

## Award Poster Session

P01

### Prevalence of Sarcopenia in Hong Kong Chinese Geriatric Hip Fracture Patient and Its Correlation

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**Introduction:** Sarcopenia and osteoporosis are age-related declines in the quantity of muscle and bone, respectively. Both contribute in disability, fall, and hip fracture in elderly.

**Methods:** All geriatric primary hip fracture patients admitted to Kowloon West Cluster Orthopaedic Rehabilitation Centre. Hand grip strength and body composition measurement using dual-energy X-ray absorptiometry were performed.

**Results:** A total of 356 patients were included with a mean age of 81.7 years. By stratifying in males and females, their respective mean hand grip strength were 20.8 kg and 13.7 kg, the mean Relative Skeletal Muscle Mass Index (RASM) being 5.79 kg/m<sup>2</sup> and 4.90 kg/m<sup>2</sup>, and the hip bone mineral density (BMD) being 0.699 g/cm<sup>2</sup> and 0.992 g/cm<sup>2</sup>. The prevalence of sarcopenia based on RASM according to the Asian Working Group for Sarcopenia definition were 89.5% in male and 76% in female. The prevalence of femoral neck osteoporosis based on hip T-score of <-2.5 were 43.4% in males and 63.6% in females. The RASM was positively correlated with hand grip strength, body weight, femur T-score, hip BMD, body mass index, and total fat mass in both males and females. All were statistically significant.

**Conclusion:** The prevalence of sarcopenia was very high in geriatric hip fracture patients, and much higher than community-dwelling elderly. Apart from the need to prescribe osteoporosis medicine to these patients, sarcopenia screening and treatment should be addressed, which is essential to reduce subsequent fall, subsequent fracture, and the fracture-related complications and economic burden to Hong Kong.

P02

### The Effect of High-intensity Circuit Training on Youth Soccer Players: An Implication on Injury Prevention and Performance Enhancement

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**Introduction:** Previous studies found that neuromuscular training programme was effective to reduce lower limb injuries in youth soccer players. However, there were limited studies about its effect on fitness performance. Using high-intensity circuit training (HICT) format to implement neuromuscular training on youth players may be the solution to coaches to achieve fitness enhancement and reduction of injury risk.

**Materials and Methods:** A total of 56 male soccer players were recruited from local secondary school football teams. Subjects were randomly assigned into 2 groups – HICT group (HG) and controls (CG). The HG underwent a 7-week intervention, with HICT programme twice a week on top of regular training. All subjects had done a total of 7 tests to examine the anthropometry condition, fitness performance, i.e. lower limb explosive power, sprint performance, agility performance, aerobic endurance, as well as injury risk factors, i.e. core strength and dynamic balance before and after intervention period.

**Results:** The HG significantly reduced their percentage body fat, agility test performance, and improved core strength compared with CG. No significant improvement was found in other test items.

**Discussion and Conclusion:** The HICT programme adopting neuromuscular training exercise can bring enhancement in soccer agility and reduce percentage body fat. It also helps to reduce injury risks by improving core muscle strength. It is implied that HICT training programme, characterised by utilising little space and time, is a potential injury prevention and performance enhancement programme. Further prospective cohort study on the protective effect of HICT training in youth soccer players is warranted.

**P03**

**Effect of Short-term High-intensity Interval Training on Land Versus in the Pool in Elite Youth Swimmers**

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**Introduction:** Conventional swimming training involves heavy loading on shoulder which may prone to overuse injury. Several cross-training programmes have demonstrated a transference effect which is able to build up fitness with reduction of the overall work at particular joint. The present study was conducted to investigate whether high-intensity interval training (HIIT) on land and in the pool would improve swimming sprint performance in the 50-metre freestyle.

**Materials and Methods:** A randomised longitudinal study of 12 competitive swimmers were arranged into 3 groups and each performed different training programmes for 4 weeks, each session lasting 20 minutes long, 3 times a week. Swimmers' profile included mixed gender, 16-to-22-years-old with regular training, and at sub-elite level. The control group (C) performed steady-state swimming, the second group performed HIIT in the water (HW), and the third group performed HIIT on land (HL). Baseline tests included hand grip strength, 50-metre sprint performance, and overhead medicine ball throw. The HL and HW groups underwent an HIIT programme, while the C group had their training regimen extending for the same amount of time.

**Results:** Post-test showed that the hand grip strength test had a substantial increase in strength variables for the HL group ( $p=0.002$ ) to the other groups, while the 50-metre swim ( $p=0.273$ ) and the overhead medicine ball throw ( $p=0.496$ ) did not yield any statistically significant data.

**Conclusion:** The short HIIT on land increased hand grip strength in swimmers compared with conventional training.

**P04**

**Adolescent Idiopathic Scoliosis-specific Hand Bone Age Atlas — A Cross-sectional Study of Bone Maturity Level from 986 X-ray Films Using a New Simplified Thumb Staging System**

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**Introduction:** Greulich & Pyle (GP) Atlas established in 1950 was an invaluable bone age tool for maturity assessment using hand and wrist radiographs in idiopathic scoliosis patients, leading to make clinical decisions. However, information are validated with normal British subjects which may not be applicable for Chinese adolescents. We aimed at establishing a new bone age maturity model for Chinese idiopathic scoliosis patients using a novel staging method.

**Materials and Methods:** A newly developed simplified thumb staging system, Thumb Ossification Composite Index (TOCI) classifying maturity into 8 stages, was introduced in this study. Inclusion criteria were as follows: female, diagnosis of idiopathic scoliosis, aged 10 to 16 years, and good past health. The TOCI staging was carried out from hand and wrist radiographs which were taken at their first visit. Results from TOCI staging were compared against age-groups and GP Atlas.

**Results:** A total of 14,600 visits from 986 X-ray films from girls with adolescent idiopathic scoliosis (AIS) between 2007 and 2013 were reviewed, and grouped by age-groups of 6-month intervals from 10 to 16 years. Median TOCI stages by age-groups corresponding to GP Atlas (i.e. [TOCI] - [age-group] - [GP Atlas]) were as follows: [4]-[10-11]-[11], [5]-[11.1-12]-[12], [6]-[12.1-12.5]-[13], [7]-[12.6-13.5]-[14], [8 to 8.3]-[13.6-16]-[15 to 17].

**Discussion and Conclusion:** The TOCI staging effectively simplifies the bone maturation classification over the traditional method, and offers specific information on AIS-specific bone age (in 6-month intervals) which traditional method could not provide.

P05

**80% Skeletal Maturity Information in Hand and Wrist Radiographs are Reflected in Thumb Region. Conclusions Drawn from an Analysis of 10,773 Epiphysis of Small Hand Bones****LH Hung,<sup>1</sup> BL Shi,<sup>2</sup> FWP Yu,<sup>1</sup> KY Cheuk,<sup>1</sup> V Hung,<sup>1</sup> JCY Cheng<sup>1</sup>**<sup>1</sup>*Department of Orthopaedics and Traumatology, Prince of Wales Hospital, Hong Kong*<sup>2</sup>*Department of Orthopaedics and Traumatology, The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing, China*

**Introduction:** Skeletal maturity and bone age determination traditionally use either Greulich & Pyle Atlas or Tanner-Whitehouse III (TWIII) method, which focuses on morphological change of epiphysis (widening, covered, or capping status) over phalangeal, metacarpal, and wrist bones. Their sequences of ossification and fusion timing among each other have never been described precisely. This study aimed to investigate the relationship of ossification / fusion timing in thumb epiphysis and ulnar 4 digits epiphysis.

**Methods:** A total of 600 hand and wrist radiographs from 127 females with idiopathic scoliosis at their peripubertal period were reviewed and scored using TWIII method over all epiphyses except carpal bones. Probability of TWIII stages among thumb and remaining digits were computed.

**Results:** A total of 10,773 epiphyses were scored which showed that their ossification and fusion sequence followed a regular predictable pattern. The probability of the same TWIII stage (F, G, and I) in both proximal phalange epiphysis of thumb and epiphysis from remaining 4 ulnar digits were 80%, 81.5% and 96.5%, respectively. Thumb distal phalange (DP) epiphysis TWIII stage I correlated with 70% chance that all other DP digits' epiphyses were at stage I as well. Overall, there was 82% chance that TWIII stage in thumb epiphysis was the same as TWIII stage in all remaining ulnar 4 digits.

**Conclusion:** Morphological stage in thumb epiphysis represented 80% chance that same stage occurred in remaining 4 ulnar digits. It forms a good rationale that skeletal maturity in thumb is representative of the hand during pubertal period.