-implant bone loss in EDS patients and its relationship with implant treatment failure. Here we report that implant treatment failed in six EDS patients which were predictable only based on mandibular bone mineral densitometry (BMD).

Longitudinal data before and after implant treatment were examined for 10 healthy (mean age 45.8±6.2 years) and 10 patients with EDS (mean age 42.9±7.1 years). All subjects had BMD measurements by dual energy X-ray absorptiometry (DEXA) at lumbar spine and hip as well as mandibular BMD by image processing of preapical radiography.

Although there was no statistically significant difference in central BMD between EDS patients and healthy controls, mean mandibular body BMD values in the EDS patints were lower than control group. The lower mandibular BMD in EDS patients was associated with implant treatment failure.

This is the first report on low mandibular BMD in EDS patients and its potential relationship with implant treatment failure in this patients. Further evaluation of mandibular BMD in individuals with EDS is needed to confirm the predictable value of mandibular BMD in implant treatment failure.

## P1161

## VIBRATION THERAPY AS AN INTERVENTION FOR POSTURAL TRAINING AND FALL PREVENTION AFTER DISTAL RADIUS FRACTURE IN ELDERLY PATIENTS: A RANDOMIZED CONTROLLED TRIAL

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**Introduction:** Distal radius fracture is a sentinel event associated with postural instability and risk of subsequent hip fracture. The latest Cochrane systematic review shows a lack of effectiveness of current rehabilitation interventions. Low-magnitude high-frequency vibration (LMHFV) is a biophysical intervention that provides non-invasive, systemic mechanical stimulation to improve muscle strength and balancing abilities. The primary objective is to apply LMHFV to improve postural stability and prevent falls in distal radius fracture elderly patients.

**Materials and Methods:** A randomized controlled trial was conducted to investigate the effect of 3 months LMHFV on postural stability and fall rates after a distal radius fracture. 120 patients will be recruited based on inclusion and exclusion criteria. Inclusion criteria: 1) aged 60 or above 2) fracture distal radius 6 weeks to 3 months 3) injury due to unintentional fall. Randomization to control or LMHFV (n=60 per group) was performed. LMHFV was provided with vertical vibration at 35Hz, 0.3g, for 20 min/day, 5 days/week for 3 months. Assessments include postural stability by Biodex Balance System SD (Overall Stability Index (OSI), Anteroposterior Stability Index (APSI), Medial/ Lateral Stability Index (MLSI), Limits of Stability (LOS)), fall occurrence, timed up-and-go test (TUG), compliance and adverse events.

**Results:** There were no significant differences between baseline characteristics. Currently 90 patients recruited and preliminary results have been generated. 2 patients dropped out (1 lost contact, 1 refused continuation) from control group and 3 patients dropped out (1 lost contact, 1 refused continuation, 1 died from medical disease) from LMHFV group. There were no significant differences between baseline characteristics. 96% and 93% compliance of control and LMHFV was documented. There was significant improvement with LMHFV compared to control at 3 months for OSI ($p=0.049$), MLSI ($p=0.046$), LOS ($p=0.049$) and TUG ($p=0.038$). Falls occurred significantly less in LMHFV group with 2 times compared to 9 times in control group at 3 months ($p=0.026$). No adverse events were recorded.

**Conclusion:** Our results showed improved postural stability and decreased falls. Future clinical practice may adopt the use of LMHFV in distal radius fracture elderly patients.

**Acknowledgement:** The authors would like to thank the community centers and collaboration.

## P1164
## THE EFFICACY OF COMPLEX KINESIOTHERAPY IN WEIGHT LOSS AND MUSCLE FUNCTION IMPROVING IN OBESITY PATIENTS

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**Aim of the study** was to estimate the effect of complex 3-week treatment with 4 kinesiotherapy methods on body weight loss and muscle function in patients with obesity.

**Material and methods:** 80 men and women aged 21-69 years old with alimentary obesity were enrolled in the study (mean age 52.4±11 years, weight 111.3±24.5 kg, BMI 40.3±8.1 kg/m2, waist circumstance WC 113.4±16 cm, hip circumstance HC 124.2±16 cm). The complex kinesiotherapy administered daily for 3 week and included interactive sensorimotor trainings on double unstable platform, kinesiohydrotherapy in a pool, special complex of physical exercises in a gym and ergocycle trainings. Weight, WC, HC, fall number for last 3 weeks were measured at baseline and after the treatment was completed. Muscle strength and walking speed functional tests results assessment (10-meters-walk test, Up-and-go test, 4 special tests for back and abdomen muscle endurance to static and dynamic loading) were performed at baseline and in 3 weeks.

**Results:** There was a significant reduction in body weight (111.3±24.4 kg at baseline vs 107.9±23.1 kg in 3 weeks; p=0,000), in BMI (40.3±8.1 vs 39.1±7.7 kg/m2;p=0.000), in WC (113.4±15.9 vs 109.2±15.1 cm;p=0.000) and in HC (124.1±15.5 vs 119.7±14.1cm;p=0.000) in treated obese patients. 10-meters-walk speed increased from 0.84±0.15 m/sec at baseline to 0.88±0.17 m/sec in 3 weeks (p=0.000). Up-and-go test results improved from 8.4±2.1 to 7.9±2.09 sec (p=0.000). We registered statistically significant elevation of the endurance to static loading in abdomen muscles from 13.1±9.7 to 16.49±12.8 sec (p=0.000) and in back muscles from 14.8±11.9 sec to 18.6 ±14.9 sec (p=0.000). The endurance to dynamic loading increased in abdomen muscles from 29.9±11.2 to 34.84 ±11.93 times (p=0.000) and also in back muscles from 9.1 ±7.4 to 12.2±9.2 times (p=0.000). Fall number markably decreased from0.14 ±0.34 at baseline to 0.0 (95%CI: 0.02; 0.25) after completion of treatment.

**Conclusions:** Investigated complex treatment with 4 kinesiotherapy methods promotes body weight loss, WC and HC reduction in obesity. 3-week special training of obese patients is associated with increasing in gate speed and lower extremities muscle strength, and it also causes improvement in static and dynamic loading endurance of back and abdomen muscles. Those changes may probably improve balance function and decrease risk of falling in obese patients.

## P1162
## AWARENESS OF OSTEOPOROSIS AND USE OF DXA AMONG NURSES

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**Introduction:** Nurses play a major role in management of osteoporosis and so should be versed in this subject matter. It is also common knowledge that this disease though prevalent is not popular in developing countries. Nurses play a role in mgt of patients to ensure success of multidisciplinary modality of treatment of osteoporosis. The nurse is the patient informant in knowledge and education so as to assist their patients in their lifestyle changes. It is also expected that adequate knowledge may be lacking in this useful group of health personnel so it is important that the nurse is adequately exposed to osteoporosis in order to improve the quality of life of patients, avoid fractures and reduce mortality. It is observed that there is reduced evidence of osteoporosis awareness in Africa and level of knowledge in South East Nigeria is also minimal. Health care givers sometimes do not appreciate presence of osteoporosis even when a fracture has occurred. These patients are therefore left untreated. Osteoporosis is a common metabolic disease which occurs in 200 million worldwide and about 33.6 million Americans have low bone density at the hip. Osteoporosis is associated with loss of bone substance and many people are not aware they are at risk of it or they have it already. It is therefore important that people are alerted by various arms of health personnel who will educate them about preventive measures and methods that will make them prevent falls especially the preventable ones. Fractures are known to occur more in individuals who have osteopenia than those who have osteoporosis. The bone is a vital organ in the body and comprises mainly collagen and calcium phosphate. Collagen is responsible for the flexible framework while the calcium phosphate provides the strength and therefore hardens the bone. Bone density depends on peak bone mass and amount of bone lost. Peak bone mass occurs before 30 years of age. At this time bones are larger and bigger. After 30 years bone formation slows down and bone resorption increases. Bone mineral density accounts for about 70% of bone strength. T-score is an index of BMD and represents the standard deviation from the normal value of that of a healthy young adult. The values of T-score and Z-score according to WHO are used for assessment. This results in low bone density with resultant increase in fragility fracture. Hip fractures have high morbidity and mortality rate. Fractures of the spine reflects mostly as loss in height. Osteoporosis is associated with loss of bone substance and many people are not aware

they are at risk of it or they have it already. Osteoporosis can occur in younger people especially those that did not attain optimal bone mass as a result of poor nutrition. Underlying disease, extreme exercise and early amenorrhoea can also predispose one to osteoporosis. Low levels of estrogen that occur at menopause( especially when it occurs before 45 years of age) contributes immensely to occurrence of osteoporosis in women 14. When osteoporosis occurs in males, the mortality rates are double the values in females. It is important that nurses who form a significant part of health professionals should be well versed in the subject of osteoporosis and its management.

**Methodology:** About 500 questionnaires were distributed during a nurses workshop but 305 nurses accepted to participate in the awareness study. Most people had heard of osteoporosis.

**Result:** A total of 305 respondents (nurses) were in this study. Most of the respondents (290) had heard about osteoporosis. Nearly half (141) know that osteoporosis is caused by reduction in bone density but failed to realise that the DXA is the best imaging modality for diagnosing osteoporosis. About 75% (228) of the nurses know that rheumatoid athritis is a risk factor of osteoporosis. It is imperative that nurses have adequate knowledge of osteoporosis so that they can form a significant part of the clinical team.

## P1163
## COMMON RADIOLOGIC FINDINGS IN KNEE OSTEOARTHROSIS

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Aim To identify the commonest radiological features of osteoathrosis in this environment, attempt to form an indigenous classification with a view to adding more value to managementespecially prior to knee replacement therapy and ultimately correlate these findings with gender. Methodology This is a retrospective study which involved collecting all the knee joint radiographs of patients who presented at the radiology department to have radiographs of their knee joints as a result of pain of osteoathritis. The radiologic features were recorded with a template recorded during routine reporting. Introduction Osteoathrosis (OA) is a degenerative joint disease in which the cartilage breaks down resulting in swelling, pain and difficulty in moving the affected joint and resultant low self esteem. There is usually functional and structural collapse of the synovial joint. OA occurs when there is an imbalance between the breakdown and repair of joints so much so that there is an overwhelming increase in breakdown. It is an active disease in which mechanical factors have enorrmous influence in its initial process. Other less influential factors include genetic,metabolic and vascular factors. Osteoathritis is the commonest type of arthritis. It is expected that its prevalence will increase with worldwide increase in obesity. OA is a major cause of morbidity in people 45 years and above. The plain radiograph of the knee is an informative initial imaging modality in diagnosis of OA and its follow up inorder to monitor progress of disease. There is a view that there is unequal correlation between plain film findings and clinical symptoms. Radiologic signs of primary OA include assymmetrical narrowing of joint space commonly seen in the medial tibiofemoral compartment and or patello femoral knee compartment, osteophyte formation, subchondral cysts, subchondral sclerosis. Osteophytes develop earlier than joint space narrowing( JSN). This means that osteophytes are used to diagnose OA while assessment of severity depends on narowing of joint space and concomitant subchondral bony abnormalities. Weight bearing radiographs are generally preferred as they show more JSN than nonweight- bearing knee joint radiograph because they will show evidence of radiographic severity subchondral cysts (geode) alteration in shape of the femoral condyles and the tibial plateau. There are many ways of grading the radiological findings of OA. The most popular plain radiograph classification of OA is Kellgren Lawrence grading. This method was initially proposed by Kellgren and his group in 1957.It was later accepted by World health organization( WHO) in 1961. This grading starts from 0 to IV and is determined solely by plain film features of osteoarthritis in the knee. Grade 0 = No radiological features of OA present;grade1= Doubtful joint space narrowing (JSN) with possible osteophytic lipping; grade 2 is definite osteophytes and possible JSN on AP weight bearing radiograph;grade 3 is presence of multiple osteophytes definite JSN, sclerosis with possible bony deformity;grade 4 is presence of large osteophytes,marked JSN, severe sclerosis and definite bony deformity. Another classification is Ahlback classification. It was proposed by Ahlback et al. in 1968.There are five grades: Grade 1 has JSN 10mm. Results A total number of 322 knee joint radiographs were reported and their findings recorded in a template.which contained the plain film findings commonly seen in patients suffering from osteoarthritis; These included osteophytes, joint space narrowing, sclorotic changes, erosions etc There were 232 females and 90 males.

Knee pain was commoner in females. Most of the patients had history of previous injury. Both knees were involved but right was more affected than the left. The tibia was most affected followed by patella and then the femur. The 3 bones were equally affected by osteophytes. The intertibial spiking affected the right knee more than the left. The tibia had more sclerosis in both knees than other bones. Tibia had more subchondral cysts than femur and patella.

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## P1165
## A DIET HIGH IN FAT AND FRUCTOSE NEGATIVELY AFFECTS OSSEOINTEGRATION AND BONE METABOLISM IN FEMALE RATS

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**Purpose:** To test the hypothesis that diet induced metabolic changes adversely affect peri-implant bone microstructure, implant osseointegration and are associated with altered activity and formation of osteoblasts.
**Materials and Methods:** Thirty female Sprague Dawley rats were divided into three groups of (n=10), control group (normal chow), and 2 intervention groups on a high-fat (60%) high-fructose (20%) diet. Titanium implants were placed in the proximal tibial metaphyses in all groups either before commencingthe diet (dHFHF) or 6 weeks after commencing the diet (HFHF) and observed for an 8 week healing period. Metabolic changes were measured by insulin tolerance and oral glucose tolerance tests at regular intervals along with weekly fasting blood glucose levels (fBGLs). Structural and functional features of the peri-implant bone, including bone-to-implant contact (BIC), were analysed post-euthanasia using microcomputed tomography, and dynamic histomorphometry. Expression of the master osteoblast transcription factor, runt related transcription factor (RUNX2) was measured ex vivoby extraction of RNA from the right humerus.
**Results:** The fBGLs were unchanged across all groups. Reduced sensitivity to insulin was noted in the dHFHF group at the final time point but not in the HFHF group. There were no changes to glucose tolerance in either of the intervention groups. Peri-implant trabecular bone volume was significantly reduced in the HFHF group compared to the control group ($p=0.02$) and BIC was significantly reduced in both the HFHF (25.42±3.61) and dHFHF (28.56±4.07) groups compared to control group (43.26±3.58, $p<0.05$). Osteoblast activity and Runx2 expression were significantly reduced in both intervention groups ($p<0.05$).
**Conclusions:** Osseointegration is compromised regardless of whether the implant is placed before or after the onset of the diet, indicating that changes in bone cell function affect both the initiation and maintenance of osseointegration. Bone structure and function are adversely affected and these changes occur despite the absence of changes to blood glucose levels and insulin and glucose tolerance suggesting that the changes in bone cell function are independent of diet related metabolic changes to blood glucose levels or insulin resistance.

## P1166
## SYMPTOMATIC EFFECTS OF LONG-TERM CRYSTALLINE GLUCOSAMINE SULPHATE THERAPY IN HAND OSTEOARHRITIS

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**Objective:** According to Guidelines, the optimal management of HOA requires a combination of nonpharmacological (such as local application of heat, exercise, ultrasound and splints for thumb base OA) and pharmacological treatments. Aim of this retrospective observational study is to evaluate the efficacy of a therapeutic strategy - including the use of prescription crystalline glucosamine sulfate (GS) at daily dose of 1500 mg- for HOA in reducing hand pain and improving hand function.
**Material and Methods:** This is a 6-months observational study with retrospective review of medical records, conducted at the Center for the diagnosis and the management of Hand Osteoarthritis, Rheumatology Unit of Azienda Ospedaliera Universitaria Senese (Italy). 108 patients of both sexes, with concomitant knee osteoarthritis and primary HOA, aged between 40 and 85 years who had clinical symptoms of HOA for at least 3 months (defined as global hand pain score superior to 40 mm on a 0–100 Visual Analogue Scale (VAS) and Functional Index for Hand Osteoarthritis (FIHOA) score of at least 6, met the eligibility. Primary outcome was to evaluate the symptomatic effects of GS treatment in addition to conventional therapy (i.e. exercise, acetaminophen and/or NSAIDs), compared to the efficacy of conventional therapy alone. Secondary outcomes were health assessment questionnaire (HAQ), medical outcomes study 36-item short form (SF-36),duration of morning stiffness and symptomatic drugs consumption. Patients were examined at baseline and after 3 and 6 months.
**Results:** Out of 108 subjects included in the study, 55 patients undergoing GS therapy presented a significant decrease in the VAS pain score and in the FIHOA score ($p<0.001$) compared to the control group (53 patients). Moreover, the therapeutic strategy including GS administration, presented association to a significant decrease in morning stiffness at 6 months follow-up ($p<0.01$), with a significant reduction of HAQ score ($p<0.001$). Besides, drug consumption in the GS group, was reduced at 3 and 6 months ($p<0.05$ and $p<0.001$,

respectively). The control group didn't present any significant change of all the analyzed parameters throughout the follow-up period.
**Conclusions:** This retrospective study highlighted that the use of GS with the usual care is more effective in improving hand OA related symptoms than the conventional OA therapy alone. GS might be considered as potential effective treatment for primary hand OA.

## P1167
## PLATELET-RICH PLASMA ADVANCED FROM ARTERIAL BLOOD ACHIEVES A BETTER THERAPEUTIC RESULT IN TREATMENT FOR KNEE OSTEOARTHRITIS

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**Objective:** In recent years, platelet-rich plasma advanced (PRP) is a new therapeutic approach for knee osteoarthritis (KOA). PRP advanced is autologous concentration of a high number of cytokines growth factors from platelets in a small volume of plasma, previously stimulated by a low-level laser (LLL) and electromagnetic field (EMF). We wanted to examine whether the isolation of the growth factor from arterial blood further enhances the therapeutic effects of the procedure.
**Material and Methods:** PRP was isolated from peripheral blood of 100 persons ranging in age from 18 to 65 years, during the first half of 2018. PRP samples are divided into two groups: arterial blood (50 patients) and venous blood (50 patients). Arterial blood sample is collected from brachial artery, venous from cephalic vein, both controlled by ultrasound. Allsamples were LLL- and EMF-treated, as in our earlier scientific papers. After that instillation of PRP-a were done. Patients were examined for range of motion, improvements in VAS scale, WOMAC score, Lequesne index (LI), ambulation speed, and medical outcomes study 36 short-form health survey (SF-36) seven, thirty, three and six months after intraarticular application of PRP-a.
**Results:** Both groups showed a significant improvement in all parameters compared to the period before the application ($p < 0.05$). Changes in range of motion, ambulation speed, and the SF-36 in both groups were recorder after three and six months of procedure. Compared with those in group of patients receiving PRP-a from venous blood, patients treated PRP-a from arterial blood showed significant improvements in VAS, WOMAC and LI. There were no PRP-a-related adverse events during and after the interventions.
**Conclusion:** PRP-a from arterial blood achieves a better therapeutic result in treatment for knee osteoarthritis, compared to PRP-a isolated from venous blood.

## P1168
## THE IMPACT OF LOW-LEVEL LASER AND ELECTROMAGNETIC FIELD ON OSTEOGENIC DIFFERENTIATION AND AGING OF HUMAN MESENCHYMAL STEM CELLS ISOLATED FROM ADIPOSE TISSUE

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**Objective:** In recent years, electromagnetic field (EMF) and low-level laser (LLL) have been found to affect various biological processes, the growth and proliferation of cells, and especially that of stem cells. The aim of this study was to investigate the effects of EMF and LLL on the characteristics and abilities of human adipose tissue-derived mesenchymal stem cells (hATMSCs) and thus to examine the impact of these therapeutic physical modalities on stem cell engraftment.
**Material and Methods:** hAT-MSCs were isolated from subcutaneous adipose tissue of 12 persons ranging in age from 18 to 65 years. LLL was applied also for 7 days, for varying periods of time, at different radiation energies of 1 J/cm2, 3 J/cm2, 5 J/cm2and 10 J/cm2, with a wavelength of 808 nm, power output of 200 mW, and power density of 0.2 W/cm2. EMF was applied for a period of 7 days, once a day forvarying periods of time, via a magnetic cushion surface at a frequency of 50 Hz and an different intensity of 1 mT, 3 mT, 5 mT and 10 mT. Nonexposed cells (control) were cultivated under the same culture conditions. Seven days after treatment, optimum doses of LLL and EMF are determined, and the cells were examined for cell viability, morphology, osteogenic proliferation, differentiation, aging and oxidative stress.
**Results:** We found that after 7 days, the number of EMF-treated hATMSCs was significantly higher than the number of the untreated cells, LLL-treated hAT-MSCs were more numerous than EMF-treated cells, and hATMSCs that were treated with the combination of EMF and LLL were the most numerous. EMF and/or LLL treatment did not significantly affect hAT-MSC viability by itself. The same positive effects were registered also when osteogenic differentiation was examined. LLL and/or EMF treatment did not affect aging and oxidative stress of hAT-MSCs. Changes in cell morphology were also observed, in terms of an increase in cell surface area and fractal dimension in hAT-MSCs treated with EMF and the combination of EMF and LLL.
**Conclusion:** LLL and/or EMF treatment accelerated the proliferation and enhance osteogenic differentiation of hAT-MSCs without compromising their viability, without affecting aging and oxidative stress, and therefore, they may be used in stem cell tissue engineering.

## P1169
## OSTEOCALCIN AND BODY MASS INDEX: A SYSTEMATIC REVIEW AND META-ANALYSIS OF OBSERVATIONAL STUDIES

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**Objective:** Rodent studies have suggested that the bone-derived protein osteocalcin (OC), may have role in energy metabolism. Given obesity is a major risk factor for metabolic disorders, a meta-analysis of observational studies was conducted to investigate whether total serum osteocalcin (TOC) and ucOC levels are associated with BMI in adult general populations.
**Methods:** Literature search up to 15 Jan 2019 were conducted in MedLine, Embase and PubMed to identify relevant studies. Pooled correlation coefficients were derived with 95% confidence intervals (CIs) using random-effects models. Between-study heterogeneity was assessed and explored using subgroup analyses and meta-regressions. Publication bias was assessed by Egger's test.
**Results:** We identified 52 correlation coefficients for TOC (n=24336 participants) and 14 correlation coefficients for ucOC (n=8059 participants) in the meta-analysis. Both lower TOC (r=–0.151, 95% CI –0.171 to –0.130, p<0.001) and ucOC levels (r=–0.060, 95% CI –0.103 to –0.016, p=0.01) were correlated with increased BMI in overall analysis, with moderate heterogeneity (I2=52% for TOC and I2=54% for ucOC) and evidence of publication bias were detected (Egger's regression p<0.05). Subgroup analysis indicated the correlation between TOC and BMI was modified by ethnicity, with a stronger pooled correlation in studies from Caucasians and other regions (r=–0.187) compared to studies from East Asian populations (r=–0.126; intra-group p-value=0.002). However, this trend was not found in studies of ucOC. The correlation between ucOC and BMI was modified by the mean/median BMI of study populations ($R^2$=77%), where the correlation coefficient tended to decrease with increased BMI of the study populations.
**Conclusion:** Previous meta-analyses have reported an association between measures of glucose metabolism and OC, although it has not been clear whether the association is due to glucose handling or measures of body composition. Here we show that both TOC and ucOC were negatively correlated with BMI, raising the question of which function of energy metabolism is driving this relationship. The association between OC and BMI may be affected by ethnicity and presence of metabolic disorders. Further investigations comparing different ethnic populations and individual participant data meta-analysis would elucidate the veracity of the associations between osteocalcin and obesity in humans.

## P1170
## DIFFERENCES IN HIP GEOMETRY BETWEEN FEMALE SUBJECTS WITH AND WITHOUT ACUTE HIP FRACTURE

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**Objective:** While it is well known that hip BMD is reduced in patients with hip fracture, differences in geometrical parameters such as cortical volume and thickness between subjects with and without hip fracture are well less known,
**Methods:** CT scans from 421 independently community-dwelling elderly women, enrolled in the China Action on Spine and Hip Status (CASH) study (NTC 01758770) between March 2016 and May 2017, were included in the study. 230 of the women had acute hip fractures. CT scans were taken within 48 h after fracture to minimize changes in vBMD and body composition. 191 age matched women served as controls. CT scans were analyzed with MIAF – femur. For the purpose of this analysis integral and cortical volumes of total hip, head, neck, trochanter and intertrochanter were analyzed. In the head and neck the volumes were further subdivided into superior anterior (SA) and posterior (SP) as well as inferior anterior (IA) and posterior (IP) quadrants. In addition cortical thickness was determined for all sub VOIs listed above. Differences between fractured and unfractured females were compared by Ancova, using age, height and weight, CT pixel size and slice thickness as covariates.
**Results:** Results of the univariable analysis are shown in the Table for those variables that remained significant after adjustments. Integral volume of the total femur, neck and intertrochanter did not significantly differ between groups. Cortical volume and thickness were significantly lower in the fractured subjects with exception of the trochanter where cortical thickness was slightly higher in the fractured subjects and cortical volume did not change. In unfractured subjects, the ratio of cortical to total volume was significantly greater

for total femur, neck, trochanter and intertrochanter but differences in the trochanter were small. A closer inspection of the quadrants (details omitted) showed that at the neck, in the fractured subjects, cortical thickness was significantly lower in all quadrants whereas cortical volume was significantly higher (n.s. in quadrant SA). Femoral head volume of all quadrants was higher ($p<0.05$ for quadrants SP and SA) higher in fracture subjects. Total neck volume of IP and IA quadrants was numerically higher and of SP and SA quadrants numerically lower than in fractured patients ($p<0.05$ for SA).

| Variable/VOI | SubVOI | Mean ± SD unfractured | Mean ± SD fractured | p |
|---|---|---|---|---|
| Age | | 70.8 ± 6.8 | 71.3 ± 7.8 | n.s. |
| Height | | 157.9 ± 5.7 | 159.0 ± 5.7 | n.s. |
| Weight | | 62.7 ± 9.8 | 60.1 ± 9.9 | 0.008 |
| Total Femur | cort vol | 15.8 ± 3.7 | 15.1 ± 2.9 | <0.001 |
| | cort thick. | 1.84 ± 0.25 | 1.76 ± 0.23 | <0.001 |
| Head | int vol | 35.5 ± 5.3 | 38.0 ± 5.9 | <0.001 |
| Neck | cort vol | 4.15 ±1.0 | 4.07 ± 1.3 | 0.001 |
| | cort thick. | 1.74 ± 0.25 | 1.63 ± 0.35 | <0.001 |
| Trochanter | int vol | 24.7 ± 4.3 | 26.5 ± 5.2 | <0.01 |
| | cort thick. | 1.71 ± 0.21 | 1.73 ± 0.24 | <0.001 |
| Intertroch. | cort vol | 5.9 ± 2.9 | 4.9 ± 1.4 | <0.001 |
| | cort thick. | 2.07 ± 0.37 | 1.90 ± 0.24 | <0.001 |

**Conclusion:** Differences in total and cortical volume as well as cortical thickness between fractured and unfractured females vary substantially across the proximal femur.

## P1171
## ASSESSMENT OF FUNCTIONAL STATUS OF CONSERVATIVE TREATMENT FRACTURE OF THE WRIST – PATIENTS WITH AND WITHOUT REDUCED BONE DENSITY

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**Introduction:** More than 10% of all human skeletal fractures, make up fractures of distal radial bone. A typical break (fractura radii loco typico) is localized to 1.5-2.5cm above the wrist. There is a Colles-type fracture (where the proximal fragment goes forward and medially and distal backward and dorsal) and Smith's fracture (the proximal fragment moves backward and dorsally and the distal forward and the medial). Only 5% of these fractures require surgical treatment-these are most patients, with reduced bone density.
**Aim:** Assessment of functional status of conservative treatment fracture of the wrist, using the Gartland-Werley (G-W) score system, as well as its elements (residual deformities, complications, subjective and objective discomfort). Measuring of bone mineral density was performed on Hologic Discovery densitometer, anteroposterior scan of lumbal vertebrae L1-L4 by the method of two energetic absorbtiometery by X- rays (DXA) was performed.
**Method:** It was tested 102 patients with fractures of distal radial bone, which were treated non-operatively with a minimum follow-up period of six months. In the age of life between 21 and 84 years - average 62.9,SD±10,5. The left wrist was injured in 64 (62.7%) patients and right at 38 (37.3%). There were 82 women (80.4%) of average BMD=0.778gr/$sm^2$, T-scor=-2.2 and 20 men (19.6%) of average BMD =0.889gr/$sm^2$,T-scor=-1.6
**Results:** The results, when applying the G-W score, were excellent in 37.1%(BMD=0.848gr/$sm^2$,T-scor=-1.6), good in 43.3% (BMD=0.960gr/$sm^2$,T-scor=-1.4), satisfactory in 15.8%(BMD=0.772gr/$sm^2$,T-scor=-2.1), and poor in 3.8% patients (BMD=0.694gr/$sm^2$,T-scor=-2.5) at the end of the assessment. The G-W score elements had the following percentages in the scoring results: residual and subjective discomfort equally by 15 patients, objective discomfort (functional results) 41 and complications 23. The correlation analysis showed a statistically significant correlation of the residual deformities and the total G-W score ($p<0.01$) and between objective discomfort and total G-W score at the same level.
**Conclusion:** Fractures of distal radial bone, require a special approach and adequate assessment of final treatment results, because inadequate treatment results in the reduction of patients daily activities and their ability to work-especially when we have reduced bone density

**Keywords:** Fracture of the Wrist, Reduced bone density, Functional Assessment, Scoring System

## P1172
## EPIDURAL INJECTIONS ON LUMBAR SPONDYLOSIS PATIENTS MAY BE ASSOCIATED WITH THE RISK OF OSTEOPOROSIS: A NATIONWIDE POPULATION-BASED COHORT STUDY

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**Objective:** Epidural injections (EI) involve the administration of local anesthetic, steroids, or both into the spinal epidural space. The procedure was regarded as a reasonable approach for lumbosacral radiculopathy. The refractory period may prolong over 6 weeks, which makes an option of nonsurgical management. However, recent studies have revealed the negative effect on BMD. The main purpose of this study is to illustrate the association between EI and the following risk of osteoporosis based on the nationwide population database.
**Methods:** 5253 patients with spondylosis have received EI between 2000-2013 were identified from the National Health Insurance Research Database. Each was randomly selected and frequency-matched with an individual without EI by age, sex, and the index year. Furthermore, the risk factors of osteoporosis were stratified by gender, age, urbanization level, income level, and comorbidity.
**Results:** The incidence rates of osteoporosis in the EIs group and the non-EI group were 8.42 and 7.30 per 1,000 person-years respectively. The EIs group had a higher risk of

osteoporosis [adjusted hazard ratio (aHR)=1.21, 95%CI=1.03–1.42]. Correlated risk factors included male (adjusted subhazard ratio aSHR=1.33, 95%CI=1.00-1.77), lowest urbanization level (aSHR=1.42, 95%CI=1.07-1.89), low income populations.(aSHR=1.86, 95%CI=1.14-3.06) and without comorbidity (aSHR=1.58, 95%CI=1.08-2.32)

**Conclusion:** According to previous literature, anti-osteoporotic prescription following EIs may achieve better prognosis. The lowest urbanization level and lower income level may decrease the accessibility to further follow-up and anti-osteoporotic agent. While patient without comorbidity may lack in motivation to further follow-up after the symptom relief by the procedure successfully. EIs on lumbar spondylosis are related to higher risks of osteoporosis. The therapy should be recommended with caution, especially in patients with correlated risk factors.

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