

Award Poster Session

BP01

Vitamin D status correlates with bone mineral accrual towards pubertal peak bone mass for adolescent idiopathic scoliosis: a 6-year prospective cohort study

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Introduction: Patients with adolescent idiopathic scoliosis (AIS) had systemic and persistent low bone mass which was one of the prognostic factors for curve progression. Recent literature suggested vitamin D (Vit-D) insufficiency was associated with low bone quality in adolescents. This study aimed to investigate whether AIS girls with low 25-hydroxyvitamin D (25(OH)Vit-D) level at baseline are associated with low pubertal peak bone mass.

Methods: This longitudinal study included AIS females at 12 to 14 years old and followed up for 6 years. Bone density and quality were measured by DXA and HR-pQCT. Serum total 25(OH)Vit-D was assessed. Accrual of value was calculated by tracking bone parameters from baseline to final follow-up. ANCOVA was used for analysis.

Results: 64 Subjects were recruited. Number of subjects with 25(OH)Vit-D ≤ 30 nmol/L, 31-50 nmol/L or >50 nmol/L during puberty was 12, 41 and 21 respectively. Accrual of cortical volumetric BMD (167.17 ± 47.13 mg/cm³ vs 220.31 ± 58.08 mg/cm³), cortical bone area (19.92 ± 6.33 mm² vs 28.82 ± 10.46 mm²) and cortical bone thickness (0.36 ± 0.11 mm vs 0.51 ± 0.81 mm) were significantly lower in subjects with 25(OH)Vit-D ≤ 30 nmol/L than in them without.

Discussion and Conclusion: AIS girls with 25(OH)Vit-D levels ≤ 30 nmol/L during pubertal spurt had less accrual of bone density until age of peak bone mass when compared with the ones without the condition. The results provided the link to the previously reported observation that low 25(OH)Vit-D levels were associated with increased fractures risk in paediatric population. This evidence supports Vit-D supplementation to adolescents who had low serum 25(OH)Vit-D levels.

Acknowledgement: This study was supported by RGC(14130216).

BP02**Prevalence and risk factors of task-related shoulder pain among workers who performed forehead temperature check during the Covid-19 pandemic****Shang Lee,¹ Karen Ka Man Ng,² Michael Tim Yun Ong,¹ Annie Hio Teng Leong,¹ Patrick Shu Hang Yung¹**¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*²*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Body temperature screening had become a routine under the COVID-19 pandemic. The Manual, forehead temperature measurement technique was commonly adopted considering its convenience and cost-effectiveness. However, its repetitive arm shoulder motion could possibly induce an occupational threat. This study is aimed to identify the risk factors associated with shoulder pathology among workers who performed the task frequently. The prevalence of task-related shoulder pain (SP) and the profile of the workers were explored.

Methods: A cross-sectional study was done using convenience sampling method. Subjects from varied sectors who has been performing the task frequently were recruited. 116 valid responses were collected using online questionnaire. Shoulder pain and disability index (SPADI) was adopted in the questionnaire in assessing pain and functioning level.

Results: Task-related shoulder pain was seen in 62.9% of the subjects, with the highest prevalence reported from healthcare settings. Significant associations were established between SPADI score and variables (i.e., age, height, number of daily temperature checks, arm raising frequency, psychological conditions and self-reported comfort level) in the SP group. Significant relationships were noted between the perceived relevance of the task to SP, SPADI score, and psychological conditions. Logistic regression reported four predictor variables (arm raising frequency, duty hours, number of daily temperature checks and age) with significant impact on the odds for SP.

Discussion and Conclusion: The findings revealed the high prevalence of task-related SP. Significant risk factors were discovered. The results could aid the derivation of injury preventive measures to enhance occupational health.

BP03**The novel Proximal Femur Maturity Index for patients with idiopathic scoliosis****Prudence Wing Hang Cheung,¹ Federico Canavese,² Chris Yin Wei Chan,³ Janus Siu Him Wong,¹ Hideki Shigematsu,⁴ Keith Dip Kei Luk,¹ Jason Pui Yin Cheung¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Pediatric Orthopedic Surgery Department, Lille University Hospital, Loos, France*³*Department of Orthopaedic Surgery, University of Malaya, Kuala Lumpur, Malaysia*⁴*Department of Orthopaedic Surgery, Nara Medical University, Nara, Japan*

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BP04

Effect of magnesium intramedullary nail on fracture healing of type ii diabetic mice

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Type 2 diabetes (T2D) patients have lower bone quality, increased fracture risk, impaired fracture repair potential, and are frequently associated with magnesium (Mg) deficits. Mg ions improve insulin sensitivity and insulin secretion in T2D patients. Mg intramedullary nail (Mg-IMN) induced new bone formation after implantation. We hypothesised that Mg-IMN would enhance fracture healing in T2D mice. Closed femoral fracture surgery was performed on thirty-two diabetic mice. These mice were divided into four groups: normal control group with stainless steel pin (control group), normal control group with Mg pin (Mg group), diabetic group with stainless steel pin (Db group), and diabetic group with Mg pin (Db+Mg group). Fracture femurs were harvested at week 4 after fracture. The healing quality of fracture calluses was assessed by radiographs, microCT scanings, four-point bending mechanical testing, and histological analysis. Radiographs showed there were larger calluses in the Mg group and Db+Mg group. Failure load, stiffness, and energy-to-failure of the callus were higher in both the Mg group and Db+Mg. Microarchitectural analysis by microCT scanning showed that there was significantly higher bone volume (BV), the ratio of bone volume to tissue volume (BV/TV), TV density in the fracture callus of the Mg groups. Histologically, more bone tissue and increased expression of RUNX2, an osteogenic marker, were observed in the Mg groups. These results suggested that Mg implants enhanced fracture healing via enhancing bone formation and improved mechanical properties. This study is a foundation for further development of Mg-based implants to enhance fracture healing in T2D patients.

BP05

The use of alternate in-brace and out-of-brace radiographs to avoid masking of curve progression in adolescent idiopathic scoliosis follow-up

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