IOF REGIONAL 2021 8th Asia Pacific Osteoporosis Conference : Poster Abstracts

P101
ROLE OF ALENDRONATE/TERIPARATIDE IN STEROID INDUCED OSTEOPOROSIS IN A DEVELOPING COUNTRY
M. Muzzammil1

1Services Hospital Karachi, Karachi, Pakistan

This is double-blinded randomized controlled trial that was conducted in tertiary care hospitals of a developing country from January 2015 to June 2019. 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. A total of 107 patients received 20 μg of teriparatide, and 107 received 10 mg of alendronate once daily. Significant difference between the groups was reached by 6 months (P<0.001). At 12 months, BMD at the 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). Patients with osteoporosis who were at high risk for fracture, BMD increased more in patients receiving teriparatide than in those receiving alendronate.

P102
ROLE OF TERIPARATIDE IN DISTAL RADIUS OSTEOPOROTIC FRACTURE PATIENTS IN A DEVELOPING COUNTRY
M. Muzzammil1

1Services Hospital Karachi, Karachi, Pakistan

Objective: Osteoporotic distal radius fractures result in serious health problems and decrease health-related quality of life (HRQoL). Faster time-to-union is important for early return to daily activities and reduction of complications. Teriparatide has been shown to accelerate fracture healing, but the literature is deficient at time of study on osteoporotic distal radius fracture. The aim of this study is to assess whether teriparatide accelerates fracture healing.

Methods: Double-blind randomized controlled trial that was conducted in tertiary care hospital Karachi, Pakistan from January 2015 to June 2019, patients with osteoporotic distal radius fractures extra-articular managed in casting are included. Group 1 included patients who were not on any osteoporosis medication prior to fracture and who postoperatively received only calcium and vitamin D; patients in Group 2 were not on any osteoporosis medication prior to fracture, and received teriparatide and calcium and vitamin D postoperatively. A total of 100 patients received 20 μg of teriparatide, and 100 received placebo once daily. Demographics, time-to-union, HRQoL (short-form health survey [SF]-12 physical component summary and SF-12 mental component summary), morbidities, mortalities, and radiographic and functional outcomes between groups were compared.

Results: Significant difference between the groups was reached by 6 months (P<0.001). Complications and mortality were also markedly reduced in the teriparatide treated groups.

Conclusion: Post fracture use of teriparatide for 6 months appears to be an effective adjunct therapy in the treatment of patients with osteoporotic distal radius fractures.

P103
EAST VS. WEST: RECENCY OF SENTINEL FRACTURES AND ITS IMPACT ON CONVENTIONAL ESTIMATES OF FRACTURE PROBABILITY USING FRAX
J. A. Kanis1,2, H. Johansson1, N. C. Harvey1, V. Guðnason1, G. Sigurdsson1, K. Siggeirsdóttir1, M. Lorentzon1, M. Liu1, L. Vandenput1, E. Mccloskey1

1Centre for Metabolic Bone Diseases, University of Sheffield Medical School, Sheffield, UK, 2Mary McKillop Institute for Health Research, Australian Catholic University, Melbourne, Australia

Prior fragility fracture, a well-established risk factor for a future fracture which is accommodated within FRAX. The population relative risk of having a hip fracture or other osteoporotic fracture is approximately 2-fold higher for most types of prior fracture. However, the increase in risk is not constant with time or age. The risk of a subsequent osteoporotic fracture is particularly acute immediately after an index fracture and wanes progressively with time. The early phase of particularly high risk has been termed imminent risk. The question arises how to accommodate the impact of a recent fracture on conventional estimates of fracture probability with FRAX.

To address this question, data were extracted from the Reykjavik Study fracture register that documented prospectively all fractures at all skeletal sites in a large sample of the population of Iceland. Fracture probabilities were determined after a sentinel fracture (humeral, clinical vertebral, forearm and hip fracture) from the hazards of death and fracture. Fracture probabilities were computed on the one hand for sentinel fractures occurring within the previous two years and on the other hand, probabilities for a prior osteoporotic fracture irrespective of recency. The probability ratios provided adjustments to conventional FRAX estimates of fracture probability for recent sentinel fractures.

Probability ratios to adjust 10-year FRAX probabilities of a major osteoporotic fracture for recent sentinel fractures were age dependent, decreasing with age in both men and women. Probability ratios varied according to the site of sentinel fracture with higher ratios for hip and vertebral fracture than for humerus or forearm fracture. Probability ratios to adjust 10-year FRAX probabilities of a hip fracture for recent sentinel fractures were also age dependent, decreasing with age in both men and women with the exception of humerus fractures.
Probability ratios provide adjustments to conventional FRAX estimates of fracture probability for recent sentinel fractures. The quantification of imminent risk enables the targeting of anabolic treatments to individuals identified to be at very high risk.

**P104**

**BODY MASS INDEX (BMI) RELATION TO OSTEOPOROSIS: A RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) SCAN-BASED REPORT IN URBAN POPULATION OF MEDAN AT ROYAL PRIMA HOSPITAL**

A. Khu1, M. Sumardi2

1Royal Prima Hospital, Medan, Indonesia

**Objective:** To determine the relationship between BMI and osteoporosis using REMS.

**Methods:** This study was the cross-sectional study that involved the patients aged 21 years old and above who underwent REMS scan from the period of October 2018 to September 2019 in Royal Prima Hospital, Medan, Indonesia, were divided into normal, osteopenia and osteoporosis based on the densitometry parameters. Meanwhile the patients’ BMI were classified into underweight (<18.5 kg/m²), normal weight (18.5-22.9 kg/m²), overweight (23-24.9 kg/m²), obese type 1 (BMI 30-40 kg/m²), and obese type 2 (40.1-50 kg/m²).

**Results:** 300 patients became the sample of this study.

Table 1. Correlation of Spine Osteoporosis and BMI by Spearman Correlation

| Spine BMD     | BMI (kg/m²) [Median (IQR)] | P-Value | R     |
|---------------|---------------------------|---------|-------|
| Normal        | 28.09 (6.84)              | <0.01   | -0.390|
| Osteopenia    | 25.48 (6.45)              |         |       |
| Osteoporosis  | 23.24 (5.25)              |         |       |

There was a significant correlation between spine osteoporosis and BMI (P-value<0.05), and the decrease of BMI leads to an increase in the potential of spine osteoporosis.

Table 2. Correlation of Neck of Femur Osteoporosis and BMI by Spearman Correlation

| The neck of femur BMD | BMI (kg/m²) [Median (IQR)] | P-Value | R     |
|-----------------------|---------------------------|---------|-------|
| Normal                | 30.84 (5.43)              | <0.01   | -0.690|
| Osteopenia            | 25.58 (5.71)              |         |       |
| Osteoporosis          | 22.51 (4.19)              |         |       |

There was a significant correlation between neck of femur osteoporosis and BMI (P-value<0.05), and the decrease of BMI leads to an increase in the potential of neck of femur osteoporosis.

**Conclusion:** Lower BMI increased the risk of osteoporosis. It was caused by poor nutritional state, which could result in decreasing bone density. Meanwhile, high BMI had a linear correlation with high BMD because of the conversion of androgen to estrogen, which increased bone mass in both men and women.

**References:**

1. Kim Y-S, et al. Osteoporos sarcopenia 2017;3:98-103.
2. Salamat MR, et al. *Hindawi Publ Corp* 2013;2013(205963):1-7. doi:10.1155/2013/205963
the control group (37.3±4.9 mg/dl) (p<0.05). CRP levels also differed significantly among the osteoporosis patients (2.23±0.68 mg/dl) and the control participants (1.07±0.42 mg/dl) (p<0.05).

**Conclusion:** Our study demonstrates that measurement of serum CP levels has potential as a surrogate marker for patients with osteoporosis.

**P108**  
**TIME TO REVISIT ‘ABSOLUTE’ AND ‘RELATIVE’ CONTRAINDICATIONS OF VERTEBROPLASTY: CASE SERIES OF 24 OSTEOPOROTIC VERTEBRA PLANAS WITH POSTERIOR/ANTERIOR WALL DEFECTED NEUROLOGICAL DEFICIT PATIENTS TREATED WITH VERTEBROPLASTY AND SHORT SEGMENT FIXATION**  
G. Kakadiya¹, D. Joshi²

¹Fortis Hospital, Mohali, India, ²Consultant Spine Surgeon, Head of Spine Surgery Department, Fortis Hospital, Mohali Panjab, India

**Objective:** To evaluate the safety and efficacy of vertebroplasty with short segmented cement augmented pedicle screws fixation for severe osteoporotic vertebral compression fractures (OVCF) with posterior/ anterior wall fracture patients.

**Methods:** A retrospective study of 24 patients of DGOU type-4 (vertebra plana) OVCF with posterior/anterior wall fracture, were treated by vertebroplasty and short segment PMMA cement augmented pedicle screws fixation. Radiological parameters (kyphosis angle and compression ratio) and clinical parameters visual analogue scale (VAS) and Oswestry disability index (ODI) were analysed.

**Results:** A significant improvement was noted in VAS (preoperative, 7.90±0.60; final follow-up 2.90±0.54) and ODI (77.10±6.96 to 21.30±6.70), (4

**P109**  
**SUBLAMINAR MERSILENE TAPE AUGMENTED PEDICLE SCREWS FIXATION FOR OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE: A NOVEL AND LOW COST MODALITY**  
G. Kakadiya¹, K. Chadhary²

¹Fortis Hospital, Mohali, ²P.D Hinduja Hospital, Mumbai, India

**Objective:** To assess the safety and efficacy of sublaminar mersilene tape augmented pedicle screws fixation as a novel and low-cost modality for osteoporotic vertebral compression fractures (OVCF) instrumentation fixation.

**Methods:** A retrospective study of 40 consecutive patients of the OVCFs. All patients were operated with open decompression, pedicle screw fixation, and sublaminar mersilene tape augmentation. Preoperative and postoperative clinical (visual analog scale [VAS], modified Oswestry disability index [M-ODI], neurologic deficit, revision surgeries, and infection) and radiological (axial collapse, fracture union, implant failure/back out,) parameters were compared to describe the utility of sublaminar mersilene tape augmented pedicle screws for OVCFs treatment.

**Results:** Complete neurological improvement was noted in 38 patients and two patients had Frankel Grade D neurology. The mean VAS was significantly improved from preoperative 8.98±0.60 to 2.76±0.54, final follow-up and M-ODI from 90.10±6.90 to 15.30±6.90. The mean local kyphosis angle was improved from 23.20°±5.90° preoperative to 5.30°±3.90° postoperatively, and 3.30°±2.50° loss of correction at final follow-up. There was no pseudoarthrosis and implant failure noted. No iatrogenic dural or nerve injury.

**Conclusion:** Sublaminar mersilene tape augmentation relies on the lamin for its hold, which is the strongest part of an osteoporotic vertebra. Sublaminar mersilene tape augmented pedicle screws fixation is a novel and low cost modality for OVCFs. It provides significant improvement in clinical and radiological outcomes. This technique is an easy learning curve, user-friendly and safe, which makes this a viable alternative option for OVCFs fixation.

**P110**  
**DENOSUMAB IN MEN: 6 YEARS RETROSPECTIVE, REALWORLD CLINICAL PRACTICE SINGLE CENTRE STUDY (OSTEOPROM) – OSTEOPOROSIS TREATMENT, FRACTURES AND SAFETY DATA**  
M. R. S. Poksāne¹, D. R. Rasa²

¹Rīga Stradiņš University, ²Rīga East Clinical University Hospital, Rīga, Latvia

**Objective:** Osteoporosis (OP) represents a considerable threat to global health and national healthcare systems. OP in men is an underrecognized and undertreated disease.

**Methods:** We analyzed the effectiveness of OP treatment in men with denosumab (Dmab) from August 2014 to January 2021. We studied BMD changes and fractures in the men retrospective cohorts in a realworld clinical setting using patient (pt) data from single-centre RECUH. We collected and analyzed at the beginning and end of the study; BMD changes of the spine L1/L4 and in some cases total spine, right and left femoral neck by using DXA and 1 case by QCT; risk factors; lab data (serum Ca, iPTH, vitamin D); comorbidities and concomitant medications. Men were divided into 6 groups according to the number of Dmab injections (inj): group (gr) nr. 1 (12–13 inj), gr nr. 2 (9–11 inj), gr nr. 3 (8 inj), gr nr. 4 (6–7 inj), gr nr. 5 (4–5 inj), gr nr. 6 (1–3 inj).

**Results:** Over the last 6 y, women with OP was 691 (89.2%) and men only 84 (10.8%). We analyzed a total of 37 (44% of 84 men, who received Dmab) men with an average age of 63.2±10.4. DXA scans analyzed BMD in 36 pts (97.3%) and QCT in 1 pt (2.7%). Men with idiopathic OP were 83.8%, GIO 10.8%, secondary OP 5.4%. At the beginning of the study, men with at least 1 fracture were 56.7% (62.0% in the spine, 9.5% hip, 14.3% forearm, 28.6% ribs, 28.6% other types of fractures). At the end of the study, men with at least 1 fracture were 2 (5.4%). DXA was made for all pts at the beginning of the study (n=37) and at the end of the study 43.2% (n=16). The most significant BMD increased in the gr nr.1–12.8% (n=2). The least significant gain was in the gr nr. 3 – 2.8% (n=2). Total right and left BMD was analyzed (n=12). The more significant BMD gain was in the gr nr.1–in the right hip 4.7% and left hip – 5.9% (n=2). Lab data, data of comorbidities and concomitant medications will be presented later. During the study, no cardiovascular events were detected.

**Conclusion:** Dmab is effective in increasing BMD at the lumbar spine and the hip. The most significant BMD increased after 12–13 Dmab injections. The study indicates that Dmab is effective and safe.
(0.65-0.32 mmol/L) and severe (<0.32 mmol/L). Also, serum calcium (Ca), vitamin D and iPTH were analyzed. The reference range for serum Ca: 2.1-2.6 mmol/L, vitamin D 30-100 ng/mL, and iPTH 12-72 pg/mL.

**Results:** A total of 3173 serum phosphorus level samples were analyzed – 1760 females, 1413 males; average age 60.2±14.9 SD; the average age of females 60.4±15.0SD and males 60.0±14.8SD. The number of blood samples with reduced serum phosphorus levels was 1803 (56.8%), where mild was 1414 (78.4%); 767 females, 647 males; average age 60.0±14.75SD; the average age of females 60.2±14.4SD; the average age of males 59.7±15.0SD; moderate were 381(21.1%); 206 females, 175 males; the average age was 56.6±15.75SD; the average age of females 54.1±17.3SD; the average age of males 59.5±12.8SD and severe were 8 (0.5%); 5 females, 3 males; the average age was 56.1±16.45SD; the average age of females 3.0±19.45SD; the average age of males 61.3±11.0SD. A total of 1719 (95.3%) serum Ca levels were analyzed, a total of 972 (53.9%) iPTH levels and a total of 456 (25.3%) vitamin D levels were also analyzed.

**Conclusion:** Reduced serum phosphorus level is more often than commonly believed, and it needs to be examined for various reasons, e.g., hyperparathyroidism, vitamin D deficiency, XLIH.

**PI14**

**THE RESULTS OF DRUG CORRECTION OF ORTHOPEDIC PATHOLOGY IN PATIENTS WITH VARIOUS FORMS OF FIBROUS DYSPLASIA**

Y. Guk1, A. Zyma1, T. Kincha-Polischuk1, A. Cheverda1, O. Skuratov1, R. Vyderko2

1SI “The Institute of Traumatology and Orthopedics” by NAMS of Ukraine, Kyiv, Ukraine

**Objective:** To improve medication correction of disorders of the structural state and metabolism of bone tissue in patients with fibrous dysplasia.

**Methods:** There were 16 patients with FD who were receiving medication treatment. Age of patients was 6-28 y. All patients underwent basic antistereoporotic therapy, of which 10 were treated with pamidronic acid. Serum Ca and Vit D3 levels were screened before and during treatment. The structural state of bone tissue was studied according to the Z- and T-criteria, bone metabolism - the study of bone markers: total P1NP, β-CrossLaps, osteocalcin.

**Results:** Based on paraclinical studies in patients with FD, depending on the clinical manifestations, form of the disease, age, indications for medication treatment with the use of pamidronic acid have been developed. Basic treatment and basic treatment in combination with pamidronic acid were used. Pamidronic acid medications were used at a dose of 0.5-1.0 mg/kg/d for 1-3 infusions, the interval between cyces was 3-4 months. Schemes, doses, combinations of pamidronic acid with other antistereoporotic drugs depending on changes in the condition and metabolism of bone tissue in FD were determined. Indications for basic therapy were: β-CrossLaps up to 0.500 ng/ml and Z-test up to -1.0 SD. Basic therapy included: preparations of Ca “Osteogenon” 1-2 capsules 2 times a day and vitamin D3 in a dose of up to 2000 IU. Indications for basic therapy in combination with the use of pamidronic acid at a dose of 0.5-1.0 mg/kg/d were severe pain, a significant area of long bone lesions, changes in β-CrossLaps from 1.5 ng/ml and above, Z-test from -1.5 SD and below. The effectiveness of the used therapy was assessed by changes in the level of β-CrossLaps in the serum and the Z-test of the lumbar vertebrae. The effectiveness of the used treatment did not depend on the dose of pamidronic acid and the form of FD. The relation between changes in the marker of osteoresorption and its reduction depending on the initial values (Wilcoxon's test p=0.0045) was reliably found - the higher the rate, the more effective the treatment, the intensity of pain decreased, the bone structure improved.

**Conclusion:** The results of medication treatment in patients with FD indicate its significant effectiveness (Wilcoxon test p=0.0045): reduction and elimination of pain, improvement of the structural condition and metabolism of bone tissue.
Extensive investigation for acquired thrombophilia, including antiphospholipid extensive areas of bone infarct on femoral, tibial, and left humeral head. The patient was diagnosed with HIV infection for 21 years. Her last CD4 was of 823/mm³, and she had severe pain on her left shoulder, knees, and ankles bilaterally. She had been previously treated with glucocorticoids, and the diagnosis of peripheral spondyloarthropathy (pSpA) has ever been described.

**Methods:** Medical records review. Informed consent was obtained from the patient.

**Results:** A 49-year-old Afro-Brazilian woman presented with acute onset of severe pain on her left shoulder, knees, and ankles bilaterally. She had been diagnosed with HIV infection for 21 years. Her last CD4 was of 823/mm³, and her viral load was undetectable. Whole body computed tomography evidenced extensive areas of bone infarct on femoral, tibial, and left humeral head. Extensive investigation for acquired thrombophilia, including antiphospholipid syndrome, resulted negative. Her current highly active antiretroviral therapy had no established association with MFON. An age-appropriate screening for occult malignancy was also negative. 99mTc-MDP bone scintigraphy evidenced hyperconcentration on the joints compromised by osteonecrosis, but also on left tarsal bones, 1st and 5th left metatarsophalangeal joint, suggesting a chronic inflammatory process. Magnetic resonance imaging of feet revealed synovitis of tibiotalar and posterior talocalcaneal joints, with no signs of osteonecrosis on those joints. pSpA was then hypothesized as the cause of her ankle and feet arthritis. The patient tested positive for HLA-B27. She was started on anticoagulation with warfarin and received zoledronic acid as adjunct therapy. Sulfasalazine was also introduced, with good response. A year after the initial presentation, the patient had complete resolution of pain.

**Conclusion:** We presented a rather atypical case of MFON in a well controlled HIV patient with pSpA, showcasing multiple mechanisms for her joint pain.

---

**P119**

**PREVENTION OF SECONDARY MEN'S HIP FRACTURES IN BELARUS: THE COST-EFFECTIVE MODEL OF GENERIC ALENDRONIC AND ZOLEDRONIC ACID**

H. Ramanau¹, E. Rudenko², N. Serdyuchenka³

¹Gomel State Medical University, Gomel, ²Belarusian State Medical University, Minsk, ³National Academy of Sciences of Belarus, Minsk, Belarus

**Objective:** To calculate the cost-effectiveness of Belarusian generic alendronic (ALN) and zoledronic acid (ZOL) in men aged 50 years and older with low-energy proximal femur (PF) fractures for prevent secondary fractures.

**Methods:** The calculation of the expected number of PF fractures in men was carried out on the basis of our own epidemiological data on the primary incidence of PF fracture in men aged 50 years and older with an interval of 5 years. The cost of treatment with generic ALN and ZOL was calculated based on the average cost of medications in the pharmacy. The cost of the course of treatment is calculated for 3 years of treatment with ALN and for 2 years of treatment with ZOL after primary PF fracture. GDP per capita of the Republic of Belarus in 2020 amounted to 6 678 USD.

**Results:** According to calculations, 2873 low-energy PF fractures are expected per year in men 50 years of age and older in Belarus. The ALN treatment for 3 years will prevent about 130 secondary PF fractures (NNT=22) and will save 601 years of life and years of healthy life for men. In case of ZOL treatment for 2 years will prevent about 151 secondary PF fractures (NNT=22) and will save 601 years of life and years of healthy life. The total cost of treatment with ALN will be 344 054 USD for 3 years, and ZOL - 554 519 USD for 2 years (FX rate of the National Bank of Belarus 01/11/2019). The cost of 1 year of saved and healthy life with the treatment of ALN will range from 376 USD at the age of 50-54 to 894 USD at the age of 85+. The cost of 1 year of saved and healthy life will be from 524 USD at age 50-54 to 1245 USD at age 85+ with ZOL treatment. The total direct economic costs for PF fracture treatment in Belarus is 1174 USD.

**Conclusion:** Treatment of ALN and ZOL for prevent secondary PF fractures in men 50+ is cost-effective at any age period and the cost of saved 1 year life does not exceed 40% of GDP per capita in Belarus.

---

**P120**

**THE EFFECTIVENESS OF THE INFLUENCE ON BONE MINERAL DENSITY OF DENOSUMAB FOR THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS**

A. Adamenka¹, E. Rudenko², V. Alekna³, M. Tamulyaitiene³, A. Rudenko³, O. Samokhovets⁴

¹Republic Medical Center, Minsk, Belarus, ²Belarusian State Medical University, Minsk, Belarus, ³Vilnius University, Vilnius, Lithuania, ⁴Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus, ⁵Minsk City Center for Osteoporosis & Musculoskeletal System Diseases, Minsk, Belarus

**Objective:** The efficacy of denosumab in the treatment of postmenopausal osteoporosis has been studied.

**Methods:** We observed 83 patients (median age 64.1 years) with a diagnosis of postmenopausal osteoporosis who had been receiving denosumab therapy in combination with calcium and vitamin D for at least 1 year. The criteria for the effectiveness of the therapy were an assessment of the dynamics of the BMD of the lumbar spine (L1-L4) and the femoral neck (SB) before the introduction of denosumab and in dynamics after 12 months of therapy, the absence of new fractures.
Sham, Ovx and Ovx + BL. BL was administered orally (109 CFU/ml) and Female C57BL/6 mice were divided into three group to study the effect of BL on bone health in Ovx induced osteoporotic mice model. We thus hypothesized interested in investigating the effect of probiotics intake on modulation of bone health in ovariectomy (Ovx) induced osteoporotic mice model. We were selected BL strain to examine its effect on bone health such as osteoporosis, rheumatoid arthritis, etc. Probiotics induce the differentiation of peripherally derived Treg (pTreg) cells from naive CD4+ T cells in GUT resulting in prevention of various inflammatory diseases by regulating immune homeostasis. Based on these facts we were interested in investigating the effect of probiotics intake on the modulation of bone health via its effect on the induction of pTregs in GUT. Thus, in present study we observed that oral administration of BL protected mice from Ovx-induced bone loss, which is not associated with significant side effects.

### P121

**BIFIDOBACTERIUM LONGUM INHIBITS BONE LOSS IN OSTEOPOROTIC MICE VIA INDUCING PTREGS IN GUT**

A. Bhardwaj1, L. Sapra2, R. K. Srivastava2

1All India Institute of Medical Sciences, New Delhi, India

**Objective:** Probiotics are defined as viable microorganisms that upon administration in adequate amount confer various health benefits by inducing alterations in composition of gut microbiota (WHO). Very few bacterial strains have been studied till date in relation to their effect on bone health. The decrease in number of Tregs leads to various inflammatory conditions of the bone such as osteoporosis, rheumatoid arthritis, etc. Probiotics induce the differentiation of peripherally derived Treg (pTreg) cells from naive CD4+ T cells in GUT resulting in prevention of various inflammatory diseases by regulating immune homeostasis. Based on these facts we were interested in investigating the effect of probiotics intake on the modulation of bone health via its effect on the induction of pTregs in GUT. Thus, in present study we observed that oral administration of *Bifidobacterium longum* (BL) strain to examine its effect on bone health in ovariectomy (Ovx) induced osteoporotic mice model. We were interested in investigating the effect of BL intake on modulation of bone health via its effect on the induction of pTregs in GUT. We thus hypothesized to study the effect of BL on bone health in Ovx induced osteoporotic mice model.

**Methods:** Female C57BL/6 mice were divided into three group’s viz. Sham, Ovx and Ovx + BL. BL was administered orally (107 CFU/ml) and after 45 days mice were sacrificed and tissues were analyzed for accessing the role of BL on bone health via various cutting-edge technologies such as SEM, AFM, μCT, FACS and ELISA.

**Results:** We observed that oral administration of BL protected mice from Ovx-induced bone loss, which was confirmed by SEM, AFM, FTIR and μCT analysis of bone samples. We further observed that BL-intake enhanced bone density in both cortical and trabecular bones of Ovx mice. Interestingly, it was observed that BL-intake enhances percentage of CD4+Foxp3+ NRP Treg cells (pTregs) in both GUT (mesenteric lymph nodes, peyer’s patches, small intestine and large intestine) and bone marrow (prime sites of osteoelasticogenesis). Furthermore, serum cytokine analysis revealed that Ovx mice administered with BL had significantly decreased levels of osteoelasticogenic cytokines IL-6, IL-17 and TNF-α along with significantly enhanced levels of anti-osteelasticogenic cytokines IL-10, IL-4 and IFN-γ with respect to Ovx group.

**Conclusion:** Taken together our results for the first time establish an osteoprotective role of BL on bone health via induction of pTregs in GUT of Ovx mice.

### P122

**PREVALENCE OF HYPOVITAMINOSIS D IN ADULT POPULATION OF THE REPUBLIC OF BELARUS**

A. Rudenko1, O. Krasko2, O. Ganchar3, S. Vasukovich3, I. Nazarchik4, D. Lukyanionak5, E. Rudenko5

1Belarusian Medical Academy of Postgraduate Education, 2United Institute of Informatics Problems, 3SYNLAB-EML Foreign Unitary Enterprise, 4Foreign LLC Synevo, 5Belarusian State Medical University, Minsk, Belarus

**Objective:** Hypovitaminosis D in both adults and children is detected in various geographic zones of our planet with high frequency. At the same time, vitamin D has number of positive effects on human health and is an important micronutrient for the prevention of some diseases. The purpose of this study is to identify the incidence of vitamin D deficiency and insufficiency in the adult population of the Republic of Belarus.

**Methods:** We analyzed the results of laboratory tests of total vitamin D, produced in 2019 and 2020 in persons over 18 years old living in the Republic of Belarus. 147673 results were analyzed, performed in laboratories located in various regions of the country. Determination of the level of total vitamin D (25(OH)D) in serum in all laboratories was carried out by the method of electrochemiluminescence (Cobas e411 apparatus manufactured by Roche Diagnostic, Germany) using original reagents from Roche Diagnostics GmbH. Level of vitamin D was considered to be normal at values of 25(OH)D ≥ 30 ng/ml, values of 20-29.9 ng/ml were defined as insufficiency, <20 ng/ml as deficiency, <10 ng/ml as severe deficiency.

**Results:** The average level of vitamin D in the surveyed population during the study period did not reach normal values in all age groups in both men and women. Hypovitaminosis D was observed in the majority of the surveyed with a frequency from 65.3% to 77%. The highest frequency of hypovitaminosis D was observed in the autumn-winter period and reached 81.6% in January 2019 and 77.8% in January 2020. In the summer months, normal levels of vitamin D were observed in less than 50% of the surveyed: the maximum values were 40.7% in July 2019 and 45.8% in July 2020.

**Conclusion:** Due to the high prevalence of hypovitaminosis D, it is advisable to carry out measures for the prevention and treatment of hypovitaminosis D in residents of the Republic of Belarus at the population level.

### P123

**NOVEL AND PREVIOUSLY DESCRIBED PATHOGENIC MUTATIONS IN COLLAGEN-RELATED OSTEOGENESIS IMPERFECTA**

P. Marozik1, A. Pachaila2, E. Rudenka3, K. Kobets1

1Institute of Genetics & Cytology of the National Academy of Sciences of Belarus, 2Belarusian Medical Academy of Postgraduate Education, 3Belarusian State Medical University, Minsk, Belarus

**Objective:** Osteogenesis imperfecta (OI) is a rare genetic bone fragility disorder. Over 85% of OI cases are associated with mutations in the procollagen type I genes (*COL1A1* or *COL1A2*). The purpose of the study was to analyse the spectrum of collagen mutations in Belarusian patients with OI and reveal their association with particular clinical phenotypes.

**Methods:** 90 Belarusian patients, diagnosed with OI by clinical standards, were included in the study. Genomic DNA was extracted from peripheral blood leukocytes. The sequencing of *COL1A1* and *COL1A2* protein coding regions was performed using Illumina MiSeq (USA). The raw data were mapped to the human reference genome hg19 using Illumina MiSeq Reporter. The variants were confirmed by Sanger sequencing. Variants not described in OI variant database were analyzed in silico using predictive programs and described as novel mutations.
Results: In total, 35 unique pathogenic COL1A1/2 variants were identified in 59 (64%) patients with OP. The whole spectrum of mutations included 32 missense, 8 nonsense, 11 frameshift, 7 splice site and 2 intronic mutations. The majority of the pathogenic variants were located in the COL1A1 gene (69.5%), 22% of them were novel (Table). At the same time, 66.7% of the COL1A2 mutations were novel (Table). All pathogenic variants were heterozygous, suggesting dominant inheritance. Glycine (Gly, G) substitutions, affecting triple-helical domains of collagen chains, were present in 19 (59.3%) of the missense variants and in 5 novel mutations.

Table. The spectrum of identified novel mutations in COL1A1 and COL1A2 genes

| Gene   | Mutation Ref | Allele | Amino Acid change | Effect          |
|--------|--------------|--------|-------------------|-----------------|
| COL1A1 | c.4103G      | T      | p.Y1368C          | Non-synonymous  |
|        | c.6868C      | G      | p.G2290R          | Non-synonymous  |
|        | c.4123A      | T      | p.A1375T          | Non-synonymous  |
|        | c.2238Gdel   | T      | p.G746fs          | Frameshift deletion |
|        | c.5426del   | T      | p.G1443del        | Frameshift deletion |
|        | c.2114delA  | T      | p.N705fs          | Frameshift deletion |
| COL1A2 | c.1036T-2A  | G      | -                 | Splice site     |
|        | c.2556A      | G      | p.G7875           | Non-synonymous  |
|        | c.1056A      | G      | p.G319E           | Non-synonymous  |
|        | c.6287T      | G      | p.R896K           | Non-synonymous  |
|        | c.1034C      | T      | p.I480T           | Non-synonymous  |

Conclusion: We identified 12 novel heterozygous missense mutations, associated with OP in Belarusian patients. We also revealed significant association of different mutations with clinical phenotype. This study expands the mutation spectrum of the COL1A1/2 genes and contribute toward the increased understanding of OP.

P124 ASSOCIATION OF SERUM 25(OH)D LEVELS WITH VDR GENE VARIATION IN POSTMENOPAUSAL WOMEN

P. Marozik1, E. Rudenka1, K. Kobets1, A. Rudenka2, V. Samokhovec3

1Institute of Genetics & Cytology of the National Academy of Sciences of Belarus, 2Belarusian State Medical University, 3Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus

Objective: Vitamin D effects have been widely investigated in various populations with regards to its possible effect on osteoporosis (OP) risk. The huge interest in the vitamin D is explained primarily by its activity in calcium homeostasis, bone formation and regulation of BMD, realized through its receptor, coded by VDR gene. The aim of this work was to reveal the effects of VDR gene Apal rs7975232, BsmI rs1544410, TaqI rs731236, FokI rs2228570 and VDR gene variants markers were determined using the quantitative PCR.

Methods: Patients were recruited at 1st Minsk city clinic (Minsk, Belarus). In total, 602 women met inclusion criteria, of them 355 patients with OP and 247 subjects from control group. BMD was evaluated by DXA (GE Lunar, USA), serum vitamin D was determined by electrochemiluminescence immunoassay (Cobas e411, Roche, Switzerland). VDR gene variants markers were determined using the quantitative PCR.

Results: We revealed significant association of rs1544410, and rs731236 (P<0.01). The opposite gene/dose relationship was revealed for rs11568820 variant (Figure). At least rs7975232, rs1544410, rs731236, and rs11568820 might help to identify individuals with increased PMO risk and vitamin D status. Revealed considerable variation in serum 25(OH)D in individuals with different VDR genotypes further suggest that a one-size-fits-all approach to vitamin D supplementation may not be appropriate.

Conclusion: The data show that the increased level of circulating vitamin D level is observed in bearers of unfavorable VDR genotypes, associated with decreased receptor expression, possibly due to altered metabolic feedback loops or effectiveness of vitamin metabolism. VDR gene variants should be considered for personalized vitamin D supplementation.

P125 EGFL6 MODERATES BONE METASTASIS OF LUNG ADENOCARCINOMA CELLS AND PROMOTES OSTEOCLAST DIFFERENTIATION

X. T. Song1, X. Cheng1, Z. Y. Li1, L. W. Zhang1, D. Hong1

1Wenzhou Medical University Affiliated Taizhou Hospital, Taizhou City, China

Epidermal growth factor-like domain multiple 6 (EGFL6) belongs to EGF-like ligands, is implied to play a role in tumor growth, migration and invasion of breast cancer, gastric cancer and nasopharyngeal carcinoma, etc. EGF-like ligands have been reported that they can stimulate osteoclastogenesis by affecting on osteoelastic cells through indirectly decreasing OPG expression and increasing MCP1 expression in an EGFR-dependent manner. Here, we proved that EGFL6 was a secreted protein and found that EGFL6 was highly expressed in lung adenocarcinoma tissues and positively correlated with bone metastasis of lung adenocarcinoma. Over-expressive EGFL6 obviously potentiated the proliferation, migration and invasion of lung adenocarcinoma cells partly through Wnt and PI3K/AKT/mTOR signaling pathways while silencing EGFL6 presented the opposite results. Intriguingly, EGFL6 promoted bone destruction of nude mice through enhancing osteoclast differentiation via NF-κB signaling pathway but affected little on osteoblast differentiation. Therefore, we elucidate that EGFL6 could be acknowledged as a precocious factor in bone metastasis of lung adenocarcinoma.

P126 OSTEOPOOROSIS, SARCOPENIA AND HIGH FRACTURE RISK IN RHEUMATOID ARTHRITIS PATIENTS

O. Dobrovolskaya1, N. Toroptsova1, A. Efremova1, N. Demin1, A. Feklistov1

1V.A. Nasonova Research Institute of Rheumatology, Moscow, Russia

Objective: To assess the frequency of osteoporosis (OP), sarcopenia (SP) and high fracture risk in rheumatoid arthritis (RA) patients (pts).

Methods: 155 women (mean age 59±9 years) with RA who met the ACR/EULAR criteria (2010) were enrolled. 126 (81%) women were postmenopausal, the postmenopause duration was 12 [5; 17] years. The duration of RA was 8 [5; 14] years. 60 (39%) pts took glucocorticoids (cumulative dose 7346 [3650; 18388] mg in prednisolone equivalent). A questionnaire was conducted on risk factors of low energy fractures (LEF). BMD and body composition
were evaluated using DXA. Sarcopenia was diagnosed according to criteria European Working Group on Sarcopenia in Older People (EWGSOP2, 2018). The 10-year probability of a major osteoporotic fracture was assessed using the FRAX tool in postmenopausal women.

**Results:** 41 (27%) women had OP among them 35 (85%) were postmenopausal, 64 (41%) pts had osteopenia and 50 (32%) normal BMD. 37 (24%) pts had a prior LEF, among them OP was found in 21 (57%) women, osteopenia in 13 (35%) and normal BMD in 3 (8%) persons. 113 (73%) pts had overweight, but only 41 (26%) persons had BMI corresponding to obesity. SP was found in 32 (21%) pts, among them 11 (7%) had osteosarcopenia, 18 (12%) osteosarcopenic obesity, 3 (2%) isolated sarcopenia. SP was found in 26 (21%) postmenopausal and in 6 (21%) premenopausal women (p=0.05). The median FRAX value was 16% [12; 23]. 31 (89%) pts with OP and 25 (27%) pts without OP had very high or high risk of LEF; 4 (11%) and 66 (73%), respectively, low risk (p<0.0001). 18 (69%) pts with SP and 47 (47%) without SP had very high or high risk, 8 (31%) and 53 (53%) pts, respectively, were at low risk of LEF (p=0.043).

**Conclusion:** Our study demonstrated that the presence of SP as well as OP increased risk of LEF in RA women.

**P127**

**EVALUATION OF ENVIRONMENTAL AND SOCIOECONOMIC FACTORS CONTRIBUTING TO FRAGILITY FRACTURES IN INDIANS**

V. Singh

1Trauma Centre and Super Specialty Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India

**Objective:** Osteoporosis causes fragility fractures that also occur in patients with BMD in the normal or osteopenic range, suggesting role of risk factors that are unrelated or partially related to BMD. The study aims at highlighting the link between 3 conditions, that are environment and occupation related risk factors and that are widely prevalent in India, and development of fragility fractures.

**Methods:** A case control study was done by recruiting 110 cases with history of recent fragility fractures and 84 controls with no history of recent fractures. 3 study parameters, village dwelling, conventional farming, and poverty, were chosen the presence or absence of which were documented in participants. This was followed by an odds ratio analysis.

**Results:** The odds of village dwellers, conventional farmers, and socioeconomically poor individuals to develop fragility fractures were both significant and large.

**Conclusion:** Urbanization is a risk in the development of fragility fractures. However, this study points that village dwelling in India is associated with the development of fragility fractures. Similarly, odds of farmers exposed to pesticides and agrochemicals to develop fragility fractures are large and significant. Pesticides and agrochemicals act as endocrine disruptors and bone health is closely linked to endocrine system. Fragility fractures among farmers may be due to endocrine disrupting properties of pesticides and agrochemicals. Socioeconomic deprivation is a known risk in the development of osteoporosis. This study too highlights that the odds of individuals living in poverty to develop fragility fractures is significant and large.

**P128**

**10-YEAR DIFFERENCES IN RADIOGRAPHIC HIP OSTEOARTHRITIS PREVALENCE AND EFFECT OF HANDGRI P STRONGTH IN JAPANESE MEN AND WOMEN**

T. Ikada1, S. Muraki2, H. Oka3, C. Hori3, K. Nakamura4, T. Akune5, S. Tanaka6, N. Yoshimura1

1Dept. of Preventive Medicine for Locomotive Organ Disorders, 22nd Century Medical & Research Center, Faculty of Medicine, University of Tokyo, Tokyo, 2Dept. of Medical & and Management for Musculoskeletal Pain, 22nd Century Medical & Research Center, Faculty of Medicine, University of Tokyo, Tokyo, 3Dept. of Orthopaedic Surgery, Faculty of Medicine, University of Tokyo, Tokyo, 4Towa Hospital, Tokyo, 5National Rehabilitation Center for Persons with Disabilities, Saitama, Japan

**Objective:** We investigated the 10-year differences in radiographic hip osteoarthritis (OA) prevalence in Japanese men and women based on data from a large-scale nationwide cohort study (Research on Osteoarthritis/ Osteoporosis Against Disability Study).

**Methods:** We analyzed the data of 2924 participants (1026 men; 1898 women) aged 40–89 y (mean 70.7 y) from urban, mountainous, and coastal communities from a baseline survey conducted in 2005–2007. We also analyzed the data of 2347 participants (726 men; 1621 women) aged 40–89 y (mean 69.2 y) obtained from a fourth survey in 2015–2016. Anthropometric measurements such as height and weight were taken. Handgrip strength was measured, and the larger value was noted as the maximum handgrip strength. Radiographs were scored using the Kellgren–Lawrence (KL) grading system: radiographic hip OA was defined as a KL score ≥ 2.

**Results:** The prevalence of radiographic hip OA in men and women was 18.4% and 14.4% in the baseline survey and 16.0% and 10.7% in the fourth survey, respectively. In the fourth survey on men and women in their 40s to 60s, the prevalence of radiographic hip OA was significantly lower than in the baseline survey, whereas height and handgrip strength measurements were significantly higher. The mean values of weight and BMI had nearly no difference between the baseline and fourth surveys. Logistic regression analysis performed after adjusting for age, sex, height, weight and residence showed that the prevalence of radiographic hip OA in the fourth survey was significantly lower than in the baseline survey (odds ratio 0.54, 95% CI 0.45–0.65), and handgrip strength was significantly associated with radiographic hip OA (-1 kg, 1.02,1.00-1.04).

**Conclusion:** Two large-scale cross-sectional cohort studies reported 10-year differences in radiographic hip OA prevalence. Handgrip strength might affect declining the prevalence of radiographic hip OA.

**P129**

**THAI OSTEOPOROSIS FOUNDATION (TOPF) POSITION STATEMENT ON MANAGEMENT OF OSTEOPOROSIS 2021**

N. Charatcharoenwitthaya1, U. Jaisamrarn2, T. Songparanasip3, V. Kupnaratsakul4, A. Unnanuntana5, C. Sririta6, H. Nimithpong7, L. Wattanachanya8, S. Chaiamnuay9, T. Valleeenukul10, P. Chotiyarnwong11, T. Amphansap12, O. Phruetthiphat13, S. Chaikitsilpa14, W. Somboonporn15, W. Kitisonprayoonkul16, P. Djaipratham17, V. Srinonprasert15, A. Petchlorlian16, S. Tejavanija17

1Division of Endocrinology & Metabolism, Dept. of Medicine, Faculty of Medicine, Thammasat University, Pathumthani, 2Dept. of Obstetrics & Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, 3Dept. of Orthopedic Surgery, Phramongkutklao Hospital, Bangkok, 4Dept. of Rehabilitation Medicine, Siriraj Hospital, Mahidol University, Bangkok, 5Dept. of Orthopedic Surgery, Siriraj Hospital, Mahidol University, Bangkok, 6Dept. of Nuclear Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, 7Division of Endocrinology and Metabolism, Ramathibodi Hospital, Mahidol University, Bangkok, 8Division of Endocrinology & Metabolism, Chulalongkorn University, Bangkok, 9Division of Rheumatology, Phramongkutklao Hospital, Bangkok, 10Dept. of Orthopedic Surgery, Bhumibol Adulyadej Hospital, Bangkok, 11Dept. of Orthopedic Surgery, Siriraj Hospital, Mahidol University, Bangkok, 12Dept. of Orthopedic Surgery, Polic General Hospital, Bangkok, 13Dept. of Obstetrics & Gynecology, Khon Kaen University, Khon Kaen, 14Dept. of Rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, 15Division of Geriatric Medicine, Dept. of Medicine, Siriraj Hospital, Mahidol University, Bangkok, 16Division of Geriatric Medicine,
Objective: To update the Thai Osteoporosis Foundation (TOFP) Position Statement on Management of Osteoporosis, published in 2016.

Methods: TOFP enlisted a panel of experts in the field of osteoporosis to review and update the 2016 TOFP position statement. Primary writers submitted their first drafts, which were subsequently reviewed, discussed, and integrated into the final document. Recommendations are based on reviews of the clinical evidence and expert’s opinions.

Results: The executive summary of this updated position statement contains 90 recommendations. New or updated topics in this position statement include the diagnosis and evaluation of osteoporosis, patient stratification according to fracture risk, management, and treatment monitoring according to fracture risk, osteoporosis management during the COVID-19 situation, multidisciplinary care of osteoporosis, atypical femoral fracture, and osteonecrosis of the jaw.

Conclusion: This updated position statement is a practical tool for physicians who take care of osteoporosis patients in Thailand.

## P130
### GUT METABOLITE 5'-HYDROXYINDOLEACETIC ACID (HIAA) INHIBITS OSTEOCLASTOGENESIS

L. Sapra1, A. Bhardwaj1, R. Srivastava1

1All India Institute of Medical Sciences, New Delhi, India

Objective: Several evidence suggests that microbiota dependent metabolites and metabolites by acting as aryl hydrocarbon receptor (AHR) ligands facilitates the bidirectional communication between the host machinery and microbiota and thus modulates host physiology. In recent years, tryptophan metabolites viz. 5'-hydroxyindoleacetic acid (HIAA) by binding and activating AHR receptor play fundamental roles in various physiological mechanisms. But no study till date has reported the direct effect of HIAA on osteoclastogenesis. Thus, in the present study, we aim to investigate the direct effect of gut metabolite HIAA on osteoclastogenesis. The present study aims to examine the potential of gut metabolite (5'-HIAA) in modulating osteoclastogenesis.

Methods: To investigate the role of 5'-HIAA in regulating bone health, we carried out in vitro studies. For determining the direct effect of HIAA on osteoclastogenesis, we cultured bone marrow cells with different concentrations of HIAA in osteoclastogenic media supplemented with M-CSF and RANKL factors for 5 d. To assess the effect of HIAA on osteoclastogenesis, TRAP staining was performed. F-actin ring polymerization was performed for investigating the effect of HIAA on osteoclast functional activity.

Results: Our in vitro data clearly indicated that 5'-HIAA significantly inhibits osteoclastogenesis in a dose dependent manner. We observed significant reduction in number of multi-nucleated TRAP positive osteoclasts in HIAA treated cultures.

Conclusion: Our data clearly indicate that HIAA inhibits osteoclastogenesis. The present study thus highlights the potential of gut metabolite HIAA as novel therapeutics in the treatment and management of several bone related diseases including osteoporosis.

Acknowledgements: This work was financially supported by projects: DST-SERB (EMR/2016/007158), Govt. of India sanctioned to RKS. LS thanks UGC for research fellowship and AB thanks DST SERB for research fellowship.

## P131
### THE FREQUENCY OF LOW BONE MINERAL DENSITY, LOW MUSCLE MASS AND SARCOPENIA IN PATIENTS WITH SYSTEMIC SCLERODERMA

A. Efremova1, N. Toroptsova1, O. Dobrovolskaya1

1V.A. Nasonova Research Institute of Rheumatology, Moscow, Russia

Objective: To identify the frequency of low BMD and low muscle mass in patients with systemic scleroderma (SSc).

Methods: 51 women >40 years (median age 53.9 [48.0;62.0] years old) who met the 2013 ACR/EULAR classification criteria for SSc were recruited: 33 (64.7%) patients with limited and 18 (35.3%) - with diffuse form of the disease. Pregnant or breastfeeding women and patients with overlapping rheumatic syndromes were not included. 13 (25.5%) women were premenopausal and 38 (74.5%) postmenopausal. Median duration of the disease was 6.0 [1.0;12.0] years. All patients underwent wholebody DXA (DXA). The appendicular muscle mass index (AMM) was calculated as the ratio of appendicular muscle mass (AMM) to height squared (kg/m²). Muscle strength was measured using hand dynamometry and “chair rising” test. Physical performance was assessed using a gait speed test and the short battery of physical performance (SPPB). Sarcopenia (SP) was diagnosed according to the revised European consensus on definition and diagnosis (EWGSOP2).

Results: Low BMD was found in 40 (78.4%) patients: 35 (92.1%) in postmenopausal and 5 (38.5%) in premenopausal women. Among postmenopausal persons osteoporosis was discovered in 26 (68.4%) and osteopenia in 9 (23.7%) cases, and among premenopausal women in 1 (7.7%) and 4 (30.8%) persons, respectively (p=0.03). Low muscle mass was discovered in 13 (25.5%) persons: 12 (31.6%) in postmenopausal and 1 (7.7%) in premenopausal women (p=0.05). All 13 (25.5%) SSc patients with low muscle mass had low BMD, 11 (21.6%) had also low muscle strength, so these women were classified as having SP, among them 6 (33.3%) patients with diffuse and 5 (27.8%) with limited form of the disease (p=0.05). SP had 1 (7.7%) premenopausal and 10 (26.3%) postmenopausal women (p=0.05). Patients with SP did not differ from patients without SP in age, BMD and the frequency of OP, number of fractures, skin score, positivity of Scl 70 and ACA, the nutritional status assessed by MNA-SF. At the same time, they had more often falls (p=0.044), a lower BMI (p=0.044), a longer disease duration (p=0.039) and a higher cumulative dose of glucocorticoids (GC) use (p=0.045).

Conclusion: Low BMD was detected in 78.4% and low muscle mass in 25.5% cases. 21.6% of SSc women had SP with no significant difference between the limited and diffuse forms of the disease. Patients with SP had a lower BMI, a longer SSc duration and a higher cumulative dose of GC use, they fell more often than women without SP.

## P132
### ZOLEDRONIC ACID IS THE TIME TESTED, COST-EFFECTIVE, ADHERABLE AND DEPENDABLE ANTIOSTEOPOROSIS MEDICATION FOR BOTH FEMALES AND MALES

S. B. Bajaj1

1Falls Institute of India, Nagpur, India

Objective: An effort to establish that zoledronic acid is the time tested, cost-effective, adherable, dependable antiestoporosis medication for both females and males. Methods: The principal author is Consultant Geriatrician. He is advising inj zoledronic acid to the elderly people having osteopenia and osteoporosis since 05 June 2012. The dose is given after doing DXA scan and knowing FRAX score. Before giving the infusion comprehensive geriatric assessment (CGA) of each patient is done. Also vit D 3 and serum calcium levels are corrected. The principal author has innovated a consent form for evaluation, education and information of the probable adverse events to the patient and the relatives. The beneficiaries are routinely given one strip of tab paracetamol 650 to take prophylactically. Also they are also given one strip each tab omprazole 20 mg and tab ibuprofen 400 mg to consume depending upon the symptoms postinfusion. Many deserving elderly patients were given the infusion by home visits. Total 230 patients were given inj zoledronic acid between 05 June 2012 to 10 Sep 2021. The monitoring visits by the trained orthogeriatric nursing staff routinely done for next 2-3 days in the “ZA PLAN”. Results: The results of giving i.v. zoledronic acid are encouraging. The age groups was between 53-92 years in both male and
female population. It is best medicine to adhere, remember, remind and also comparatively affordable to even elderly from lower S-E status.

**Conclusion:** The PI author came to the conclusion over the study of last 10 yrs with 230 beneficiaries that the zoledronic acid is the most convenient, cost-effective, easy to administer, least time consuming and best to adhere antosteoporosis medication available at present.

**P134**

**SOY PROTEIN SUPPLEMENTATION AND MUSCLE HEALTH IN OLDER ADULTS AND ELDERLY: SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS**

L. I. Octovia1, J. R. Tandaju2, F. Witjaksono1

1Dept. of Nutrition, Faculty of Medicine, Universitas Indonesia, Dr. Cipto Mangunkusumo Hospital, Indonesia Osteoporosis Association, 2 Faculty of Medicine, Universitas Indonesia, Dr. Cipto Mangunkusumo Hospital, Jakarta, Indonesia

**Objective:** To determine potential benefits of soy protein towards muscle health in older adults and elderly.

**Methods:** Systematic review and meta-analysis was done based on PRISMA statement on PubMed, Scopus, ProQuest, EBSCOHost, and WileyOnline. Studies were screened and included studies were processed for quality assessment and data synthesis. Quantitative analysis was done by RevMan 5.4 with fixed- or random-effects model based on heterogeneity, with additional tests performed if applicable to determine bias.

**Results:** Six randomized controlled trials (RCT) involving 831 subjects were found. Appraisal shown good results with analysis shown several relations between soy protein and muscle health. Quantitative analysis on 598 subjects shown that there was no significancy of soy supplementation towards muscle mass (MD 0.39; 95% CI -0.02, 0.74), handgrip (MD 4.33; 95% CI -2.02, 10.68), knee extension (MD 0.88; 95% CI -4.45, 6.20), and lat pull down (MD 0.37; 95% CI -1.94, 2.69). However, there was significant relation between soy protein supplementation and bench press results (MD 7.41; 95% CI 2.43, 12.39).

**Conclusion:** Soy consumption was related to better muscle performance on older adults and elderly, thus improving performances. However, more studies should be done to determine its benefits on muscle profile.

Figure. Relation between soya protein supplementation and muscle profile.
The presence of low-energy fractures in the history and their localization was evaluated. The low-energy fractures were considered osteoporotic and non-traumatic. The criteria of non-inclusion were related diseases that affect bone metabolism, taking any glucocorticoids for >3 months.

**Results:** It has been found that in women with OA knee joint, fractures at the minimum level of injury were statistically less frequent than in the control group: in 14 (33.3%) and 36 (55.5%) women respectively (p=0.048). There is no statistically significant impact of OA on reducing the chances of low-energy fractures in women in postmenopause (OR=2.5; 95%CI=0.160-1.00, p=0.05). Among the cases analysed, fractures of the forearm were most frequent, both in the group of women with OA of the knee joint and in the control group: 9 (20.9%) and 12 (30.2%) women, respectively. Compression fractures of the vertebrae were less common in 6 (16.2%) and 4 (9.3%) patients. The fracture of the humerus was found in 1 (12.3%) of women with OA and 4 (10.8%) of women without OA, rib fractures in 1 (2.7%) and 1 (2.3%) of women, respectively. Only 1 woman (2.7%) without OA has a femur fracture. There is no statistically significant difference in the location of fractures between the studied groups (p>0.05).

**Conclusion:** The results indicate a statistically significantly lower incidence of low-energy fractures in women with OA knee joint compared to women without OA. The groups of women with OA knee joint and without OA were comparable in the localization of fractures.

---

**NCT03495021**

**P137 MORBIDITY OF ANTICOAGULANT OR ANTIPLATELET MEDICATION IN HIP FRACTURE PATIENTS**

A. Elete1, Y. Panwar1, J. Dannaway1, J. Chen1, B. Thomas1

1Blacktown Hospital, Blacktown, Australia

**Objective:** Hip Fractures represent a prevalent geriatric cause of morbidity and mortality. The presence of multiple comorbidities requiring the use of an anticoagulant/antiplatelet medication adds complexity to management and influences outcomes. International guidelines suggest expedited surgery within 48 hours, however anticoagulants/antiplatelet medications commonly cause delay. There is limited research exploring health outcomes in this group. Therefore we aimed to determine the impact of anticoagulants/antiplatelet medications on key health outcomes and time to surgery.

**Methods:** A retrospective cohort study of hip fractures was performed at a tertiary hospital over a three-year period from January 1, 2018 to December 31, 2020. Data collected included demographics, time to surgery, length of stay, postoperative blood transfusion, acute coronary syndrome (ACS), stroke, hospital acquired infections and 120-day mortality. Patients were categorised based on the use of direct oral anticoagulants (DOAC), warfarin and antiplatelet medications. Categorical data was assessed with the chi-square test whilst continuous data were evaluated with the Kruskall-Wallis test and the independent samples median test.

**Results:** 474 patients were included of which 43.5% were on an anticoagulant or antiplatelet. These patients had increased overall complication rate (p<0.001) which included a higher ACS risk (p=0.02), postoperative blood transfusion (p=0.021), and infection rate (p=0.01). Anticoagulant/antiplatelet patients had a higher rate of time to surgery >48 h (41.7% vs. 17.2%, p=0.021) with this being highest in the DOAC group (92.7%). Time to surgery >48 h was associated with worse outcomes including a higher overall complication rate and a higher 120-day mortality (p=0.035).

**Conclusion:** There is a significantly higher incidence of complications in hip fracture patients on anticoagulant/antiplatelet medications as well as a greater time to surgery. This is significantly associated with greater morbidity and 120-day mortality. Patients on anticoagulant/antiplatelet medications are at increased risk of poor health outcomes. In a well resourced tertiary hospital outcomes may have room for improvement. Guidelines tailored to the resources of the institution are required to expedite early safe surgery in this high risk patient group.

---

**P138 QUANTITATIVE DIAGNOSIS & SCREENING OF OSTEOPOROSIS USING ABDOMINAL COMPUTED TOMOGRAPHY SCANS OBTAINED FOR OTHER INDICATIONS**

G. Kakadiya1, D. Joshi2

1Fortis Hospital, Mohali, India, 2Consultant Spine Surgeon, Head of Spine Surgery Department, Fortis Hospital, Mohali Panjab, India

**Objective:** Osteoporosis is a prevalent condition in current developing era but undiagnosed or underdiagnosed condition in especially developing countries like India. The study aim was to evaluate computed tomography (CT)-derived BMD assessment compared DXA measures for identifying osteoporosis by using CT scans performed for other clinical indications.

**Methods:** It was a cross-sectional study. A total of 1867 adults undergoing CT and DXA (n=2067 pairs) within a period over 5 years. CT-attenuation values (in Hounsfield units [HU]) of trabecular bone between the T12 and L5 vertebral levels, with an emphasis on L1 measures (study test); DXA BMD measures (reference standard). Sagittal CT images assessed for moderate-to-severe vertebral fractures.

**Results:** CT-attenuation values were significantly lower at all vertebral levels for patients with DXA-defined osteoporosis (P<0.001). An L1 CT-attenuation threshold of 160 HU or less was 90% sensitive and a threshold of 110 HU was more than 90% specific for distinguishing osteoporosis from osteopenia and normal BMD. Positive predictive values for osteoporosis were 68% or greater at L1 CT-attenuation thresholds less than 100 HU; negative predictive values were 99% at thresholds greater than 200 HU. Among 119 patients with at least 1 moderate-to-severe vertebral fracture, 62 (52.1%) had nonosteoporotic T-scores (DXA false-negative results), and most (97%) had L1 or mean T2 to L5 vertebral attenuation of 145 HU or less. Similar performance was seen at all vertebral levels. Intravenous contrast did not affect CT performance.

**Conclusion:** Abdominal CT images obtained for other reasons that include the lumbar spine can be used to identify patients with osteoporosis or normal BMD without additional radiation exposure or cost. The potential benefits and costs of using the various CT-attenuation thresholds identified were not formally assessed.

---

**P139 SYSTEMATIC REVIEW OF POST-SURGERY INTERVENTIONS FOR HIP FRACTURE**

Y. H. Kwan1, Z. Y. Lim2, W. Q. Yee2, L. L. Low2

1Duke-NUS Medical School, 2Singapore General Hospital, Singapore

**Objective:** We aim to summarise the existing literature on post-surgery interventions provided in the acute, subacute and community settings in order to improve outcomes for patients with hip fractures.

**Methods:** We performed a systematic literature review guided by the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA). We included articles that were (1) randomized controlled trials (RCTs), (2) involved post-surgery interventions that were conducted in the acute, subacute or community settings and (3) conducted among older patients above 65 years old with any type of non-pathological hip fracture that was surgically treated, and who were able to walk without assistance prior to the fracture. We excluded (1) non–English language articles, (2) abstract-only publications, (3) articles with only surgical interventions, (4) articles with interventions that commenced pre-surgery or immediately upon completion of surgery or blood transfusion, (5) animal studies. Due to the large number of RCTs identified, we only included “good quality” RCTs with Jadad score ≥3 for data extraction and synthesis.

**Results:** Our literature search has identified 109 good quality RCTs on post-surgery interventions for patients with fragility hip fractures. Among
the 109 RCTs, 63% of the identified RCTs (n=69) were related to rehabilitation or medication/nutrition supplementation, with the remaining RCTs focusing on osteoporosis management, optimization of clinical management, prevention of venous thromboembolism, fall prevention, multidisciplinary approaches, discharge support, management of post-operative anemia as well as group learning and motivational interviewing. 44 RCTs were carried out in the inpatient setting (40.4%), 28 RCTs in the outpatient setting (25.7%), and 37 RCTs in the inpatient to outpatient setting (33.9%).

**Conclusion:** The identified RCTs regarding post-surgery interventions were heterogeneous in terms of type of interventions, settings and outcome measures. Recovery post-surgery usually spans from the acute inpatient stay to subacute to post-discharge. Greater improvement of various outcomes like physical function recovery, nutritional status recovery, reduction of various postoperative complications, shortening of length of stay etc., could be better achieved through combining various interventions across various settings instead of a specific setting.

**P140**

**THE DEMOGRAPHIC, HEALTH RISK FACTORS AND PHYSICAL FITNESS CHARACTERISTICS OF A VIRTUAL OSTEOPOROSIS PERWATUSI GROUP EXERCISE PROGRAM IN INDONESIA: A DESCRIPTIVE STUDY**

A. Anggunadi1, A. Tobing1, A. A. Kurniawan1

1Perkumpulan Warga Tulang Sehat Indonesia, PERWATUSI, Jakarta, Indonesia

**Objectives:** To describe the demographic, osteoporosis risk factors and physical fitness characteristics of a virtual Perwatusi Osteoporosis group exercise program that will be analyzed to design further improvement for the program.

**Methods:** An online survey was distributed on April 2021 for 3 weeks among the virtual Perwatusi Osteoporosis group exercise’s participants to collect demographic and osteoporosis risk factors, and also asking the participants to do simple muscle endurance and flexibility test at home (Chair stand test and Apley Scratch test). The virtual group exercise was started due to COVID-19 pandemic on 2020.

**Results:** From about 300 participants joining this 3 times/week (1 h/session) group exercise, a total of 164 subjects (mean age 68.2 y.o.; 93.9% of them are female) join the survey. Demographically, though about 62% of the subjects were in Jakarta, but the exercise program has succeeded to reach participants from outside of Java Island (8% of the subjects) mostly through the Zoom meeting media, but also through YouTube and Live Instagram (18.3% and 1.8%, respectively). About the osteoporosis risk factors, 50.6% of the subjects are obese, whereas <5% of them are underweight. The most frequent osteoporosis risk factors found were early menopause (20.1%), followed by smoking (17.3%), diabetes (15.9%), gastrointestinal disorders (15.9%), genetic factor (14%) and thyroid gland disorders (7.3%). Most of the subjects had poor flexibility (42.7%). On the other hand, most of the subjects had moderate muscle endurance (50.6%).

**Conclusion:** Based on the results description, it is necessary to design strategies to: (1) invite the Perwatusi branches located in outside Java Island to actively participate and broadcast about the group exercise to society living outside Java Island; (2) increase the participants’ knowledge about the osteoporosis risk factors and its management; (3) evaluate how routine is the participation to analyze their physical fitness improvement better.