HIP AND KNEE ORIGINS AND ADVANCES

THE HONG KONG ORTHOPAEDIC ASSOCIATION

43RD ANNUAL CONGRESS

香港骨科醫學會

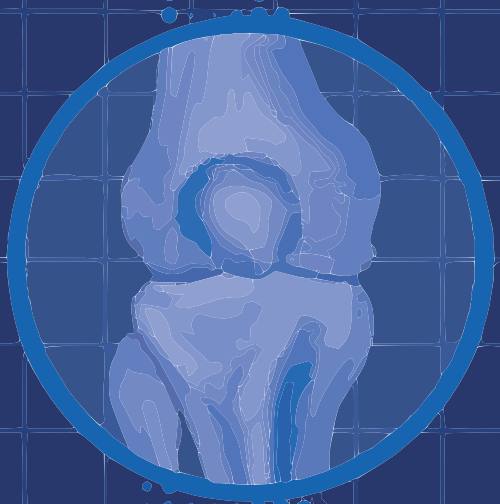
第四十三屆週年大會

HONG KONG CONVENTION AND EXHIBITION CENTRE

香港會議展覽中心

4 – 5 November 2023

二零二三年十一月四日至五日



Programme & Abstracts

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Welcome Message from the President of The Hong Kong Orthopaedic Association

Dear guests, colleagues and friends,

It is my great pleasure to welcome you to the 43rd Annual Congress of Hong Kong Orthopaedic Association (HKOA). This year we are able have overseas speakers, guests and ambassadors join in person since the outbreak of the COVID-19 pandemic. We also finally say goodbye to face masks and social distancing.

The pandemic created many challenges to, and perhaps permanently changed some of our clinical and academic practices. Our previous council members and organizing committees strived for keeping our annual congress face-to-face, which was a remarkable achievement. Now all the travel restrictions are lifted, we are so eager to share and learn from each other's experience with local and overseas experts. To achieve this goal, we have assembled a roster of authoritative speakers who represent the best and brightest in their fields. They have committed to elevating our knowledge to help us reach our full potential. We are grateful to have them with us for the meeting.

The theme of this year's meeting is 'Hip and Knee, Origins and Advances'. The academic programme comprehensively covers various subspecialties related to the two biggest joints of human body. I would like to thank the entire congress organizing committee led by Dr. Steve Cheung and Dr. Michael Ong for their tireless effort and dedication.

HKOA continues to strive to provide a unique, effective platform for knowledge exchange and social networking among local, regional and international professionals working in the field of orthopaedic surgery. If you or your colleague are not a HKOA member yet, please consider joining this dynamic society, and join us for future HKOA annual congresses.

Once again, welcome to the 43rd Annual Congress of HKOA. I appreciate your participation and hope you will find this congress stimulating and rewarding.

Best regards,
Dr Chun Hoi YAN
President, Hong Kong Orthopaedic Association

Welcome Message from the Co-Chairmen of the Organising Committee

Dear Fellows, members and friends,

Welcome to the 43rd Annual Congress of Hong Kong Orthopaedic Association! It is our great honour to serve as the co-chairman for the HKOA congress this year.

Among the myriad of reasons why COVID has been difficult, the biggest may be the epidemic of *loneliness*. People have become isolated. Although virtual meetings have maintained a connection, it has been limiting and cannot replace face-to-face meetings for building bridges with international friends. Since the lifting of various travelling restriction, many have started their 'revenging' travelling. In the Academic and the Professional world, things are no different. This year, as the first face-to-face HKOA annual congress after COVID pandemic, we aim to provide a successful congress with an exciting program, to encourage both local and international experts for knowledge exchange and re-establishing collaborations. We would also like to regain the vitality of members and guest of the HKOA by a series of social events, such as the welcome dinner, which has been suspended in previous years due to local social distancing requirement.

The theme of this year is "Hip and Knee Origins and Advances". Hip and Knee Surgeries, despite their long history in orthopaedic surgery, are constantly evolving. Rapid developments in robotic surgery in arthroplasty and minimal invasive surgery in sports surgery have allowed procedures to be done with high accuracy and minimal complications. Furthermore, advances in trauma surgery and spine surgery has led to significant improvement in the management of hip-knee trauma and patient with spino-pelvic problem respectively. These topics and discussions will be well illustrated by this year's 39 renowned overseas and local surgeons who lined up to share their expertise with our audience in the Plenary and Concurrent Sessions. In addition, there are over 300 papers in the Free Paper and Poster sessions. We are confident that this meeting will be beneficial to orthopaedic surgeons from all ranges of years of practice and experience.

We would like to express our thanks to the Organising Committee of the Annual Congress for their hard work, to the Council of the Hong Kong Orthopaedic Association for their tremendous support, and to all the international and local speakers for their great contributions. We would also like to thank the sponsors for their support. Finally, we especially thank all of you, the honourable guests, friends and colleagues, for your active participation in and support for this year's Annual Congress.

We hope you find it a fruitful and enjoyable congress.

Dr Steve MH CHEUNG & Dr Michael TY ONG
Co-Chairmen
HKOA 43rd Annual Congress

Organising Committee

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Dr Steve Man Hong CHEUNG
Dr Michael Tim Yun ONG

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Dr Colin Shing Yat YUNG

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Dr Kenneth Cheuk Kee NG
Dr Ka Ki TAM
Dr Benny Yu Nang TSE
Professor Kevin YEUNG
Dr Yip Kan YEUNG
Dr Norman Wai Chuen YIP
Dr Yu Bun YUNG

Overseas and Local Faculties

OVERSEAS SPEAKERS – PLENARY SESSION AND CONCURRENT SESSIONS

Professor Davy CHENG
Founding Dean
School of Medicine
The Chinese University of Hong Kong
Shenzhen, China

Dr Dennis Hwee Weng HEY
Senior Consultant
Department of Orthopaedic Surgery
National University Hospital
Singapore

Dr Ying Hui HUA
Chief Surgeon
Department of Sports Medicine
Huashan Hospital, Fudan University
Shanghai, China

Dr Eivind INDERHAUG
Department of Clinical Medicine
University of Bergen
Bergen, Norway

Professor Young Min KWON
Department of Orthopaedic Surgery
Harvard Medical School
Harvard University, Boston, USA

Dr Bo LIU
Department of Hand Surgery
Beijing Ji Shui Tan Hospital
Beijing, China

Dr David OJI
Clinical Assistant Professor
Division of Foot and Ankle Surgery
Stanford University School of Medicine California
USA

Dr David PARKER
Director, Sydney Orthopaedic Research Institute
Clinical Associate Professor, University of Sydney
Australia

Professor Roman PFEIFER
Department of Trauma Surgery
University Hospital Zürich
Zurich

Dr Vudhipong SUDHASANEYA
Senior Advisory Board
Thai Orthopedic Society for Sports Medicine
Bangkok Academy of Sports and Exercise Medicine
Bangkok Hospital

Professor Eleftherios TSIRIDIS
PGH Hospital
Aristotle University Medical School
Thessaloniki, Hellas

Professor Fu Chan WEI
Department of Plastic and Reconstructive Surgery
Chang Gung Memorial Hospital
Taipei, Taiwan

Dr Zhen Zhong ZHU
Associate Chief Physician
Shanghai Sixth People's Hospital
Shanghai, China

LOCAL SPEAKERS – PLENARY SESSIONS AND CONCURRENT SESSIONS

Dr Lewis Ping Keung CHAN
Dr Ping Tak CHAN
Dr William Kin Hung CHENG
Dr Kenneth Man Chee CHEUNG
Dr Jason Pui Yin CHEUNG
Professor Peter Kwong Yuen CHIU
Dr Calvin Wang Kei CHIU
Dr Christian FANG
Dr Sin Tak FONG
Dr Pak Cheong HO
Dr Kenneth Wai Yip HO
Dr Wing Man KO
Dr Yvette LAM
Dr Jacky LAU
Dr Sheung Wai LAW
Dr Anderson LEUNG
Dr Cho Yau LO
Dr Ka Lok MAK
Ms Priscilla POON
Dr Timothy Yat Cheong SO
Dr Michael Siu Hei TSE
Dr Ronald Man Yeung WONG
Dr Raymond Nang Man WONG
Professor Yat Wa WONG
Dr Raymond Ching Hin YAU
Professor Patrick Shu Hang YUNG

OVERSEAS SPEAKERS – LUNCH SYMPOSIUM

Dr Joon Kiong LEE
Deputy Medical Director
Consultant Orthopedic Surgeon and Head
Department of Orthopedic Surgery
Beacon Hospital, Petaling Jaya, Malaysia

A/Professor Kevin LIM
Chairman, Division of Surgery and Senior Consultant
Department of Orthopaedic Surgery
KK Women's and Children's Hospital
Singapore

Professor Xinzhan MAO
Head of the Orthopaedic Department
The Second Xiangya Hospital
Xiangya Medical College
Xiangya, China

LOCAL SPEAKERS – LUNCH SYMPOSIUM

Dr Steve Man Hong CHEUNG
Department of Orthopaedics and Traumatology
The University of Hong Kong
Hong Kong

Dr Michael Tim Yun ONG
Clinical Assistant Professor
Department of Orthopaedics and Traumatology
The Chinese University of Hong Kong
Hong Kong

PRESIDENTS, REPRESENTATIVES AND AMBASSADORS OF SISTER ASSOCIATIONS

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Dr Priyamurti HEKA, Indonesian Orthopaedic Association
Dr Kein Boon POON, Singapore Orthopaedic Association
Dr Thipachart PUNYARATABANDHU, The Royal College of Orthopaedic Surgeons of Thailand
Dr Daisuke SAKAI, Japanese Orthopaedic Association
Dr Gandhi Nathan SOLAYAR, Malaysian Orthopaedic Association

AMBASSADORS
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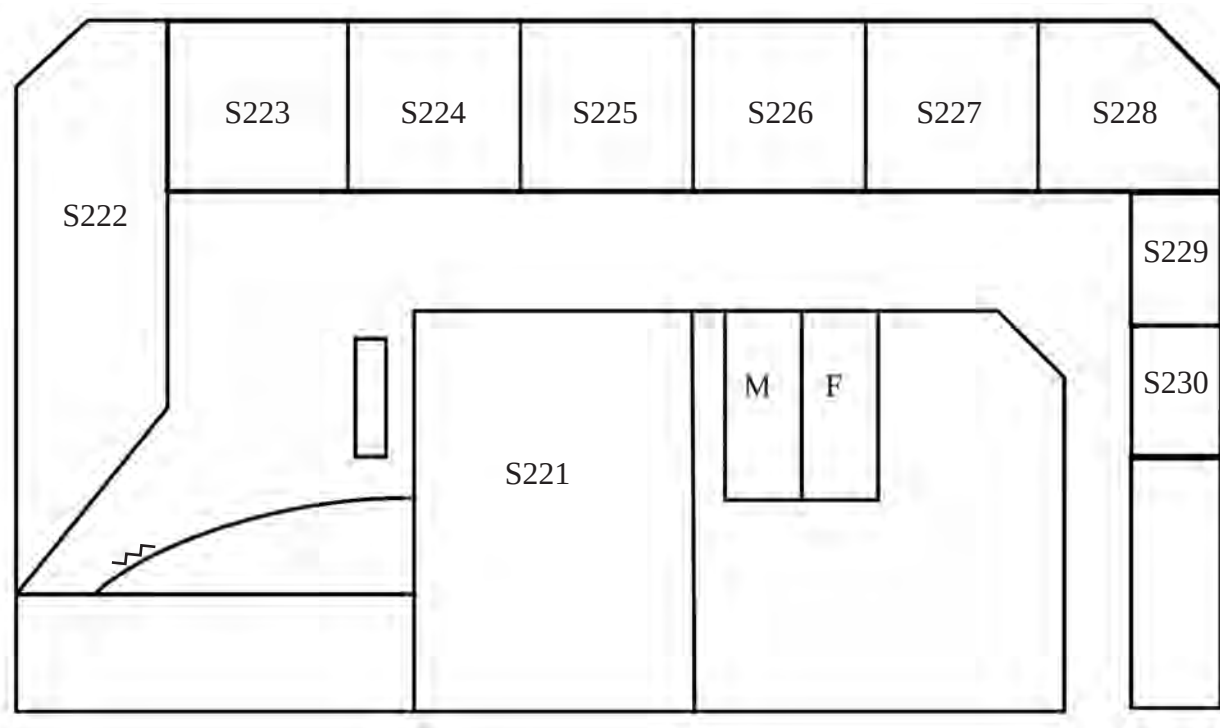
Dr Tanay PRABHOO, Indian Orthopaedic Association
Dr Nattaphat SRISUWAT, The Royal College of Orthopaedic Surgeons of Thailand
Dr Koji TAMAI, Japanese Orthopaedic Association
Dr Chin Zheng YAO, Malaysian Orthopaedic Association
Dr Chidchanok SAKDAPANICHKUL, Thai Orthopedic Society for Sports Medicine
Dr Vorapop TRIATTANAPIKUL, Thai Orthopedic Society for Sports Medicine

Floor Plan

The Hong Kong Convention and Exhibition Centre



Registration: S229

Slide Preview: S230

Plenary Sessions: S221

Concurrent Sessions: S225, S226, S227, S228

Free Paper Sessions: S221, S225, S226, S227, S228

Opening Ceremony: S221

Award Paper Session: S221

E-poster Station:

Award Poster Station:

Lunch Symposium: 225, 227, 228

Programme at a Glance

Saturday, 4 November 2023

07:30 – 10:00	**Free Paper Session I: Hand and Microsurgery** *(08:00 – 10:00)* **Free Paper Session II: Spine** **Free Paper Session III: Basic Science** **Free Paper Session IV: Sports Medicine** **Free Paper Session V: Adult Joint Reconstruction I**	Room S221 Room S225 Room S226 Room S227 Room S228
10:00 – 10:30	**Coffee Break / Exhibition**	
10:30 – 12:10	**Plenary Session I**	Room S221
12:10 – 12:35	**Opening Ceremony**	Room S221
12:35 – 13:35	**Lunch / Lunch Symposium**	
13:35 – 15:45	**Award Paper Session**	Room S221
15:45 – 16:15	Room S221 Foyer **Award Poster Session**	**Coffee Break / Exhibition**
16:15 – 17:45	Room S221 **Plenary Session II**	Room S227 **Concurrent Session I: Hand** Room S228 **Concurrent Session II: Adult Joint Reconstruction**
17:45 – 18:15	**Annual General Meeting of The Hong Kong Orthopaedic Association**	Room S221
18:30 – 22:00	**Congress Banquet**	Chancellor Room, 4/F, Old Wing

Sunday, 5 November 2023

08:00 – 10:00	**Free Paper Session VI: Foot and Ankle** **Free Paper Session VII: Trauma** *(07:30 – 10:00)* **Free Paper Session VIII: Rehabilitation, Tumour, Others** **Free Paper Session IX: Paediatric Orthopaedics and AGM of Paediatric Orthopaedic Chapter** **Free Paper Session X: Adult Joint Reconstruction II** *(07:30 – 10:00)*	Room S221 Room S225 Room S226 Room S227 Room S228
10:00 – 10:30	**Coffee Break / Exhibition**	
10:30 – 12:00	Room S221 **Plenary Session III**	Room S225 **Concurrent Session III: Trauma** Room S226 **Concurrent Session IV: Orthopaedic Rehabilitation** Room S227 **Concurrent Session V: Sports Medicine** Room S228 **Concurrent Session VI: Foot and Ankle**
12:00 – 13:00	**Lunch / Lunch Symposia**	
13:00 – 14:30	Room S221 **Plenary Session IV**	Room S227 **Concurrent Session VII: Tumour** Room S228 **Concurrent Session Spine VIII: Spine**
14:30 – 15:00	**Coffee Break / Exhibition**	
15:00 – 16:30	**Plenary Session V**	Room S221
16:30 – 16:45	**Closing Remarks**	Room S221

Programme in Detail

Saturday, 4 November 2023

Time	Room	Topic (Moderators)	Speakers / Presenters
08:00 – 10:00	**S221**	**Free Paper Session I: Hand and Microsurgery** (Michelle Lee, Edmund LK Yau)	
1.1		Complications and unplanned reoperation after thumb metacarpophalangeal arthrodesis	Oscar Shen
1.2		Outcomes in patients aged 60 years and over after treatment for distal radius fractures: a systematic review and network meta-analysis	Oscar Shen
1.3		The effect of primary treatment of distal radius fractures on the scapholunate distance in late middle-aged patients with distal radius fractures and concurrent scapholunate diastasis	Pui Ying Lam
1.4		Managing distal radius fractures in septuagenarians and octogenarians: Conservative or Surgical treatment?	Nga Ping Tang
1.5		Three-dimensional (3-D) accuracy evaluation of computer virtual planning and 3-D printed patient specific instruments in corrective osteotomies for the distal radius	Michelle Kar Lam Li
1.6		Clinical outcome of using volar plating in proximal phalangeal base fracture: a preliminary report	Cheryl Cheuk Wing Kong
1.7		Comparing the surgical outcomes of endoscopic carpal tunnel release (ECTR) and open carpal tunnel release (OCTR) in elderly population	Steven Hon Yeung Tsui
1.8		Use of WALANT in spastic hand release surgeries	Anubrat Kumar
1.9		VOLy classification for type 6 extra thumb	Karen Ka Man Ng
1.10		A new sub-type analysis of Wassel type IV thumb polydactyly: a comprehensive review of anatomical features, surgical management, and outcomes	Ka Wai Cheng

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S225**	**Free Paper Session II: Spine** (Michael SH Tse, Cho Yau Lo)	
2.1		Development of machine learning algorithms for identifying spine patients with limited health literacy	Oscar Shen
2.2		Effect of intraoperative hinge fracture on post operative cervical spine alignment in double door cervical laminoplasty	Wai Wang Chau
2.3		Increased lengthening frequency does not adversely affect the EOSQ scores in magnetically controlled growing rod surgeries in 134 subjects followed to final fusion	Zhi Wen Sheryl Saw
2.4		Can anterior vertebral body tethering provide superior range of motion outcomes compared to posterior spinal fusion in adolescent idiopathic scoliosis? A systematic review	Darren Li Liang Wong
2.6		Assessing the psycho-social effects of early screening for adolescent idiopathic scoliosis in teenagers and caregivers in Hong Kong	Anjaly Saseendran
2.7		A pooled analysis on early definitive fusion technique versus traditional growing rods implants in treating early-onset dystrophic scoliosis in neurofibromatosis type 1	Tin Chi Chung
2.9		Towards reducing repeated hospital attendance and admissions for patients with low back pain using a machine learning approach	Chung Yin Tai
2.10		Outcome of patients with vertebral fragility fractures: a 7 year-experience of a Fracture Liaison Service (FLS) in Hong Kong, China	Bernard Wai Tat Yung
2.11		Single door versus double door laminoplasty: retrospective study of clinical and radiological outcome	Yuen Ting Leung
2.12		Spontaneous correction of proximal thoracic curve after selective thoracic fusion in Lenke 1 curve	Chun Man Ma
2.15		Surgical treatment of thoracic myelopathy due to ossification of yellow ligament: retrospective review of clinical results and surgical approaches.	Suk Ying Mak
2.16		Influence of curve types on spinal flexibility assessed by ultrasound scanning in patients with adolescent idiopathic scoliosis	Wing Ki Cheung
2.17		Novel technique of bilateral diskectomy and intra-discal bone graft impaction (BDIBG)—enhancing fusion rate and preventing subsidence in transforaminal lumbar interbody fusion (TLIF) with expandable lordotic cage	Jimmy Kit Yan Lau
2.18		Correlation between knee osteoarthritis and lumbar spondylosis	Xin Jiong Ong
2.19		Risk factors for proximal junctional fracture following fusion surgery for osteoporotic vertebral collapse with delayed neurological deficits: a retrospective cohort study of 403 patients *(Japanese Orthopaedic Association Ambassador Paper)*	Koji Tamai
2.20		Upper instrumented vertebra tilt angle in Lenke 1 and 2 adolescent idiopathic scoliosis patients with post-operative medial shoulder balance *(Malaysian Orthopaedic Association Ambassador Paper)*	Chin Zheng Yao

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S226**	**Free Paper Session III: Basic Science** (Louis WH Cheung, Grace Teng Zhang)	
3.2		Anti-RANKL treatment suppresses macrophage infiltration and attenuates mitochondria deterioration during sarcopenia	Can Cui
3.3		Infrapatellar fat pad adipose-derived stem cells co-cultured with articular chondrocytes from osteoarthritis patients exhibit increased chondrogenic gene expression	Christopher Chi Hang Mak
3.4		Prospective randomized controlled study on the effects of valgus knee brace for knee osteoarthritis in Chinese patients	Koon Yin Ng
3.5		An interpretable knee replacement risk assessment system for osteoarthritis patients	Toby Ho Hin Li
3.6		A hydrogel drug delivery system to treat sarcopenia	Tao Huang
3.7		Overexpression of FAPB4 in clinical samples and animal model of tendinopathy is associated with excessive tendon inflammation	Zebin Ma
3.8		Engineering stem cells to produce exosomes with enhanced bone regeneration effects: an alternative strategy for gene therapy	Tak Man Wong
3.9		Adipose-derived stromal cells (ADSCs) and their secretome reversed excessive inflammation in tendon-derived stem/progenitors cells (TDSCs) isolated from tendinopathy patients	Run Huang
3.10		Targeting subchondral bone osteocytes by magnet guided anti-H19 delivery for osteoarthritis treatment: a preclinical study	Ashley Ying-Ying Wong
3.11		Low-magnitude high-frequency vibration attenuates sarcopenia and modulates mitochondria dynamically	Marco Cho Sang Chui
3.12		The application of direct evolution for gene therapy vector development and screening	Wenxue Tong
3.13		Decellularized tendon-derived stem/progenitor cell sheet augmented graft healing after anterior cruciate ligament reconstruction via enhancing osteogenesis	Cheuk-Hin Kot
3.14		From clinical to benchside: Probiotics Lactobacillus rhamnosus and Faecalibacterium prausnitzii treats sarcopenia in aged mice through regulation of mitochondria function	Ronald Man Yeung Wong
3.15		Exploring the molecular mechanism of type XV osteogenesis imperfecta caused by WNT1 mutation	Zhijia Tan
3.16		Lower CYP27B1 expression in osteocytes increases the risk of scoliosis curve progression in a mouse model—a new insight to improve bone quality in Adolescent Idiopathic Scoliosis	Adam Yiu-Chung Lau
3.17		Mg-containing hybrid interference screw promotes the healing of ACL reconstruction	Yuantao Zhang
3.18		Deep-learning radiomics for survival analysis on anticipated knee arthroplasty using posteroanterior view X-rays	Tianshu Jiang
3.19		Harnessing DenseNet-based deep learning for robust and precise osteoporosis classification: an evaluation using spine, hip, and Wrist X-ray images	Elvis Chun-Sing Chui
3.21		A preclinical study exploring the link between vitamin D and muscle function in aging muscle	Jessica Hiu-tung Lo
3.22		Temporal changes of regulatory T cells in synovial tissue following knee injury in a mouse model of posttraumatic osteoarthritis	Xueyou Zhang
3.23		Inhibition of piezo1 improves tendon healing	Lei Lei
3.24		Bilayer biomimetic membranes enhance tendon-bone healing	Florence Ou-Suet Pang
3.25		Effect of β-hydroxy-β-methylbutyrate and vibration on age-related neuromuscular junction degeneration in sarcopenia mice model	Qianjin Wang
3.26		The relationship between bile acids, vitamin D and muscle function in patients with knee OA	James Hong Yin Woo

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S227**	**Free Paper Session IV: Sports Medicine** (Keith Wan, Ramon L Yiu)	
4.1		A rare case of large Morel-Lavallee lesion of the knee successfully managed conservatively: a case report	Kam To Siu
4.2		In vivo effect of single intra-articular injection of tranexamic acid on articular cartilage and meniscus in a rat model	Ming Wang
4.3		Is there a difference in clinical outcomes at 5-year follow-up between patients suffering from re-tear of rotator cuff repair and those with intact repair on post-operation MRI?	Wai Pan Yau
4.4		Outcome of arthroscopic rotator cuff repair in massive rotator cuff tear with pseudoparalysis	Brian Siu
4.5		Retrospective comparative study of single-row versus double-row fixation in arthroscopic rotator cuff repair	Tsz Wan Hung
4.6		Arthroscopic suture button fixation for acute acromioclavicular dislocation	George Ying Kan Law
4.7		Large Hill-Sachs lesion. Finally, a better solution	Kevin KH Wong
4.8		The effect of whole body vibration training on neuromuscular performance and knee biomechanics during landing for ACL injury prevention	Xin He
4.9		Clinical outcome of arthroscopic lateral release for lateral patella compression syndrome	Ka Mun Lam
4.10		Identifiable factors preventing patellofemoral joint osteoarthritis after anterior cruciate ligament reconstruction	Ashley Ying-Ying Wong
4.11		The role of 25OHD and 1,25OHD status in determining quadriceps strength and neuromuscular function in patients after anterior cruciate ligament reconstruction	Sunnie Tin-Ching Lam
4.12		Single-bundle anterior cruciate ligament reconstruction with and without concomitant anterolateral ligament reconstruction	Wai Pan Yau
4.13		Labral tear and paralabral cyst of shoulder—a case series	Tak Man Wong
4.14		Is the outcome affected when anterior cruciate ligament reconstruction (ACLR) is done by a supervised trainee?	Florence Ou Suet Pang
4.15		Prevalence of asymptomatic rotator cuff arthropathy on chest X-rays in elderly patients: a cross-sectional study	Michael Sui Hou Cheng
4.16		Risk factors for graft rerupture after revision anterior cruciate ligament reconstruction	Jonathan Patrick Ng
4.18		Epidemiological study on springboard or platform diving related injuries in adult amateur diving athletes	Emily Ka Yan Yip
4.19		A novel quantitative assessment of bone tendon junction healing in patients after ACL Reconstruction by high-resolution peripheral computer tomography: the development of an image-based deep-learning algorithm	Jeremy Ho Pak Liu

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S228**	**Free Paper Session V: Adult Joint Reconstruction I** (Raymond Lai, Jimmy Chan)	
5.1		Development and comparative study of an image recognition-based augmented reality navigation system for high tibial osteotomy: a pilot study on bone model trials	Ericsson Chun-Hai Fung
5.2		Outcomes between staged bilateral total knee arthroplasty and simultaneous bilateral total knee arthroplasty: a retrospective cohort study between 2001 and 2022	Omar Wai-Kiu Tsui
5.3		Can proprioceptive knee brace improve functional outcome following total knee arthroplasty?	Thomas Chun Hei Lo
5.4		The influence of alignment and tibial cementation on aseptic loosening in total knee arthroplasty: a long-term analysis of 351 knees with a mean follow-up of 17.5 years	Michelle Hilda Luk
5.5		High variability in total knee arthroplasty cementing techniques and practices	Michelle Hilda Luk
5.6		Bone bed preparation techniques will influence the cementation of total knee replacement: a cadaveric study	Jonathan Patrick Ng
5.7		Cementless versus cemented fixation in total knee arthroplasty: analysis of regional tibial bone density and clinical outcome	Wai Yip Wong
5.9		Preoperative Imaging may not improve the outcome of robotic total knee replacement (TKR): Accuracy and Early outcome of a novel Image-free robotic assisted system for TKR	Man Hong Cheung
5.10		Surgical accuracy of image-free versus image-based robotic-assisted total knee arthroplasty	Dennis King Hang Yee
5.11		Mendelian randomization studies of lifestyle-related risk factors for osteoarthritis: a PRISMA review and meta-analysis	Christopher Chi Hang Mak
5.12		Comparing clinical results of cruciate retaining total knee replacement by MAKO, Verasense, and manual instrumentation	Tsz-Lung Choi
5.13		Promising short-term outcomes of free-hand burring technique to implant second-generation metaphyseal cone in Asian knees—a case series	Thomas Ka Chun Leung
5.14		Comparison of the kinematics between cruciate retaining (CR) and bi-cruciate retaining (BCR) total knee arthroplasty	Ashley Ying-Ying Wong
5.15		Conventional vs robotic bicruciate retaining total knee arthroplasty: a randomised controlled trial	Amy Cheung
5.16		Comparing outcome of posterior stabilized vs medial pivoting vs bicruciate substituting TKA	Wai Hoi Chan
5.17		Functional impact of joint line obliquity and left-right symmetry in patients with Oxford unicompartmental knee arthroplasty (OUKA)	Gloria Yan-Ting Lam
5.19		The role of intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis: a placebo-controlled randomized controlled trial	Ping Keung Chan
5.20		The Coronal Plane Alignment of the Knee (CPAK) classification in Chinese patients with knee osteoarthritis	Samuel Yan Jin Fang
5.21		Radiographic parameters for predicting anterior cruciate ligament status in osteoarthritis of the knee	On Lap Yiu
5.22		Leg length discrepancy following bilateral knee arthroplasty (UKA with TKA)	Kelvin Chin-Hei Lo
10:00 – 10:30		**Coffee Break / Exhibition**	

Time	Room	Topic (Moderators)	Speakers / Presenters
10:30 – 12:10	**S221**	**Plenary Session I** (Christian Fang, Henry Fu)	
10:30 – 10:50		Periprosthetic THA fractures: from the acetabulum to the knee	Eleftherois Tsiridis
10:50 – 11:10		Outcomes of dual mobility articulations for abductor deficiency in revision THAs	Young Min Kwon
11:10 – 11:30		Early fixation strategies for high energy pelvic ring injuries - the Zurich algorithm	Roman Pfeifer
11:30 – 11:50		Handling complex acetabulum or hip fracture surgeries	Roman Pfeifer
11:50 – 12:10		Workhorse flaps for soft tissue and / or bony reconstruction for areas around joint	Fu Chan Wei
12:10 – 12:35	**S221**	**Opening Ceremony** (MC: Samuel YJ Fang, Jojo HC Lai)	
12:10 – 12:15		Welcome Address	Steve MH Cheung Michael TY Ong
12:15 – 12:20		Presidential Address	Chun Hoi Yan
12:20 – 12:25		Speech of Guest of Honour	Donald Li
12:25 – 12:35		Present Souvenir	Chun Hoi Yan
12:35 – 13:35		**Lunch / Lunch Symposium**	
	S225	Lunch Symposia I (Sponsored by Zimmer Biomet Hong Kong)	
		ROSA robotic knee replacement surgery: early clinical result , advantages and challenges	Steve MH Cheung
	S227	Lunch Symposia II (Sponsored by Device Technologies)	
		The 7D in Paediatric Scoliosis Surgery – initial experience, benefits and challenges	Kevin Lim
	S228	Lunch Symposia III (Sponsored by Smith & Nephew)	
		Robotics + intelligence in knee arthroplasty	Xinzhan Mao Michael TY Ong
13:35 – 15:45	**S221**	**Award Paper Session** (Steve MH Cheung, Michael TY Ong)	
AP01		Functional impact of joint line obliquity and left-right symmetry in patients with Oxford unicompartmental knee arthroplasty (OUKA)	Gloria YT Lam
AP02		Targeting subchondral bone osteocytes by magnet guided anti-H19 delivery for osteoarthritis treatment: a preclinical study	Ashley YY Wong
AP03		The influence of alignment and tibial cementation on aseptic loosening in total knee arthroplasty: a long-term analysis of 351 knees with a mean follow-up of 17.5 years	Michelle Hilda Luk
AP04		Written in the stars? Prognosticating long-term outcomes for developmental dysplasia of the hip at skeletal maturity—analysis of 50 years' experience with mean follow-up of 18 years	James SH Wong
AP05		Novel AI machine learning algorithm with volumetric bone quality and microarchitecture cluster phenotyping in the early prediction of curve progression and progression to surgical threshold in Adolescent idiopathic Scoliosis—a 6-year longitudinal study	Adam YC Lau
AP06		Lower CYP27B1 expression in osteocytes increases the risk of scoliosis curve progression in a mouse model—a new insight to improve bone quality in Adolescent Idiopathic Scoliosis	Adam YC Lau
AP07		From clinical to benchside: Probiotics Lactobacillus rhamnosus and Faecalibacterium prausnitzii treats sarcopenia in aged mice through regulation of mitochondria function	Ronald MY Wong
AP08		Risk factors for graft rerupture after revision anterior cruciate ligament reconstruction	Jonathan Patrick Ng
AP09		Investigation and treatment of osteoporosis for orthopaedic in-patient: implication for re-admission due to further fragility fracture	Cheuk Ho Leung
AP10		Harnessing DenseNet-based deep learning for robust and precise osteoporosis classification: an evaluation using spine, hip, and wrist X-ray images	Elvis CS Chui
AP11		Virtual impingement tests in 113 patients undergoing total hip arthroplasty	Gursharn Singh
AP12		The role of intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis: a placebo-controlled randomized controlled trial	Ping Keung Chan

Time	Room	Topic (Moderators)	Speakers / Presenters
15:45 – 16:15	**S221 Foyer**	**Award Poster Session** (Dennis KH Yee)	
BP01		Osseus morphological difference of osteoarthritis knees in southern Chinese population	Wei Wang
BP02		Tibial Cortex Transverse Transport (TTT) enhances mesenchymal stem cell (MSCs) mobilization via SDF-1/CXCR4 signalling pathway for accelerating diabetic foot ulcer (DFU) healing	Zhaowei Jiang
BP03		Scoliosis in osteogenesis imperfecta: identifying the factors affecting severity and progression from longitudinal data	Peikai Chen
BP04		Cementless acetabular cup without supplementary screws followed by immediate full weight bearing is a winning combination with excellent longevity in total hip arthroplasty—prospective study with minimum 20-years follow-up	Man Hong Cheung
BP05		Retrospective analyses of clinical features in 28 Chinese patients with type V osteogenesis imperfecta: new perspectives in an old issue	Hiu Tung Shek
15:45 – 16:15		**Coffee Break / Exhibition**	
16:15 – 17:45	**S221**	**Plenary Session II** (Michael TY Ong, Sammy NT Mak)	
16:15 – 16:35		Anterolateral stablization of the knee: facts & fallacies	Patrick SH Yung
16:35 – 16:55		Multiligamentous injuries of the knee: assessment, management and outcome	David Parker
16:55 – 17:15		Cartilage damage - Burden of disease	Vudhipong Sudhasaneya
17:15 – 17:35		Why do ACL reconstructions fail?	Eivind Inderhaug
17:35 – 17:45		Q & A	All
16:15 – 17:45	**S227**	**Concurrent Session I: Hand** (Margaret WM Fok, Jeffrey JSC Koo)	
16:15 – 16:30		Microsurgery concept and practice in congenital upper limb abnormality	Pak Cheong Ho
16:30 – 16:45		New classification system of severe hypoplastic thumb based on novel reconstruction methods	Bo Liu
16:45 – 17:00		Toe hand transfer	Fu Chan Wei
17:00 – 17:15		Microsurgery practice in general district hospital	Ping Tak Chan
17:15 – 17:45		Discussion	All
16:15 – 17:45	**S228**	**Concurrent Session II: Adult Joint Reconstruction** (Gloria Lam, Kenneth Chan)	
16:15 – 16:30		STAR approach: the new piriformis sparing MIS posterior approach for hip	Eleftherois Tsiridis
16:30 – 16:45		Trunnion corrosion: sensitivity and specificity of metal ion level in predicting head-neck taper corrosion in metal on PE THAs	Young Min Kwon
16:45 – 17:00		Robotic assisted TKA: experience in ROSA using personalized alignment	Eleftherois Tsiridis
17:00 – 17:15		Kinematics in TKA: Is Bi-cruciate retaining TKA the ultimate solution?	Young Min Kwon
17:15 – 17:30		Outcome of one- versus two-stage exchange arthroplasty of chronic culture negative PJI	Young Min Kwon
17:30 – 17:45		Q & A	All
17:45 – 18:15	**S221**	**The Hong Kong Orthopaedic Association – Annual General Meeting**	
18:30 - 22:00	Chancellor Room, 4/F, Old Wing	Congress Banquet	

Sunday, 5 November 2023

Time	Room	Topic (Moderators)	Speakers / Presenters
08:00 – 10:00	**S221**	**Free Paper Session VI: Foot and Ankle** (Charles Li, Yeung Yeung)	
6.1		Role of arthroscopy in ankle fracture: a review of intra-articular findings and outcome at 6 months	Yan Man Tse
6.2		Total ankle replacement using in-house designed patient-specific cutting jig	Joseph Sai Loong Yuen
6.3		Prospective trial comparing the efficacy of stretching vs insoles vs combined stretching and insoles in the treatment of plantar fasciitis	Samuel Ka-Kin Ling
6.4		Investigation on the acute effect of adding whole-body vibration in the warm-up routine among the recreational athletes	Samuel Ka-Kin Ling
6.5		Pilot randomised controlled trial on the effectiveness of trigger point dry needling for treatment of plantar fasciitis	Samuel Ka-Kin Ling
6.6		Case series investigating the effectiveness of bioinductive scaffold augmentation for the repair of Achilles tendon rupture complicated with underlying tendinopathy	Esther Man-Wai Chow
6.7		Dynamic tightrope fixation for the correction of the 1,2 intermetatarsal angle in hallux valgus deformities	Jojo Hoi-Ching Lai
6.8		Clinical and radiological outcome of third-generation minimally invasive Chevron and Akin osteotomies (MICA) for hallux valgus in a single local center: a retrospective study	Cheuk Yin Tam
6.9		Normalized Achilles tendon resting angle in a Chinese population	Meng Zhou
6.10		The clinical effectiveness of pulsed electromagnetic field therapy on the management of chronic ankle instability: a double-blinded randomized controlled trial (interim study)	Cheryl Shu Ming Chia
6.11		Pulsed electromagnetic field therapy improves pain and function for Achilles tendinopathy: a double-blinded randomised controlled trial	Violet Man-Chi Ko
6.12		Scarf osteotomy versus chevron osteotomy in hallux valgus surgery: a comparative study	Chun Hei Mak
6.13		Postoperative use of incisional portable negative pressure wound therapy (NPWT) for closed ankle fracture	Tsz Ching Lee

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S225**	**Free Paper Session VII: Trauma** (Yuk Chuen Siu, Isaac Ko)	
7.1		Clinical effectiveness of a fracture liaison service for geriatric hip fracture patients in Hong Kong	Sheung Kan Siu
7.2		Intramedullary nailing of tibial shaft fractures in the semi-extended position using suprapatellar approach: a case series in Hong Kong	Sze Fai Lo
7.3		A comparison study of reverse shoulder arthroplasty versus hemiarthroplasty for proximal humerus fracture in elderly	Wai Yuen Leung
7.4		Elastic-band resistance exercise or vibration treatment in combination with hydroxymethylbutyrate supplement to combat sarcopenia in the elderly: a randomised controlled trial	Ronald Man Yeung Wong
7.5		Review of the use of lock plate for distal fibula fracture fixation. A retrospective study of 77 cases from 2019 to 2022	Wun Kee Szeto
7.6		Segmental forearm fractures—osteosynthesis using preset plate and less invasive approach	Kei Wing Wong
7.7		Clinical and patient-reported outcomes of surgical versus conservative treatment of severely displaced three- and four-part proximal humerus fracture in adults: a retrospective cohort study	Justin Hoi Lui Wong
7.8		Determination of the ideal plate for medial femoral condyle fracture: a biomechanical study	Felix Leung
7.9		New accelerated rehabilitation protocol for reverse shoulder arthroplasty—local centre experience in 2 years	Kar Hei Lam
7.10		Optimal rotation of glenoid component and angle of screws in reverse shoulder arthroplasty	Martin Shun Sing Cheng
7.11		Investigation and treatment of osteoporosis for orthopaedic in-patient: implication for re-admission due to further fragility fracture	Cheuk Ho Leung
7.12		A retrospective review of incidence and outcomes of femoral head fractures in local trauma center	Wataru Kumamoto
7.13		Deep learning-based ultrasonic navigation system (DLUNS) for minimally invasive plate osteosynthesis (MIPO) in distal humeral intra-articular fractures: a pilot cadaveric study	Elvis Chun-Sing Chui
7.14		RSA vs ORIF in acute surgical management of geriatric proximal humeral fracture	Sui Kit Chan
7.15		Early results of minimally invasive surgery with screw fixation for geriatric patients with pelvic fracture	Douglas See Lok Ho
7.16		Effects of COVID pandemics on geriatric hip fracture services in acute setting—a general perspective (Part I)	Albert Yung Chak Hsu
7.17		Evaluation of using grip strength and hand muscle cross-sectional area to predict secondary fractures post distal radius fracture.	Matthew Tsz Kin Kong
7.18		Effects of COVID pandemics on geriatric hip fracture services in acute setting—a focus on cognitively impaired patients (Part 2)	Mattew Chung Yan Lam

Time	Room	Topic (Moderators)	Speakers / Presenters
08:00 – 10:00	**S226**	**Free Paper Session VIII: Rehabilitation, Tumour, Others** (Simon SM Leung, Ying Lee Lam)	
8.1		Lessons learned from the COVID-19 pandemic: a PRISMA review of the role of home-based exercise therapy on knee osteoarthritis	Christopher Chi Hang Mak
8.2		A structured non-operative treatment programme for traumatic triangular fibrocartilage complex tears: a quasi-experimental study	Yancy Lai-Fan Tse
8.3		The effects of exoskeleton training on neurogenic bowel dysfunction in spinal cord injury/ disease	Christopher Chun Hei Yip
8.4		Effects of pulsed electromagnetic field (PEMF) for the promotion of cartilage regeneration and pain relief in patients with early knee osteoarthritis—a double-blinded placebo-controlled randomised clinical trial	Ssu-Chi Chen
8.5		Impact of fracture liaison service: early results from regional hospital	Kwun Ping Fung
8.6		Application of machine learning models on predicting the length of hospital stay in fragility fracture patients	Bernard Wai-Tat Yung
8.7		Prediction of in-patient stay time for hip fracture patients in a rehabilitation hospital—a regression model of cases from 12 years	Cheuk Kin Kwan
8.8		Update on the effect of sarcopenia in elderly women with vertebral compression fracture on global sagittal alignment and its relationship with quality of life	Cheuk Kin Kwan
8.9		Biomechanical effects of lateral wedged insoles and ankle foot orthosis on medial compartment knee osteoarthritis by in-shoe pressure analysis and lower limb posture scanning	Emily Wai-yin Chung
8.10		Health related quality of life assessment in joint replacement procedures: a comparative study	Karen Hoi Ting So
8.11		Identifying the risk of sarcopenia in patients with knee Osteoarthritis	Qian-wen Wang
8.12		Development of a novel deep learning model in the detection of symptomatic knee osteoarthritis by sit-to-stand video recording using smartphone camera	Justin Lok-Chun Chan
8.13		Neoadjuvant radiotherapy is associated with fewer acute skin adverse reactions without increased risk of postoperative wound complications in high-grade soft tissue sarcoma of the extremity—a retrospective comparative study with a mean follow-up of 7 years	Jacky Hiu-Woo Lau
8.14		Two-incision approach for pelvic tumour resection: single centre case series	Raymond Ching Hin Yau
8.15		A network analysis approach to understanding medical claims by ChatGPT: where is the information coming from?	Oscar Shen
8.16		Local experience with the use of romosozumab in patient with severe osteoporosis	Paul YT Tse

Time	Room	Topic (Moderators)	Speakers / Presenters
08:00 – 10:00	**S227**	**Free Paper Session IX: Paediatric Orthopaedics and AGM of Paediatric Orthopaedic Chapter** (Alec LH Hung, Karen CM Yeung)	
9.1		Three-in-one protocol for the management of hemodynamically unstable paediatric pelvic fracture—A level one trauma centre 15 year review	Adam Zhen-Wei Yang
9.2		Novel AI machine learning algorithm with volumetric bone quality and microarchitecture cluster phenotyping in the early prediction of curve progression and progression to surgical threshold in Adolescent idiopathic Scoliosis—a 6-year longitudinal study	Adam Yiu-Chung Lau
9.3		Quasi-experimental study to compare the intermediate intervention outcomes between passive and dynamic helmet design in positional plagiocephaly	Sin Wa Lam
9.4		Can we predict curve progression in adolescent idiopathic scoliosis patients with Cobb angles <10°? A pilot study with vertebra vector sequencing by recurrent neural networks (RNN)	Guangpu Kenneth Yang
9.5		Online mindfulness intervention to enhance psychosocial well-being for adolescent idiopathic scoliosis (AIS)—a pilot randomised single-blinded controlled trial	Christien Wong
9.6		Role of sagittal plane malalignment on the etiopathogenesis of frontal plane deformity in idiopathic scoliosis—a prospective longitudinal study	Yung-ai Sheng
9.7		Effect of upper limb cast on Chinese handwriting speed in paediatric patients	Kelvin Tze Kit Wan
9.8		Infections after paediatric orthopaedic surgery—culture culture in the broth, who is the most infectious of them all	Lauren Sun
9.9		Should finding of an incidental discoid meniscus change your practice?	Anubrat Kumar
9.10		Written in the stars? Prognosticating long-term outcomes for developmental dysplasia of the hip at skeletal maturity—analysis of 50 years' experience with mean follow-up of 18 years	Janus Siu-him Wong
9.12		Selective hip ultrasound screening for developmental dysplasia of the hip (DDH) in newborns *(The Royal College of Orthopaedic Surgeons of Thailand Ambassador Paper)*	Nattaphat Srisuwat

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S228**	**Free Paper Session X: Adult Joint Reconstruction II** (Gerry Ho, Matthew Lee)	
10.1		Deep patellar shape analysis aided with diffusion model for predicting knee replacement surgery risk on lateral radiograph	Sing Hin Lau
10.2		Effect of posterior tibial slope in patient's outcome for cruciate retaining total knee arthroplasty—experience in a regional joint replacement center	Hiu-Hong Wong
10.3		Posterior tibial slope on preoperative CT scans of patients undergoing UKA	He Yi Hsieh
10.4		Modifications of the cemented tibial tray in a modern total knee arthroplasty system: is the new design better?	Michelle Hilda Luk
10.5		Common complications after total knee arthroplasty: current trends	Michelle Hilda Luk
10.6		Investigating the role of metagenomic next-generation sequencing in the diagnosis of periprosthetic joint infections	Jun Ren Khoo
10.7		Development of a novel machine learning model for the prediction of periprosthetic joint infection following primary total knee arthroplasty: a 23-year retrospective study	Yuk Yee Chong
10.8		10 years experience of periprosthetic joint infection in a joint replacement centre: clinical characteristics, microbiology, and treatment outcomes	Chi Kin Lo
10.9		Introduction of a novel spacer technique that can reduce the complication in the management of periprosthetic infection after total hip arthroplasty: early outcome from a retrospective review	Man Hong Cheung
10.10		C-reactive protein (CRP) is the most important determinant factor on the success of debridement, antibiotics and implant retention (DAIR) in patients with periprosthetic joint infection—a 15-year retrospective study of 2 major joint arthroplasty centres	Cheryl Cheuk-Wing Kong
10.11		Multicenter validation of an automatic analysis platform for full-length lower limb X-rays based on convolutional neural networks	Chenxi Yu
10.12		Association of preoperative fat infiltration in hip muscles with functional outcomes after total hip arthroplasty	Zhengyuan Bao
10.13		The effects of pulsed electromagnetic field (PEMF) therapy on muscle strength and function in patients with end stage knee osteoarthritis: a double-blinded randomized control trial	Jonathan Patrick Ng
10.15		Predictive factors for prolonged length of hospital stay following primary total hip replacement in one joint replacement center in Hong Kong	Tin Mong Chan
10.16		Revision total hip arthroplasty with modular femoral stem—a retrospective study	Man Sui Yau
10.17		Relationship between hip osteoarthritis and degenerative disc disease in Chinese	Yiu Hei Tse
10.18		Clinical & radiological outcomes of dual mobility total hip arthroplasty: a retrospective review	Ryan Man Chun Chan
10.19		Virtual impingement tests in 113 patients undergoing total hip arthroplasty	Gursharn Singh
10.21		Spinopelvic relationship in Hong Kong: analysis of 345 primary total hip arthroplasties	Jack Chak Hei Lam
10.22		Streamlining surgical instruments sets for greener arthroplasty	Amy Cheung
10.23		Oral and intravenous tranexamic acid are equivalent at reducing blood loss following total shoulder arthroplasty: a multicentre prospective randomised controlled trial *(New Zealand Orthopaedic Association Ambassador Paper)*	R Gao
10:00 – 10:30		**Coffee Break / Exhibition**	

Time	Room	Topic (Moderators)	Speakers / Presenters
10:30 – 12:00	**S221**	**Plenary Session III** (Ying Kei Chan, Tsz Lung Choi)	
10:30 – 10:50		Impact of hip deformity on low back pain: how much is the relationship?	Yat Wa Wong
10:50 – 11:10		Surgical planning of spinal deformity surgery with consideration of hip and femur: global sagittal alignment correction	Dennis HW Hey
11:10 – 11:30		Controversy in spine-pelvic deformity correction: why and how I go for hip surgery first	Eleftherois Tsiridis
11:30 – 11:50		THA in patients with spino-pelvic imbalance: implications for implant selection and implant positioning	Lewis PK Chan
11:50 – 12:00		Q & A	All
10:30 – 12:00	**S225**	**Concurrent Session III: Trauma** (Colin SY Yung, Ronald MY Wong)	
10:30 – 10:45		Treatment strategies for multiple injured patients: historical review and current perspectives	Roman Pfeifer
10:45 – 11:00		How to clear polytrauma patients for fracture fixation	Roman Pfeifer
11:00 – 11:15		Q & A	All
11:15 – 11:30		Case discussion: polytrauma, complex acetabulum and proximal femur fractures	Christian Fang
11:30 – 11:45		Case discussion: complication after pelvis fixation – conversion total hip replacement	Ronald MY Wong
11:45 – 12:00		Q & A	All
10:30 – 12:00	**S226**	**Concurrent Session IV: Orthopaedic Rehabilitation** (Sheung Wai Law, Raymond WK Ng)	
10:30 – 10:55		Disruptive innovation in orthopedic rehabilitation – 3D printing, AI, robotics	Sheung Wai Law
10:55 – 11:20		Tele-rehabilitation in orthopaedics	Priscilla Poon
11:20 – 11:45		Intelligent walking device and big data system for precise lower limb weight-bearing rehabilitation	Zhen Zhong Zhu
11:45 – 12:00		Q & A	All
10:30 – 12:00	**S227**	**Concurrent Session V: Sports Medicine** (George Law, Stephen Chung)	
10:30 – 10:50		Osteotomy around the knee: indications, techniques and outcomes	David Parker
10:50 – 11:10		Save the meniscus - preserve the knee	Eivind Inderhaug
11:10 – 11:30		Injury prevention in football medicine	Vudhipong Sudhasaneya
11:30 – 11:40		AC joint dislocation, a suspension button alone vs suspension button augmented with ACL repair using anchor suture: a finite element analysis study	Chidchanok Sakdapanichkul
11:40 – 11:50		Biomechanical comparison study between aperture and cortical fixation for posterior medial meniscus root tendon graft reconstruction in swine knee	Vorapop Triattanapikul
11:50 – 12:00		Q & A	All
10:30 – 12:00	**S228**	**Concurrent Session VI: Foot and Ankle** (Ka Hei Leung, Angela WH Ho)	
10:30 – 10:45		Ankle arthritis and total ankle replacement	David Oji
10:45 – 10:50		Q&A	All
10:50 – 11:05		The deltoid ligament injury in the ankle instability	Ying Hui Hua
11:05 – 11:10		Q&A	All
11:10 – 11:50		Controversies in foot and ankle surgery – case discussion: - Case 1: Chronic ankle instability - Case 2: Ankle OA	All
11:50 – 12:00		Q & A	All

Time	Room	Topic (Moderators)	Speakers / Presenters
12:00 – 13:00		**Lunch / Lunch Symposia**	
	S228	Lunch Symposia I (Sponsored by Amgen Hong Kong Limited)	
		Bone health optimization – treatment beyond elective orthopedics surgery	Joon Kiong Lee
13:00 – 14:30	**S221**	**Plenary Session IV: Knee Arthroplasty** (Qunn Jid Lee, Chun Hoi Yan)	
13:00 – 13:30		Innovation of in-vivo kinematics in TKA: next frontier in enhancing patients' outcomes	Young Min Kwon
13:30 – 14:00		Artificial intelligence and big data: the new frontiers in TKA surgery	Eleftherois Tsiridis
14:00 – 14:30		Memoir of a knee arthroplasty surgeon in Hong Kong - is the enemy of good "better"	Peter KY Chiu
13:00 – 14:30	**S227**	**Concurrent Session VII: Tumour - Metastasis in Femur** (Ying Lee Lam, Moses Li)	
13:00 – 13:10		Introduction and principles of management	Timothy YC So
13:10 – 13:20		Proximal femur metastasis	Sin Tak Fong
13:20 – 13:30		Shaft of femur metastasis	Calvin WK Chiu
13:30 – 13:40		Distal femur metastasis	Raymond CH Yau
13:40 – 14:20		Case presentation with commenters	Kenneth WY Ho Yvette Lam Jacky Lau Anderson Leung Ka Lok Mak
14:20 – 14:30		Q & A	All
13:00 – 14:30	**S228**	**Concurrent Session VIII: Spine** (Edwin KH Lam, Nelson CH Wong)	
13:00 – 13:15		Role of limited surgery in adult deformity	Michael SH Tse
13:15 – 13:30		Use of anterior approach for deformity correction	Jason PY Cheung
13:30 – 13:45		Current concepts for adult deformity	Dennis HW Hey
13:45 – 14:00		Proximal junctional kyphosis	William KH Cheng
14:00 – 14:15		Fragility patient's evaluation and complications prevention	Cho Yau Lo
14:15 – 14:30		Case presentation on adult deformity	Raymond NM Wong
14:30 – 15:00		**Coffee Break / Exhibition**	
15:00 – 16:30	**S221**	**Plenary Session V** (Sheung Wai Law, Wilson Li)	
15:00 – 15:15		Career opportunities for orthopaedic surgeons in the GBA area and the mainland: a macroscopic view	Wing Man Ko
15:15 – 15:30		Establishing synergistic orthopaedic healthcare in the GBA – a perspective from Mainland China	Bo Liu
15:30 – 15:45		New era in higher medical education and health system at GBA	Davy Cheng
15:45 – 16:00		The HKU Shenzhen story	Kenneth MC Cheung
16:00 – 16:30		Round table discussion + Q&A	All
16:30 – 16:45	**S221**	**Closing remarks**	Steve MH Cheung Michael TY Ong

Award Paper Session

AP01

Functional impact of joint line obliquity and left-right symmetry in patients with Oxford unicompartmental knee arthroplasty (OUKA)

Gloria Yan-Ting Lam,[1] Tsz Lung Choi,[1] Jonathan Patrick Ng,[2] Michael Tim-Yun Ong,[3] Patrick Shu-Hang Yung[4]
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Introduction: Post-operative joint line tilting >3° in OUKA was known to be associated with poor functional outcome. However, the effect of left-right joint line symmetry in bilateral OUKAs is still largely unknown.

Methods: Radiological analysis was conducted for patients who received unilateral or bilateral OUKA in Alice Ho Miu Ling Nethersole Hospital from year 2018 to 2021. Joint line obliquity angle (JLOA) was measured in post-operative standing anteroposterior X-rays. Total knee arthroplasties (TKA) were performed in those patients with unilateral OUKA.

Results: 73 patients were reviewed with 100 OUKAs performed. 60 knees were involved in bilateral OUKAs while 40 knees were involved in unilateral TKA and OUKA. 22 knees (22%) had symmetrical JLOA while 26 patients (26%) had bilateral JLOA difference ≥3 degrees. Mean postoperative JLOA was -1.98°±2.94° (medially tilted) and mean left-right (L-R) difference was 2.79°±2.55°. OUKAs with JLOA >3° had less improvement in Knee Society Functional Score (KSFS) than JLOA ≤3° (22.6 vs 31.7, p=0.006). Comparing the group with JLOA symmetry (=0° L-R difference), any asymmetry in JLOA (>0° L-R difference) would have worse Oxford Knee Score (OKS) improvement post-operatively (15.6 vs 20.9, p=0.01). And the degree of L-R asymmetry of JLOA was also moderately correlated with worse OKS improvement (r=0.397, p=0.0001).

Discussion and Conclusion: In bilateral OUKAs, maintaining JLOA<3° and achieving left-right symmetry are essential to maximize the post-operative improvement of functional outcomes.

AP02

Targeting subchondral bone osteocytes by magnet guided anti-H19 delivery for osteoarthritis treatment: a preclinical study

Rongliang Wang,[1] Ashley Ying-Ying Wong,[1] Babak Mehrjou,[2] Dorsa Dehghan-Baniani,[1] Michael Tim-Yun Ong,[1] Vivas Hon Fai Chan,[3] Gang Li,[1] Paul Kim Ho Chu,[2] Wayne Yuk Wai Lee[1]
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[3]Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong

AP03

The influence of alignment and tibial cementation on aseptic loosening in total knee arthroplasty: a long-term analysis of 351 knees with a mean follow-up of 17.5 years

Michelle Hilda Luk,[1] Hongtai Chen,[2] Amy Cheung,[1] Man Hong Cheung,[2] Henry Fu,[2] Ping Keung Chan,[2] Chun Hoi Yan,[3] Kwong Yuen Chiu[2]
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[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Private practice

AP04

Written in the stars? Prognosticating long-term outcomes for developmental dysplasia of the hip at skeletal maturity—analysis of 50 years' experience with mean follow-up of 18 years

Janus Siu-him Wong,[1] Evelyn Eugenie Kuong,[2] Noah Lok-wah So,[3] Michael Kai-tsun To,[1] Wang Chow[2]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Hong Kong Children's Hospital
[3]Department of Orthopaedics and Traumatology, Duchess of Kent Children's Hospital

AP05

Novel AI machine learning algorithm with volumetric bone quality and microarchitecture cluster phenotyping in the early prediction of curve progression and progression to surgical threshold in Adolescent idiopathic Scoliosis—a 6-year longitudinal study

Guangpu Yang,[1,2] Adam Yiu-Chung Lau,[1,2] Alec Lik-hang Hung,[1,2] Tsz-ping Lam,[1,2] Chun-yiu Cheng[1]
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AP06

Lower CYP27B1 expression in osteocytes increases the risk of scoliosis curve progression in a mouse model—a new insight to improve bone quality in Adolescent Idiopathic Scoliosis

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AP07

From clinical to benchside: Probiotics Lactobacillus rhamnosus and Faecalibacterium prausnitzii treats sarcopenia in aged mice through regulation of mitochondria function

Ronald Man Yeung Wong,[1] Chaoran Liu,[1] Pui Yan Wong,[1] Ning Zhang,[1] Jun Yu,[2] Sunny Hei Wong,[3] Margaret Ip,[4] Joseph Jao Yiu Sung,[3] Wing-hoi Cheung[1]
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AP08

Risk factors for graft rerupture after revision anterior cruciate ligament reconstruction

Jonathan Patrick Ng,[1] Victor Yan Zhe Lu,[2] Dennis Hei Yin Lee,[3] Simon Ho Yin Tsui,[3] James Hong Yin Woo,[3] Thomas Chun Hei Lo,[3] Jack Wai Wang Chau,[3] Michael Tim Yun Ong,[3] Patrick Shu Hang Yung[4]
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Background: The literature on revision anterior cruciate ligament reconstruction (ACLR) is sparse. While it is well known that revision surgery is associated with significantly higher graft rerupture rates, the risk factors for repeated failure are not well defined. This study aims to explore the outcomes and risk factors of revision ACLR.

Methods: Revision ACLR performed between January 2013 and January 2023 were included. Univariable logistic regression models explored the association between graft re-rupture and prognostic variables. Those achieving statistical significance were included in a multivariable logistic regression model to identify risk factors of graft re-rupture.

Results: 132 revision ACLRs were identified (91 males; 41 females) with a mean age of 23.1 years (range 15-48). Pivoting sports accounted for 87.9% (n=116) of preinjury sports, with the majority being football (n=48; 36.4%). The mean graft diameter was 9.26 mm (range 7.0-10.5 mm). MRI detected concomitant pathologies on the medial meniscus (n=45; 34.1%), lateral meniscus (n=41; 31.1%), and chondral pathologies (n=26; 19.7%).

The graft rerupture rate was 16.7% (n=22) and 11.4% (n=15) of the revision ALCRs were revised a second time. A cut-off value of 9 mm was the optimum graft diameter during revision ACLR (AUC=0.63; p=0.049). Risk factors for re-rupture were graft diameter <9 mm (OR=3.873; p=0.031) and return to pivoting sport (OR=4.105; p=0.049).

Conclusion: Small graft diameter <9 mm and return to pivoting sport are risk factors for re-rupture. Techniques to maximise graft diameter and lateral reinforcement procedures to constrain pivoting motion may help reduce the incidence of graft rerupture following revision ACLR.

AP09

Investigation and treatment of osteoporosis for orthopaedic in-patient: implication for re-admission due to further fragility fracture

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Introduction: In this longitudinal study, we followed the surgically treated fragility fracture patients to see whether appropriate anti-osteoporotic investigation or treatment had been offered. On the other hand, the clinical outcome and financial implication related to these patients were also studied.

Methods: This is a 2-year longitudinal study about the patients admitted with fracture hip and distal radius. The clinical outcome was based on the comparison between the patients with and without additional osteoporotic therapy after index surgery in terms of readmission rate of fragility fracture and symptomatic osteoporotic collapse.

Results: From 2017 to 2021, 515 patients were admitted with hip and distal radius fracture and all of them were treated operatively. Overall, DEXA scan was arranged in only 8.2% (n=42) of the patients. Only 14% (n=72) of the patients were given both Calcichew and Bisphosphonate while 29.7% of them (n=132) had only Calcichew after surgery. 5.2% (n=27) of the patients were readmitted due to another fragility fracture and 3.7% (n=19) of them suffered from new onset of osteoporotic back pain. There was significant association between reduction in re-admission rate of fragility fracture and the active treatment group treated with both Calcichew and Bisphosphonate (p=0.031).

Discussion and Conclusion: There are a great proportion of patients readmitted due to another episode of fragility fracture. The patients receiving both Calcichew and Bisphosphonate were associated with significant reduction in readmission rate. The results implied that osteoporotic therapy should be started earlier after the first episode of fragility fracture.

AP10

Harnessing DenseNet-based deep learning for robust and precise osteoporosis classification: an evaluation using spine, hip, and wrist X-ray images

Elvis Chun-Sing Chui, Xin Ye, Ericsson Chun-Hai Fung, Michelle Mei-Shuen Chan, Hong-Tim Lau, Patrick Shu-Hang Yung, Louis Wing-Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

AP11

Virtual impingement tests in 113 patients undergoing total hip arthroplasty

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AP12

The role of intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis: a placebo-controlled randomized controlled trial

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Award Poster Session

BP01

Osseus morphological difference of osteoarthritis knees in southern Chinese population

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Introduction: Enhanced comprehension of the morphological characteristics of osteoarthritis knees can optimize implant size selection, implant positioning and balancing in unicompartmental knee arthroplasty (UKA). Therefore, the aim of this study was to outline the morphological differences in the distal femur of osteoarthritis knees in Southern Chinese population.

Methods: Preoperative CT images of patients who underwent primary UKA were collected from the local hospital in Hong Kong. Standardized measurement approaches were developed to obtain three-dimensional morphological parameters of the femur, including 1) the posterior condylar angle (PCA), the angle between the surgical transepicondylar axis and posterior condylar line; 2) the condylar offset ratio, ratio of medial to lateral posterior condylar offset; 3) the condylar radius ratio, ratio of medial to lateral posterior condylar radius.

Results: 74 patients (female:male=43:31; mean age=68.57±7.05) were included. Mean PCA, condylar offset ratio, and condylar radius ratio were 1.65°±1.61°, 1.06±0.06, and 1.01±0.05 respectively. Compared with male patients, the female patients had a significantly larger condylar radius ratio (1.03±0.05 vs 0.99±0.05, p=0.004). In terms of PCA and condylar offset ratio, there was no significant difference between male and female patients.

Discussion and Conclusion: This study found that the posterior femoral condyles were asymmetrical in southern Chinese population. The radius of the medial condylar flexion facet was significantly larger than that of the lateral condyle in female patients, whereas the opposite was observed in male patients. This gender-related difference may require further investigation to determine whether gender-specific femoral component is needed in UKA.

BP02

Tibial Cortex Transverse Transport (TTT) enhances mesenchymal stem cell (MSCs) mobilization via SDF-1/CXCR4 signalling pathway for accelerating diabetic foot ulcer (DFU) healing

Zhaowei Jiang, Yongkang Yang, Yucong Li, Haixing Wang, Jiaming Yang, Sien Lin, Gang Li
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Introduction: Diabetic foot ulcer (DFU) is a severe complication of diabetes that carries a higher risk of amputation and mortality. Tibial Cortex Transverse Transport (TTT) has shown promising results in treating peripheral ischemic conditions, including DFU. However, the underlying biological mechanisms of TTT treatment require further clarification. This study aimed to examine the mechanism by which the TTT technique confers therapeutic benefits for DFU treatment, with a specific focus on MSCs mobilization and homing.

Methods: A rat model of TTT was established to investigate its therapeutic effects on DFU. Wound healing index (WHI), histology and immunohistochemistry were used to evaluate the wound healing processes. MSCs mobilization and homing were tracked using flow cytometry analysis and immunohistochemistry. Additionally, molecules related to MSC mobilization were evaluated using qRT-PCR and Western Blotting.

Results: TTT technique accelerated DFU closure and improved the quality of newly formed skin tissues. Furthermore, TTT treatment enhanced MSCs migrating to peripheral blood and homing to wound site. The expression of SDF-1, CXCR4/7 and FAK was upregulated after cortex transport.

Discussion and Conclusion: TTT technique can accelerate the healing of DFU by enhancing mobilization and homing of MSCs. SDF-1/CXCR4 signaling pathway may be responsible for the systemic mobilization of MSCs, which may promote angiogenesis and regulates immune response at the site of ulcer. These findings shed light on the potential biological mechanisms underlying TTT treatment and may pave the way for the development of new therapeutic targets in DFU management.

BP03

Scoliosis in osteogenesis imperfecta: identifying the factors affecting severity and progression from longitudinal data

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Background: Scoliosis is prevalent in osteogenesis imperfecta (OI) patients, but factors affecting severity and progressions are not known.

Methods: We retrospectively retrieved longitudinal radiographic and clinical records of all OI patients seeking treatments at our hospital from 2015 to 2022, scored their pre-operative spinal conditions into four scoliosis grades, estimated their progression rates, and analyzed the genetic and non-genetic factors that may affect the outcomes and progression rates, using both descriptive and inferential methods.

Results: In all, 290 OI patients met the inclusion criteria, where 221 had genetic records. With an average age of 12.6 years (interquartile range [IQR] 6.9 to 16.1), 70.7% of the cohort had scoliosis (Cobb angle >10°), including 106 (36.5%) mild (10°-25°), 40 (13.8%) moderate (25°-50°), and 59 (20.3%) severe (>50°) scoliosis patients. Patients with either COL1A1 or COL1A2 were strongly biased towards having mild or no scoliosis, where patients with mutations in IFITM5, WNT1 and other recessive genes were more evenly distributed among the four outcome grades. Lower-limb discrepancy (LLD), bone mineral density (BMD) and age of first drug used were all significantly correlated with severity outcomes. Higher BMD Z-scores was protective in advancing into severe outcomes. We estimated a cohort-wide progression rate of 2.7 degrees per year (confidence interval 2.4 to 3.0), which peaked at ~12.5 years.

Conclusion: The severity and progression of scoliosis in OI were affected by genetic factors including genotypes and mutation types, and non-genetic factors including age and BMD. Progression rates were fastest in the adolescent group.

BP04

Cementless acetabular cup without supplementary screws followed by immediate full weight bearing is a winning combination with excellent longevity in total hip arthroplasty—prospective study with minimum 20-years follow-up

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BP05

Retrospective analyses of clinical features in 28 Chinese patients with type V osteogenesis imperfecta: new perspectives in an old issue

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Introduction: Type V osteogenesis imperfecta (OI) is a form of OI characterized by radial head dislocation (RHD), calcification of interosseous membrane (CIM), and hyperplastic callus (HPC). In this study, we characterized the clinical features of 28 type V OI patients. The study aims to systematically characterize the skeletal phenotypes of patients with type V OI and suggest possible surgical solutions.

Methods: A total of 28 patients diagnosed with type V OI (either clinically diagnosed or genetically confirmed with the IFITM5 c.-14C>T mutation) were admitted for inpatient care at The Hong Kong University-Shenzhen Hospital.

Results: Prevalence of type V radiological features was comparable to previous literatures (RHD, 100%; CIM, 100%; HPC, 44%; and scoliosis, 50%). Novel skeletal phenotypes were presented including extension of coronoid process, acetabular labrum, acetabular protrusion, spontaneous autofusion of the hip, bulbous epiphysis, and popcorn calcification. Significant increase in BMD was observed in patients with bisphosphonate treatment. Twenty-five percent (3/12) of patients with preoperative use of indomethacin developed HPC postoperatively, and HPCs were absorbed in 2 young patients 2 years later.

Discussion and Conclusion: This retrospective study summarized the clinical features. Our study contributed to a more comprehensive clinical spectrum of type V OI. We also characterized the natural progression of HPC formation and resorption in patients in different ages. The use of bisphosphonate treatment is effective in improving bone mineral density in type V OI patients, and whether indomethacin can reduce incidence of HPC formation deserves further investigation.

Free Paper Session I: Hand and Microsurgery

FP1.1

Complications and unplanned reoperation after thumb metacarpophalangeal arthrodesis

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Introduction: Arthrodesis of the metacarpophalangeal (MP) joint of the thumb is a common procedure to treat patients with arthritis or instability. Studies reporting hardware complications and nonunion after thumb MP joint arthrodesis report on small sample sizes. We aim to describe the hardware complication and nonunion rate for thumb MP arthrodesis and compare the nonunion rate and time to union between 2 arthrodesis techniques.

Methods: A database of 5 urban hospitals in a single metropolitan region in the United States was searched for patients that underwent thumb MP joint arthrodesis between January 1, 2004, and January 1, 2020. We identified 122 thumbs that underwent MP joint arthrodesis and had a minimum follow-up of 90 days. The primary outcome was reoperation after hardware complications and nonunion. A bivariate analysis was performed to compare nonunion rate and time to union between tension band and screw fixation arthrodesis.

Results: Twenty-one out of 122 thumbs (17%) had hardware complications after arthrodesis, and 11 out of 122 thumbs (9%) developed a nonunion. Patients who underwent screw fixation arthrodesis had no hardware complications or subsequent hardware removal. There were no significant differences between the tension band arthrodesis group and the screw fixation arthrodesis group in terms of the nonunion rate (9/65 vs 2/45) and time to radiographic union (108 days vs 90 days).

Conclusion: Although the surgical technique for thumb MP joint arthrodesis should be decided on an individual basis, our data suggests that screw fixation has fewer hardware complications and, therefore, fewer reoperations.

FP1.2

Outcomes in patients aged 60 years and over after treatment for distal radius fractures: a systematic review and network meta-analysis

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Aim: This network meta-analysis aims to compare functional outcomes and complications between conservative treatment and surgery for distal radius fractures in elderly patients.

Methods: We searched three databases for randomized controlled trials (RCTs) assessing the effect of conservative treatment and surgery for distal radius fractures in patients aged 60 years and over. Primary outcomes included grip strength and overall complications. Continuous and binary outcomes were assessed using standardized mean differences (SMDs) and odds ratio (OR), respectively. The surface under the cumulative ranking curve (SUCRA) was used to determine a hierarchy of treatments.

Results: Fourteen RCTs were included to compare conservative treatment, volar locked plate (VLP), K-wires fixation, and external-fixation. VLP outperformed conservative treatment for 1-year and minimum 2-year grip strength (SMD; 0.28 [0.07 to 0.48] and 0.27 [0.02 to 0.53], respectively). VLP yielded the optimal grip strength at 1-year and minimum 2-year follow-up (SUCRA; 89.8% and 86.7%, respectively). In a subgroup analysis of patients aged 60 to 80 years old, VLP outperformed conservative treatment in DASH and PRWE scores (SMD, 0.33 [0.10, 0.56] and 0.23 [0.01, 0.45], respectively). In addition, VLP had the fewest complications (SUCRA=84.3%).

Conclusion: Evidence to date demonstrates that VLP provides measurable benefits in grip strength and fewer complications to those aged 60 years and over, and that benefit is not reflected in current practice guidelines. There is a subgroup of patients where K-wire fixation outcomes are similar to VLP; defining this subgroup may yield substantial societal benefits.

FP1.3

The effect of primary treatment of distal radius fractures on the scapholunate distance in late middle-aged patients with distal radius fractures and concurrent scapholunate diastasis

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Introduction: Studies showed scapholunate diastasis reflects secondary carpal stabilisers involvement. It is likely if displaced bony attachments of secondary stabilisers in distal radius (DR) fractures are fixed, secondary stabilizers heal by DR fixation. The radiological progression of scapholunate diastasis after fixation of DR fractures with associated scapholunate diastasis was evaluated.

Methods: Within our centre in Hong Kong, patients aged 50-69 years who had intra-articular DR fractures with a scapholunate distance of 2.5 mm or more on injury radiographs, and had been subsequently treated with open reduction and internal fixation of the DR were included in the study. The study period was between the year 2018-2021. The radiographic progression of the scapholunate distance and angle were evaluated from radiographs taken upon injury, immediate post-fixation and upon the latest follow-up.

Results: 28 patients were included. The results were analysed with ANOVA test. The average scapholunate distance upon injury was 3.04 mm. The scapholunate distance measured during the immediate postoperative period showed a mean of 2.30 mm. The scapholunate distance measured at the latest follow-up was 2.02 mm. The change in scapholunate distance resulting immediately from DR fixation was a mean reduction of 0.40 mm. The total change in scapholunate distance from injury to the latest follow up radiograph was a mean reduction of 0.96 mm (p=0.001).

Discussion and Conclusion: With primary DR fixation, the associated scapholunate diastasis shows a reduction in distance immediately after operation. Upon latest follow-up, reduction of scapholunate diastasis is maintained.

FP1.4

Managing distal radius fractures in septuagenarians and octogenarians: Conservative or Surgical treatment?

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Introduction: This study aimed to compare two treatments for distal radius fracture in elderly patients aged 70 years and older: conservative treatment (casting) and open reduction internal fixation (ORIF) using volar locking plate.

Methods: A retrospective study reviewed patients admitted to United Christian Hospital between January 2021 and March 2023. The patients were divided into two groups: casting or ORIF. Clinical parameters including pain score, range of motion, radiological measurements, Modified Mayo wrist score, and QuickDASH score were compared between the two groups.

Results: There were 59 patients included (casting n=30; ORIF n=29). The mean age of the casting group and the ORIF group were 75.7 and 75.1 respectively. The ORIF group had better post-treatment X-ray alignment including radial height ($p<0.001$), volar tilting ($p=0.04$), radial inclination ($p<0.001$) and ulna variance ($p=0.03$). The pain score, grip-strength-ratio were similar in both groups (3 months and 6 months). The wrist range of motion was significantly better in the ORIF group at 6 weeks (flexion, $p=0.014$; extension, $p=0.001$; supination, $p=0.001$ and pronation, $p=0.001$). The wrist range of motion showed no statistically difference in both groups at 3 months and 6 months. There was no difference in Modified Mayo wrist score and QuickDASH score at the latest follow-up.

Discussion and Conclusion: The study suggests ORIF has better early range of motion and better post-treatment radiological alignment compared to conservative treatment. However, it should be noted that ORIF carries the potential complication of implant failure in this group of elderly patients.

FP1.5

Three-dimensional (3-D) accuracy evaluation of computer virtual planning and 3-D printed patient specific instruments in corrective osteotomies for the distal radius

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Introduction: Computer-assisted virtual surgical planning allows the surgeon to achieve complex multiplanar deformity correction in the distal radius via 3-D printed patient-specific instruments. We attempt to quantify the three-dimensional accuracy of correction of a 3-D printed spacer reduction guide.

Methods: This is a single-centre retrospective review of 6 patients with extra-articular distal radius osteotomy for fracture malunion performed from 2018-2021. The 3-D bone model of the planned correction in the distal radius is compared to the post-operative model.

Results: The average distance between the planned and post-operative articular surface is 0.9 mm (root mean squared value) based on distance map measurement.

Discussion and Conclusion: Computer virtual planning executed via patient-specific 3-D printed spacer reduction guides in distal radius corrective osteotomy provides a high degree of precision.

FP1.6

Clinical outcome of using volar plating in proximal phalangeal base fracture: a preliminary report

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FP1.7

Comparing the surgical outcomes of endoscopic carpal tunnel release (ECTR) and open carpal tunnel release (OCTR) in elderly population

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Introduction: ECTR and OCTR are the two mainstays of surgical approach to carpal tunnel syndrome (CTS). Recent studies suggest elderly with CTS can benefit from surgery. The difference in the effect of the two approaches on elderly is uncertain.

Methods: This is a retrospective study reviewing patients at 70-year-old or above who had carpal tunnel release in United Christian Hospital between 2013-2023. Patients operated for recurrent symptoms, with intraoperative conversion or combined with other major procedures were excluded. Patients were divided into ECTR and OCTR groups. The demographics, comorbidity, operative time, preoperative thenar wasting and Bland's severity scale in each group were compared. The surgical outcomes were measured by the 6-item CTS symptoms scale and subjective numbness improvement score.

Results: A total of 52 hands in 46 patients were included (ECTR, n=30; OCTR, n=22). The two groups were comparable in terms of demographics and comorbidities. The operative time was significantly longer in the OCTR group than in the ECTR group (42.4±10.4 minutes vs 28.3±8.5 minutes, $p<0.001$). The OCTR group involved more advanced diseases in terms of thenar wasting and Bland's scale. However, the two groups do not have a statistically significant difference in the surgical outcome. There were 2 cases of wound infection in the OCTR group, and 1 case in the ECTR group requiring re-operation due to incomplete release.

Discussion and Conclusion: ECTR has the advantages of shorter operative time, fewer infections, and equal effectiveness in improving symptoms compared with OCTR in the elderly.

FP1.8

Use of WALANT in spastic hand release surgeries

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FP1.9

VOLy classification for type 6 extra thumb

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Introduction: Pre-axial polydactyly bifurcating from the CMCJ (Wassel type 6) is the second least common type of extra-thumb. Within this group, marked heterogeneities in structure make surgical decision difficult. We carried out a retrospective review for this group of patients and proposed a novel classification system to guide future surgical management for similar patients.

Methods: This was a retrospective review for all patients with clinical Wassel type 6 pre-axial polydactyly operated in our centre in the past 13 years. A classification was proposed based on radiological morphology-'VOLy'. Surgical procedures were reviewed to detect any connection with the classification.

Results: There were 15 patients (7 females, 8 males) and 16 thumbs in total. All were paediatric patients except one adult. There were 7 type 'V', 5 type 'O', 2 type 'L' and 2 type 'y'. Type V thumbs in children were managed by radial digit excision. However, in the adult, web-space contracture developed and on-top transposition to the radial digit was done. In 'O' type, all MCPJs were lax and required stabilization and first web tightness was addressed in one patient by on-top transposition and augmentation in another. The 'L' type was not suitable for on-top transposition and web augmentation was necessary for web-space tightness. Type 'y' had asymmetrical nail-pulp hypoplasia; pulp combination was done in one case, and transposition in another.

Conclusion: Type 6 pre-axial polydactyly is a heterogenous group, and a classification system was proposed to address characteristics and guide surgical treatment.

FP1.10

A new sub-type analysis of Wassel type IV thumb polydactyly: a comprehensive review of anatomical features, surgical management, and outcomes

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Introduction: The aim of our study is to review cases of thumb polydactyly and to propose a new sub-type classification for Wassel IV thumb polydactyly, in addition to Hung's classification, with its potential implication in guiding surgical treatment and predicting prognosis.

Methods: This retrospective study analyzed cases of thumb polydactyly operated in a single center between 2014 and 2022. The Wassel IV thumbs were further analyzed with specific radiological features, intra-operative findings, and surgical outcomes with Tada Score.

Results: A total of 76 patients (84 thumb polydactylies) were identified. Family history was present in 12 patients (15.8%). Associated congenital anomalies were found in 3 patients (3.9%). The average follow-up time was 38 months. There were 37 Wassel IV thumbs (44%). These were sub-classify into 5 sub-types: 1. Type IVA (hypoplastic, n=8, 21.6%), 2. Type IVB (ulnar deviated, n=19, 51.4%), 3. Type IVC (divergent, n=0), 4. Type IVD (convergent, n=6, 16.2%) and 5. Type IVE (parallel, n=4, 10.8%). The Type IVE is a new sub-type which showed typical radiological findings of hypoplastic radial digit, parallel bone alignment, and intra-operative synostosis, resembling the disposable "chopsticks". Surgical Outcomes were good (Tada score=4.74/5). Type IVD has lower Tada score 4.17 ($p=0.033$). Radiological findings of synostosis index showed that value of >0.205 is a good predictor of proximal phalanx base synchondrosis.

Conclusion: This study provides a new sub-type classification of Wassel IV thumb polydactyly, which provide a better guidance to surgical treatment and prediction of prognosis.

Free Paper Session II: Spine

FP2.1

Development of machine learning algorithms for identifying spine patients with limited health literacy

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Background: Limited health literacy (HL) leads to poor health outcomes, psychological stress, and misutilisation of medical resources. Although interventions aimed at improving HL may be effective, identifying patients at risk of limited HL in the clinical workflow is challenging. With machine learning (ML) algorithms based on readily available data, healthcare professionals could incorporate HL screening without the need for administering in-person HL screening tools.

Methods: Between December 2021 and February 2023, English-speaking patients over the age of 18 and new to an urban academic outpatient spine clinic were approached for participation in a cross-sectional survey study. HL was assessed using the Newest Vital Sign and scores were divided into limited (0-3) and adequate (4-6) health literacy. Additional patient characteristics were extracted through a sociodemographic survey and electronic health records. Subsequently, five ML models were developed to predict limited HL.

Results: 753 patients were included for model development, of whom 259 (34.4%) had limited health literacy. Variables identified for predicting limited HL were age, ADI-national, SVI, insurance category, BMI, race, college education, and employment status. The Elastic-Net Penalized Logistic Regression algorithm achieved the best performance with a c-statistic of 0.766, calibration slope/intercept of 1.044/-0.037, and Brier score of 0.179.

Conclusion: ML algorithms can predict limited HL with reasonable accuracy. ML algorithms offer an opportunity to identify patients at risk for limited HL without administering in-person health literacy assessments. This could possibly enable screening and early intervention to mitigate the potential negative consequences of limited HL without taxing the existing clinical workflow.

FP2.2

Effect of intraoperative hinge fracture on post operative cervical spine alignment in double door cervical laminoplasty

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FP2.3

Increased lengthening frequency does not adversely affect the EOSQ scores in magnetically controlled growing rod surgeries in 134 subjects followed to final fusion

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FP2.4

Can anterior vertebral body tethering provide superior range of motion outcomes compared to posterior spinal fusion in adolescent idiopathic scoliosis? A systematic review

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Introduction: The aim of this systematic review was to compare the range of motion (ROM) outcomes between anterior vertebral body tethering (AVBT) and posterior spinal fusion (PSF) in the treatment of adolescent idiopathic scoliosis (AIS).

Methods: A comprehensive search of PubMed, EMBASE, MEDLINE, and Cochrane Library was conducted. Studies were included if they were published in the English language and reported on patients with AIS who were treated with AVBT or PSF. The primary outcome was ROM. Secondary outcomes included Cobb angle correction, quality of life (QOL), complications, and muscle strength and endurance.

Results: Twelve studies were included in this review. Moderate evidence suggests that AVBT results in superior ROM outcomes than PSF while achieving comparable Cobb angle correction. The comparison of QOL outcomes between AVBT and PSF remained inconclusive. In addition to the complications noted conventionally in PSF, AVBT could result in over-correction and distal adding-on. Very low evidence suggests that AIS patients treated with AVBT have superior muscle strength and endurance when compared to those treated with PSF.

Discussion and Conclusion: This is the first systematic review that compares ROM outcomes between AVBT and PSF in treating AIS. This review demonstrated that AVBT provides better preservation of ROM and muscle strength postoperatively when compared with PSF, while achieving comparable curve correction. Future studies should explore the spinal growth trajectory to determine the window of opportunity for AVBT in AIS.

FP2.6

Assessing the psycho-social effects of early screening for adolescent idiopathic scoliosis in teenagers and caregivers in Hong Kong

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Introduction: Adolescent idiopathic scoliosis (AIS) screening and treatment is well-established in Hong Kong, but the psycho-social impact on patients and caregivers is unclear. This study aimed to investigate the psycho-social effects of AIS during early screening on both patients and caregivers.

Methods: Patients aged 11-18 with AIS and their caregivers were recruited from a local tertiary centre between February and October 2021. Patients completed surveys on health-related quality of life, self-esteem, anxiety, depression, body image, and physical activity, while caregivers answered questionnaires on distress, child vulnerability, overprotection. Scoliosis misconception questionnaire was included to identify their understanding of scoliosis.

Results: A total of 134 AIS patients (32 males, 102 females) and 121 caregivers participated. Patients reported good overall health but had low physical activity levels. They experienced low anxiety, fair physical and mental health, moderate scoliosis-specific quality of life, and low self-esteem and depression. Body dysmorphism was also low. Caregivers showed moderate distress and a lower tendency towards overprotection. Both groups had moderate misconceptions about scoliosis, with incorrect beliefs about posture and fatigue being common. Cardiopulmonary functioning and activity levels were top concerns for both patients and caregivers.

Discussion and Conclusion: Patients had good overall health, but scoliosis-specific quality of life and physical activity levels were concerning. Education and support could help both patients and caregivers address misconceptions about scoliosis and manage psycho-social factors such as anxiety and distress.

FP2.7

A pooled analysis on early definitive fusion technique versus traditional growing rods implants in treating early-onset dystrophic scoliosis in neurofibromatosis type 1

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Introduction: NF-1 dystrophic scoliosis is a common manifestation of the genetic disease neurofibromatosis. In contrast to the treatment regimen for non-NF scoliosis, the variable dystrophic features warrant a case by case surgical approach. However, the technique used stays constant: growing rods (GR) or definitive fusion (SF). Currently, studies have failed to reflect if there is a better approach due to the limitation in sample sizes. Therefore, this study aims to conduct a pooled analysis of studies for a more comparative result.

Methods: This is a pooled analysis of 8 studies from PubMed. All patients are diagnosed with NF-1 and dystrophic scoliosis. They have undergone SF and GR and their respective treatment outcomes have been recorded. The following parameters were tested for significance using IBM SPSS 28: major Cobb correction, % spinal growth, complication.

Results: Across all 8 studies, there are 60 GR patients and 34 SF patients. The major cobb correction rate is 50.4% for GR and 51.6% for SF. The complication frequency is 48.3% for GR and 48% for SF. Both these parameters were not statistically significant. However, the GR patients demonstrated double percentage growth in spinal length than SF patients.

Discussion and Conclusion: This study is the first pooled analysis to compare surgical outcomes of NF-1 patients undergoing SF or GR. GR demonstrated to be a better technique in this study. Further studies should aim to gather a bigger population with more parameters such as lung function and number of unplanned versus planned surgeries.

FP2.9

Towards reducing repeated hospital attendance and admissions for patients with low back pain using a machine learning approach

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Objective: Low back pain (LBP) is a significant global health issue that often leads to repeated visits to healthcare providers and hospitalisations. The study aims to construct a prediction model for repeated hospital attendance and readmissions of patients with low back pain. Four scenarios (S) are defined to predict patient readmission to the hospital: S1 within 1 year, S2 within 1 month or 6 months, S3 within 10 weeks, and S4 within 2 weeks, 2 months, or 10 months. Each admission record is considered an individual data point for analysis, with only records where the patient is discharged to their home being retained.

Methods: LightGBM, a gradient-boosting framework is employed. For feature engineering, the Variance threshold, Random Forest, and Correlation matrix methods were applied. Finally, the model's effectiveness was assessed using a 10-fold cross-validation process and evaluation metrics such as ROC and AUC, along with a confusion matrix.

Results: The records span from 2010 to 2019, involving 96,420 patients with a total of 703,303 readmission records. Four predictive models were developed, two for binary classification (scenario 1 and 3) with AUCs of 0.873 and 0.910 respectively, and two for multiclass classification (scenario 2 and 4) with AUCs of 0.856 and 0.843 respectively. Important features in the models include patients' outpatient unit, emergency admission triage, age, and red cell distribution width (RDW).

Conclusions: Leveraging the machine learning approach, we effectively developed a predictive model capable to address the challenge of repeated patient readmissions due to low back pain.

FP2.10

Outcome of patients with vertebral fragility fractures: a 7 year-experience of a Fracture Liaison Service (FLS) in Hong Kong, China

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Introduction: The aim of this study was to evaluate the occurrence of an imminent fragility fracture within 1 year in patients with vertebral compression fracture (VCF) in our FLS.

Methods: A VCF clinic was initiated since 2016 at the Department of Orthopaedics & Traumatology, Prince of Wales Hospital. The inclusion criteria were (1) ≥1 symptomatic VCF (T1-L5), (2) within 3-months of diagnosis, (3) ≥50 years old, (4) low-energy mechanism, and (5) dual-energy X-ray-absorptiometry with osteopenia/osteoporosis. The exclusion criteria were (1) secondary osteoporosis, (2) malignancy, (3) bedbound/chairbound, (4) non-communicable, (5) infection, and (6) neurological deficits. A decrease of vertebral body height of ≥20% or a 4-mm reduction in height is the radiographic criteria for VCF. Patient education and fall prevention advice were given. Denosumab was given as the first-line agent. A retrospective review was performed from January 2016 to June 2023 from the Clinical Management System, Hospital Authority.

Results: 375 patients were recruited. The mean age of patients was 75.9±8.3. The number of levels of VCF in our patients ranged from one to eight. 1.3% (n=5) of patients suffered a fragility fracture within 1 year from the initial VCF. 0.8% (n=3) of all patients suffered a fragility hip fracture, which all occurred >1 year after the initial fracture. 1.6% patients (n=6) died within 1 year from the initial VCF.

Conclusion: This is one of the first reported FLS for VCF patients in Hong Kong. It has been shown that early patient education and treatment could potentially lead to good clinical outcomes.

FP2.11

Single door versus double door laminoplasty: retrospective study of clinical and radiological outcome

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Introduction: Laminoplasty is a common procedure in treating cervical myelopathy. This is a retrospective review of clinical and radiological outcomes between patients receiving single-door and double-door laminoplasty.

Methods: 40 patients with laminoplasty were recruited from 2018 to 2022. There was no statistically significant difference in patient's baseline characteristics including age, sex, preoperative neck pain, cervical lordosis and Pavlov ratio between the groups. However, the mean preoperative mJOA score was lower in the single-door group than in the double-door group (10.2 vs 12.3, p=0.006).

Results: Both groups had improved postoperative mJOA score (p=0.000) and Pavlov ratio at 6-month post-op (p=0.000). The recovery rate for single-door group was about twice that of the double-door group (43.7% vs 21.2%, p=0.28). The percentage change in postoperative Pavlov ratio for the single-door group is also higher (59.2% vs 54.8%, p=0.60). Postoperative cervical lordosis slightly increased only in double-door group (1.5 degrees). The operative time in single-door group was 143 minutes, which is significantly shorter than 221 minutes in double-door group (p=0.00). Less blood loss is also noted in the single-door group. There were no significant differences in C5 palsy and length of stay between both groups. Both techniques were effective for neural decompression and can be considered as viable options for treating cervical myelopathy, though they may not provide optimal deformity correction such as increasing cervical lordosis.

Conclusion: Given that single-door laminoplasty is effective with fewer operative risks (e.g. shorter operative time, less blood loss) and more technically feasible, it may be considered as a primary technique in laminoplasty in novice surgeons.

FP2.12

Spontaneous correction of proximal thoracic curve after selective thoracic fusion in Lenke 1 curve

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Introduction: According to Harm's study group, T4 is the recommended upper instrumented level for Lenke 1 curve with higher shoulder on the right. Satisfactory shoulder balance and neck tilt would be achieved with surgical correction of the main curve and spontaneous correction of proximal curve. However, the degree of corrections is not highly predictable. This is a retrospective radiological analysis of spontaneous correction in relation to various parameters.

Methods: Adolescent idiopathic patients with Lenke 1 curve stopped at T4 cranially are included. Cobb angles of the proximal and main thoracic curves, degree of neck tilt, T1 tilt, UIV tilt and lateral shoulder balance are measured in standing anteroposterior X-rays before the operation, immediately after the operations and 6 months after the operations. Flexibility of curves are represented as percentage correction comparing the standing films and supine side bending films. Skeletal maturity are assessed using the TOCI method.

Results: From 2019 to 2022, 10 patients with mean age of 16.6 years were recruited. There were significant ($p=0.00$) spontaneous corrections of both main and proximal curves with mean correction of 41 and 12 degree respectively. Significant change in T1 and UIV tilt were also observed. There was lack of correlation between percentage of spontaneous correction of proximal curve and its flexibility or percentage correction of main curve.

Discussion and Conclusion: Significant degree of spontaneous correction of proximal curve was observed, but predictability required further evaluations.

FP2.15

Surgical treatment of thoracic myelopathy due to ossification of yellow ligament: retrospective review of clinical results and surgical approaches.

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Introduction: Thoracic myelopathy due to ossification of yellow ligament (OYL) requires surgical decompression to prevent further neurological deterioration, while surgery in thoracic spine with presence of OYL is challenging and carries high risk of complications including dural tear (22%), CSF leak (10.6%) and early neurological deficit (5.7%). Purpose of this study was to analyse surgical approaches and tools in relation to clinical and operative parameters.

Methods: 24 patients with OYL presented with thoracic myelopathy and received posterior decompression surgeries from 2003 to 2023 in AHNH and NDH were retrospectively reviewed with mean follow up of 8.6 years. Surgical approaches including posterior decompression with or without instrumentation and surgical tools including burr, rongeur, ultrasonic aspirators were evaluated. Clinical and operative parameters were compared.

Results: 12 cases had adopted instrumentation and used ultrasonic aspirators for decompression. 12 cases used traditional tools (instrumented=2; non-instrumented=10). Hirabayashi recovery rate, improvement in Frankel score and mJOA were satisfactory but statistically insignificant when comparing the groups. Blood loss (p=0.077) and post-op length of stay (p=0.185) are statistically insignificant. Dura tear rate was the same in both groups (25%). There was no immediate catastrophic neurological deterioration. No recurrence or progression of symptom was observed even in the instrumented group.

Discussion and Conclusion: Posterior decompression was able to give satisfactory outcome in symptomatic thoracic OYL. High incidence of dura tear, similar to literature, with or without using ultrasonic aspirator, was seen in our study population. Meticulous surgical techniques are more important than special instruments in achieving good result.

FP2.16

Influence of curve types on spinal flexibility assessed by ultrasound scanning in patients with adolescent idiopathic scoliosis

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Introduction: Spinal flexibility has been utilised to assess surgical correction and predict the effectiveness of bracing for patients with adolescent idiopathic scoliosis. However, there are doubts regarding the prediction accuracy of the flexibility assessment which may be due to inadequate understanding. This study aims to examine the relationship between spinal flexibility and curve types using Scolioscan.

Methods: 76 female patients who were under observation for completed brace treatment were recruited and were scanned during maximum lateral bending in a prone position and in standing. The subjects were categorised into three groups based on their curve type. The Cobb angle of the whole spine, the thoracic spine, the lumbar spine, and the major curve were measured. Concave-convex asymmetry was calculated by the angle during bending to the concave side minus the angle bending to the opposite side.

Results: Among the three groups, double curve group had a greater concave-convex asymmetry than triple curve group in the lumbar spine ($p=0.00271$ for prone posture; $p=0.00553$ for standing posture). They also had a more negative asymmetry in the thoracic spine during standing ($p=0.00345$) but more positive in the major curve during prone posture ($p=0.012$) than the single curve group. The overall bending angle was more asymmetry in the double curve group than the single curve in standing posture ($p=0.0259$).

Discussion and Conclusion: Our results indicated that there was a significant difference in asymmetry between the three curve types and between postures.

FP2.17

Novel technique of bilateral diskectomy and intra-discal bone graft impaction (BDIBG)—enhancing fusion rate and preventing subsidence in transforaminal lumbar interbody fusion (TLIF) with expandable lordotic cage

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FP2.18

Correlation between knee osteoarthritis and lumbar spondylosis

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Introduction: It was known that osteoarthritis (OA) of knee and lumbar spondylosis often exist concurrently in patient, but their correlation is not well studied. Thus, this study is to investigate the relationship between knee OA in patients with lumbar spondylosis using sagittal spinal parameters of spine.

Methods: 128 patients with lumbar spondylosis and minimal to mild knee symptoms were examined retrospectively. X-ray films of knee were assessed using Kellgren and Lawrence (KL) grading system and widths of knee joint space were measured. Presence of medial and lateral joint space narrowing, osteophytes, subchondral sclerosis and subchondral cyst were documented. Several sagittal spinal parameters were collected, including sacral slope (SS), pelvic tilt (PT), L1 to S1 kyphotic angle (L1S1), T5 to T12 lordotic angle (T5T12) and pelvic incidence (PI). Simple Pearson correlation was used to assess correlation between components of knee OA and the spinal measurements.

Results: The distribution of KL grading is 20.3%, 28.1%, 32.8%, 13.3% and 5.5% from grade 0 to 4 respectively. Subchondral sclerosis and subchondral cyst are negatively correlated with SS and L1S1(r= -0.391, p=0.048 and r= -0.553, p=0.003, r= -0.404, p=0.041 and r= -0.523, p=0.006 respectively). Osteophyte is positively correlated with PT (r=0.434, p=0.027). No significant correlation is found between KL grading and joint space width with T5T12 and PI.

Conclusion: Knee OA correlates with worse sagittal spinal malalignment in lumbar spondylosis, including SS and L1S1 due to decreased lumbar lordosis. Therefore, screening of knee OA in patients with significant lumbar spondylosis may aid early detection and management.

FP2.19 ***Japanese Orthopaedic Association Ambassador Paper***

Risk factors for proximal junctional fracture following fusion surgery for osteoporotic vertebral collapse with delayed neurological deficits: a retrospective cohort study of 403 patients

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Introduction: The aim of this study is to identify the incidence and risk factors of proximal junctional fracture (PJFr) following fusion surgery for osteoporotic vertebral collapse (OVC) with neurological deficits.

Methods: This study retrospectively analyzed registry data collected from facilities belonging to the Japan Association of Spine Surgeons with Ambition (JASA) in 2016. We analyzed 403 patients retrospectively who underwent corrective surgery for neurological deficits due to OVC; only those followed up for 2 years were included. Potential risk factors related to the PJFr and their cut-off values were calculated using multivariate logistic regression analysis and receiver operating characteristic (ROC) analysis.

Results: Sixty-three patients suffered PJFr during the follow-up (mean 45.7 months). In multivariate analysis, the grade of osteoporosis (p=0.001) and LIV level (p=0.003) were independent factors. ROC analysis demonstrated that lumbar bone mineral density (BMD) was a predictive factor (p=0.035) with optimal cut-off value of 0.61 g/cm^2 (sensitivity, 76.5%; specificity, 58.3%), but that of the hip was not (p=0.228).

Conclusion: PJFr was found in 16% cases within 4 years after surgery; independent risk factors were severe osteoporosis and extended fusion to the sacrum. The lumbar BMD with cut-off value 0.61 g/cm^2 may potentially predict PJFr.

FP2.20 ***Malaysian Orthopaedic Association Ambassador Paper***

Upper instrumented vertebra tilt angle in Lenke 1 and 2 adolescent idiopathic scoliosis patients with post-operative medial shoulder balance

Chin Zheng Yao

Adolescent idiopathic scoliosis (AIS) is the commonest form of all idiopathic scoliosis. One of the main goals of scoliosis surgery is to improve cosmesis. Nevertheless, incidence of post-operative shoulder imbalance is reported up to twenty-five percent. There are two types of shoulder imbalance, medial and lateral. Medial shoulder asymmetry is reflected clinically by trapezial prominence and radiologically by T1 Tilt, whereas lateral shoulder asymmetry is represented by clavicle angle. This is a retrospective study conducted in the Department of Orthopedic Surgery in University Malaya Medical Centre (UMMC) from June 2021 to December 2021. Pre-operative and post-operative radiological parameters of shoulder balance of Lenke 1 and 2 AIS patient who underwent posterior spinal fusion (PSF) surgery in UMMC between January 2013 and June 2019 were measured and analysed accordingly. In this study, an optimum UIV tilt angle of -6.4°±2.1°, -5.8°±3.2°, -4.9°±3.4°should produce balanced medial shoulder in Lenke 1 negative, Lenke 1 positive and Lenke 2 patients, respectively, regardless of UIV level. Positive or close to zero final UIV tilt angle produced positive medial shoulder imbalance while a UIV tilt angle close to -10° erred towards producing negative medial shoulder imbalance. This study therefore offered knowledge and insight of the UIV tilt angle that produced medial shoulder balance among Lenke 1 negative, Lenke 1 positive and Lenke 2 AIS patients.

Free Paper Session III: Basic Science

FP3.2

Anti-RANKL treatment suppresses macrophage infiltration and attenuates mitochondria deterioration during sarcopenia

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Introduction: Sarcopenia is an age-related geriatric syndrome which is associated with subsequent disability and morbidity. The receptor activator of nuclear factor NF-κB ligand (RANKL) inhibits myogenic differentiation and leads to skeletal muscle dysfunction. The study aims to investigate the effects of an anti-RANKL treatment on sarcopenic skeletal muscle and explore the related mechanisms in mitochondria modulation and the polarization status of macrophages.

Methods: Sarcopenic senescence-accelerated mouse P8 (SAMP8) mice at month 6 were treated intraperitoneally with 10 mg/kg anti-RANKL (Bio X Cell) every 2 weeks and harvested at month 10. Senescence accelerated mouse resistant-1 (SAMR1) were collected at month 10 as age-matched non-sarcopenic group. Ex-vivo functional assessment, grip strength, oil red and immunostaining of CD45, F4/80, CD206, iNOS, C/EBPa, and Pax7 were performed. Mitochondria morphology was examined with a transmission electron microscope (Hitachi H7700, Tokyo, Japan). Data analysis was done with one-way ANOVA, and the significant level was set at $p \leq 0.05$.

Results: After anti-RANKL treatment, tetanic, twitch force and grip strength were significantly higher than CTL group ($p<0.01$, $p<0.01$ and $p<0.05$). Anti-RANKL treatment could significantly decrease CD45, F4/80, iNOS, C/EBP□ and CD206 positive area and oil red area, and significantly increase PAX7 positive cell numbers. There was an increase in the number of intermyofibrillar mitochondria and restoration of mitochondria morphology in Anti-RANKL group.

Discussion and Conclusion: The anti-RANKL treatment protected against sarcopenic skeletal muscle through suppressing muscle inflammation and modulating mitochondria which may represent a novel therapeutic approach for sarcopenia.

FP3.3

Infrapatellar fat pad adipose-derived stem cells co-cultured with articular chondrocytes from osteoarthritis patients exhibit increased chondrogenic gene expression

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Introduction: Current trials of mesenchymal stem cell (MSC) therapy for knee osteoarthritis demonstrate heterogenous outcomes regarding osteochondral repair. We sought to understand this by investigating the in-situ crosstalk between MSCs and chondrocytes, and how it promotes chondrogenesis.

Methods: Human adipose-derived MSCs and chondrocytes were respectively extracted from the infrapatellar fat pad and non-weight-bearing cartilage of osteoarthritis knee joints (Kellgren-Lawrence III/IV). Multipotency of MSCs is characterised using flow cytometry and immunohistochemistry. MSCs and chondrocytes were respectively mono-cultured as controls and co-cultured at 1:1, 10:1, 100:1 ratios. Chondrogenic gene expression was measured by Real-Time quantitative-PCR with a panel comprising: COL1A1, COL2A1, COL10A1, L-SOX5, SOX6, SOX9, ACAN, HSPG2, COMP. Expression levels measured in co-culture samples is compared with an expected reference level of expression derived from control-monocultures, to determine whether co-culturing MSCs in proximity with chondrocytes facilitates signalling crosstalk that promotes chondrogenic differentiation.

Results: Chondrogenic gene expression measured in MSC-chondrocyte co-cultures were greater than their expected level of expression ($p<0.05$). This is more pronounced in co-cultures where MSC-chondrocyte cell counts were in parity: 1:1 cultures demonstrated greater than expected expression of COL2A1 ($p=0.004$), L-SOX5 ($p=0.0061$), SOX6 ($p=0.0036$), SOX9 ($p=0.0029$), ACAN ($p=0.0002$), COMP ($p=0.0038$); 10:1 cultures in SOX9 ($p=0.0412$) & ACAN ($p=0.0245$); 100:1 cultures in L-SOX5 ($p=0.0136$) & SOX6 ($p=0.0426$).

Conclusion: Proximity-based crosstalk between chondrocytes and MSCs promotes chondrogenesis. The optimal microenvironment which facilitates crosstalk is contingent upon the sufficient relative abundance of both cell types, i.e. when MSC & chondrocyte counts near parity. Cell-based therapies using MSCs pre-conditioned by chondrocytes represents one of the future directions to achieve satisfactory osteochondral repair when managing early-stage osteoarthritis.

FP3.4

Prospective randomized controlled study on the effects of valgus knee brace for knee osteoarthritis in Chinese patients

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Introduction: Osteoarthritis of the knee is the most common type of arthritis affecting the middle age and geriatric population. Orthotic device can theoretically alter the loading to the knee joint and help to provide symptomatic relief. The purpose of the study is to evaluate the effectiveness of valgus knee brace in ethnic Chinese patients with medial compartment knee osteoarthritis compared with physiotherapy.

Methods: A prospective randomized controlled study from January 2020 to December 2021 was carried out in our institution. Patient with radiological evidence of symptomatic medial compartment osteoarthritis were recruited from our out-patient clinic. They were randomized into 2 groups. Patients in the control group received a course of standardized, protocol driven knee physiotherapy. Patients in the knee brace group the same course of physiotherapy, with the additional prescription of valgus knee brace. The Western Ontario and McMaster Universities Arthritis Index (WOMAC) and visual analogue scale scores (VAS) were used as outcome measured. Patients were assessed before the treatment, and at 16 weeks after the treatment.

Results: 50 patients were recruited. 29 and 21 patients were recruited into the control and knee brace group respectively. Both groups showed improvement in WOMAC score (pain, functional and total) as well as VAS ($p<0.01$). WOMAC (functional) score of the knee brace group had significantly improved compared to the control group ($p<0.05$).

Discussion and Conclusion: Both physiotherapy and valgus knee braces were effective in providing symptomatic relief in patients with medial compartment osteoarthritis.

FP3.5

An interpretable knee replacement risk assessment system for osteoarthritis patients

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Introduction: We aim to develop a quantitative and self-administrable knee replacement (KR) risk stratification system for knee osteoarthritis (KOA) patients by leveraging tabular clinical features.

Methods: A total of 17 baseline features were extracted from 9,592 cases including those with left and right censoring in the Osteoarthritis Initiative (OAI) cohort. A survival model was constructed using the Random Survival Forests algorithm. Sequential Forward Selection was implemented to filter the most relevant features. The prediction performance was evaluated with the concordance index (C-index) and average receiver operating characteristic curve (AUC). A three-class KR risk stratification system was built to differentiate three distinct KR-free survival groups. Thereafter, survSHAP(t) was introduced for model explanation.

Results: KR incidence was accurately predicted by the model with a C-index of 0.774 and an average AUC of 0.825 with 9 clinical features. Three distinct survival groups were observed from the KR risk stratification system with a four-year KR rate of 0.86%, 6.39%, and 16.5% from the low, medium, and high-risk groups respectively. SurvSHAP(t) revealed that older age, higher Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Physical Function Score and body mass index, history of knee surgery, and regular use of pain medications, were the most conducive risk factors to KR incidence.

Conclusion: A self-administrable and interpretable KR survival model was developed, underscoring a KR risk scoring system to stratify KOA patients. It will help identify the modifiable risk factors towards personalised healthcare for secondary prevention of KOA.

FP3.6

A hydrogel drug delivery system to treat sarcopenia

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Background: Sarcopenia is an age-related skeletal muscle disease. β-aminoisobutyric acid (BAIBA) will increase during and after exercise. Chronic gastrointestinal diseases affect sarcopenic patients. Bioactive glass (BG) is effective in gastrointestinal inflammation. We perform a hydrogel containing BAIBA and BG to treat sarcopenia.

Methods: Senescence-accelerated prone mice (SAMP8) were randomized into control (CTL), BAIBA (BA), hydrogel with BAIBA (HBA), hydrogel with BG (HBG), and combine (COM) groups. Muscle function and mass were tested. Inflammation levels in small intestinal and serum were tested. Muscle tissue and adipose tissue were tested by oil red O staining and histology tests. In-vitro, the C2C12 cell line was treated with BA and BG.

Results: The lean mass of BA, HBA, and COM was higher than the CTL group. Twitch, tetanic and tetanic forces of BA, HBA, HBG, and COM groups were higher. BA, HBA, and COM presented lower oil red O areas than the CTL. Type I muscle fiber in the CTL group was higher than BA, HBA, and COM groups. Inflammation level was decreased in HBG and COM than CTL group. The expression levels of PGC1a, PPARa, UCP1, and CIDEA in BA, HBA, and COM were higher than CTL group.

Conclusion: Our results showed that BA interventions enhanced muscle strength and decreased the percentage of fat mass and intramuscular fat by altering cell fate from adipogenesis to myogenesis and inhibiting intramuscular lipid accumulation. BG interventions could decrease the inflammation level in small intestinal and serum. Muscle strength was enhanced and greater in the combined intervention.

FP3.7

Overexpression of FAPB4 in clinical samples and animal model of tendinopathy is associated with excessive tendon inflammation

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Introduction: Tendinopathy is a disabling tendon disorder with disappointing treatment outcomes. Excessive inflammation has been suggested to contribute to the disease pathogenesis. Fatty acid binding protein 4 (FABP4) is a pro-inflammatory adipokine mediating various metabolic and inflammatory diseases. However, its roles in tendinopathy have never been explored. We investigated the expression of FABP4 and its association with the expression of inflammatory cytokines in clinical samples and animal model tendinopathy.

Methods: 1) Clinical patellar tendinopathy samples and healthy hamstring tendon samples (n=6/group), 2) metabolically healthy rotator cuff tendinopathy samples and age-matched and metabolically healthy hamstring tendon samples (n=5/group); and 3) Achilles tendons of C57BL/6J mice at week 1 after 0.1 mg collagenase or saline injection (n=5/group) were stained with FABP4 by IHC. For animal samples, consecutive sections were also stained with inflammatory cytokines by IHC. For the rotator cuff tendinopathy samples, expression of inflammatory cytokines was examined by co-localization of FABP4 with IL-1β was done by IF (n=5/group).

Results: There was significant overexpression of FABP4 in both patellar tendinopathy samples and rotator cuff tendinopathy samples compared to their corresponding controls (both $p<0.05$). FABP4 was mainly expressed in the blood vessels, hypercellular area and calcified region. Collagenase induced tendinopathic-like changes and overexpression of inflammatory cytokines (IL-1β, IL-6, TNF-α, IL-10) in mouse Achilles tendons, with a concomitant increase in FABP4 expression. The expression of IL-1β increased in human rotator cuff tendinopathy samples and co-localized with the expression of FABP4.

Conclusion: Overexpression of FABP4 is associated with excessive inflammation in the pathogenesis of tendinopathy.

FP3.8

Engineering stem cells to produce exosomes with enhanced bone regeneration effects: an alternative strategy for gene therapy

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Introduction: Mesenchymal stem cell-derived exosomes (MSC-Exo) have attracted much attention for their applications in "cell-free" therapies, such as enhancing regeneration in musculoskeletal system. However, the regeneration capacities of exosomes are susceptible to sources and status of donor cells.

Methods: Our team has developed a strategy to produce exosomes with enhanced bone regeneration potency (MSC-BMP2-Exo) by genetically engineering exosome donor MSCs with bone morphogenetic protein-2 gene.

Results: The MSC-mediated gene therapy strategy is developed in which mediator MSCs are genetically engineered by bone morphogenetic protein-2 gene to produce MSC-BMP2-Exo with enhanced bone regeneration potency. This effect is attributed to the synergistic effect of the content derived from MSCs and the up-regulated BMP2 gene expression. The MSC-BMP2-Exo also present homing ability to the injured site. The toxic effect of genetical transfection vehicles is borne by mediator MSCs, while the produced exosomes exhibit excellent biocompatibility. In addition, by plasmid tracking, it is interesting to find a portion of plasmid DNA can be encapsulated by exosomes and delivered to recipient cells.

Discussion and Conclusion: In this strategy, engineered MSCs function as cellular factories, which effectively produce exosomes with designed and enhanced therapeutic effects. The accelerating effect in bone healing and the good biocompatibility suggest the potential clinical application of this strategy.

FP3.9

Adipose-derived stromal cells (ADSCs) and their secretome reversed excessive inflammation in tendon-derived stem/progenitors cells (TDSCs) isolated from tendinopathy patients

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Introduction: Tendon overuse initiates an inflammatory cascade that promotes aberrant tendon-derived stem/progenitor cell (TDSC) differentiation, causing tissue metaplasia and failed healing. Mesenchymal stromal cells (MSCs) and their secretome are known to exhibit immunomodulatory effects. This study aimed to examine the effects of adipose-derived stromal cells (ADSCs) and their secretome in suppressing excessive inflammation in TDSCs isolated from tendinopathy patients.

Methods: ADSCs and secretome were supplied by Rohto Advanced Research Hong Kong Ltd (ARHK). TDSCs isolated from normal hamstring tendon (nTDSCs) and pathological rotator cuff tendon (pTDSCs) were treated with ADSCs and secretome. The mRNA expression of inflammatory markers in nTDSCs and pTDSCs after treatment was examined.

Results: pTDSCs expressed higher level of inflammatory cytokines compared to nTDSCs. Addition of ASDCs and secretome reversed excessive gene expression of inflammation in pTDSCs and nTDSC. ADSC secretome showed similar effects on pTDSCs compared to ADSCs.

Conclusion: ADSCs and secretome reversed excessive inflammation in pTDSCs. ADSC secretome might be useful as a cell-free alterative for the treatment of tendinopathy.

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FP3.10

Targeting subchondral bone osteocytes by magnet guided anti-H19 delivery for osteoarthritis treatment: a preclinical study

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FP3.11

Low-magnitude high-frequency vibration attenuates sarcopenia and modulates mitochondria dynamically

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FP3.12

The application of direct evolution for gene therapy vector development and screening

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FP3.13

Decellularized tendon-derived stem/progenitor cell sheet augmented graft healing after anterior cruciate ligament reconstruction via enhancing osteogenesis

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Introduction: We have previously shown that wrapping tendon graft with decellularized tendon-derived stem/progenitor cell (dTDSC) sheet prior to bone tunnel insertion promoted graft healing in an anterior cruciate ligament reconstruction (ACLR) model. The underlying mechanism remains unclear. This study aimed to examine the osteogenic effects of dTDSC sheet in vitro.

Methods: The expression of periostin and SDF-1 in dTDSCs was examined by ELISA. The effects of dTDSC sheet on the proliferation, migration, osteogenic differentiation of mouse MC3T3 pre-osteoblasts were assessed by AlamarBlue assay, transwell assay, Alizarin red-S staining and mRNA expression of osteogenic markers.

Results: dTDSC sheet expressed similar levels of periostin and SDF-1 as compared to TDSC sheet. dTDSC sheet enhanced proliferation, migration, calcium nodule formation and gene expression of osteogenic markers in MC3T3 cells upon osteogenic induction compared to the plastic surface control.

Discussion and Conclusion: dTDSC sheet expressed osteogenic factors and enhanced proliferation, migration, and osteogenic differentiation of pre-osteoblasts. The expression of SDF-1 in dTDSC sheet could attract stem/progenitor cells to the injury site for tissue repair. These findings could explain increased tunnel bone in ACLR after dTDSC sheet transplantation.

Acknowledgement: Supported by ITF with 10% funding support from Grand Win Technology Development Ltd. (Ref. ITS/179/21FP).

FP3.14

From clinical to benchside: Probiotics Lactobacillus rhamnosus and Faecalibacterium prausnitzii treats sarcopenia in aged mice through regulation of mitochondria function

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FP3.15

Exploring the molecular mechanism of type XV osteogenesis imperfecta caused by WNT1 mutation

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Osteogenesis imperfecta (OI) is a serious genetic bone disorder characterized by congenital low bone mass, deformity and frequent fractures. Type XV is a moderate to severe form of OI caused by mutations in WNT1, while heterozygous carriers display early onset osteoporosis. In the pilot study of 243 OI patients from southern China, we found the proportion of type XV patients was relatively high (~10%) with a diverse phenotypic spectrum. Functional assays indicated that mutations of WNT1 significantly impaired its secretion and effective activity. Analysis of proteomic data indicated that the expression of SOST was dramatically reduced. Single-cell transcriptome data suggested the maturation of osteoblasts and osteocytes was impaired. We will further explore the functions of Wnt1 through loss-of-function (Wnt1flox) and gain-of-function (Rosa26Wnt1) mouse models during the skeletal development. These genetic models combined with multi-omics data will delineate how WNT1 activates downstream signaling pathways and regulates the differentiation and maturation of skeletal stem cells, which will give insights into the pathogenic mechanisms of type XV osteogenesis imperfecta, and provide a new direction for the treatment strategy of common low bone mass diseases such as early onset osteoporosis.

FP3.16

Lower CYP27B1 expression in osteocytes increases the risk of scoliosis curve progression in a mouse model—a new insight to improve bone quality in Adolescent Idiopathic Scoliosis

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FP3.17

Mg-containing hybrid interference screw promotes the healing of ACL reconstruction

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Introduction: Magnesium (Mg) and alloys have been recognized as potential biodegradable materials in anterior cruciate ligament (ACL) reconstruction due to promising effects on osteogenesis, angiogenesis, and tissue regeneration. However, one of the obstacles limiting the application of pure magnesium implant in clinic is that mechanical support is impaired at the rapid degradation phase after implanted in vivo. We innovatively designed a Mg-containing hybrid interference screw to maintain the mechanical strength while make good use of the biological effects of Mg.

Methods: Twenty-four skeletally mature Chinese mountain goats were divided into control group and Mg group, which were fixed with conventional titanium interference screw and Mg-containing hybrid interference screw to fix the graft in bone tunnel in ACL reconstruction, respectively.

Results: X-ray showed no signs of deformity or dislocation in both groups. For macroscopic evaluation, Mg group showed a relatively better outcome with more tissue connection and cartilage matrix at the tunnel aperture, which showed a higher Oswestry Arthroscopy Score than the control group at week 8 and week 16. HR-pQCT results showed greater BV/TV in the Mg group at both week 8 and week 16 compared to control group. At weeks 8 and 16, the tibial tunnel diameter in the Mg group was smaller than the control group.

Discussion and Conclusion: The innovative Mg-containing hybrid interference screw shows superior outcomes in terms of new bone formation around the bone tunnel than conventional interference screw, highlighting the great translational merit.

FP3.18

Deep-learning radiomics for survival analysis on anticipated knee arthroplasty using posteroanterior view X-rays

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Introduction: Knee osteoarthritis (OA) prognosis presents a significant challenge in orthopaedics, influencing the timing of potential knee arthroplasty and patient triage. While diagnosing the current stage of knee OA is achievable, forecasting its future progression is not straightforward. To address this challenge, we propose a deep-learning radiomics model, which boasts strong predictive power without the need for manual segmentation.

Methods: 9592 knees were retrospectively extracted from the Osteoarthritis Initiative dataset. Our approach involves automatic bounding box segmentation of the tibiofemoral joint from posteroanterior view X-rays. A Convolutional Neural Network (CNN) is leveraged to extract relevant textural information. We implement a long-short-range self-attention aggregation mechanism to identify the most crucial parts and features of an image. A Cox regression model is then employed for survival analysis, facilitating the stratification of patients into different risk categories.

Results: Our deep-learning radiomics model outperforms traditional methods, demonstrating superior prognostic performance. Notably, the risk stratification provided by our model presents distinct survival patterns, effectively identifying patients at high risk of rapid knee OA progression and imminent knee arthroplasty.

Discussion and Conclusion: This study introduces a novel application of deep-learning radiomics for the stratification of medical images, demonstrating the substantial potential to enhance the prognosis of knee OA and lesion detection. Combining CNNs, self-attention aggregation, and Cox regression modelling provides a reliable and efficient prognostic tool for knee OA progression. By offering more accurate forecasting of disease progression, our method could significantly enhance clinical decision-making around knee arthroplasty, leading to improved patient outcomes.

FP3.19

Harnessing DenseNet-based deep learning for robust and precise osteoporosis classification: an evaluation using spine, hip, and Wrist X-ray images

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FP3.21

A preclinical study exploring the link between vitamin D and muscle function in aging muscle

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FP3.22

Temporal changes of regulatory T cells in synovial tissue following knee injury in a mouse model of posttraumatic osteoarthritis

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FP3.23

Inhibition of piezo1 improves tendon healing

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FP3.24

Bilayer biomimetic membranes enhance tendon-bone healing

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FP3.25

Effect of β-hydroxy-β-methylbutyrate and vibration on age-related neuromuscular junction degeneration in sarcopenia mice model

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Introduction: Sarcopenia is an aging-induced deterioration of skeletal muscle mass and function. β-hydroxy-β-methylbutyrate (HMB) was shown to increase muscle mass and strength. Also, low-magnitude high-frequency vibration (LMHFV) was demonstrated to alleviate the neuromuscular junction (NMJ) degeneration in sarcopenic SAMP8 mice during ageing. We hypothesized that LMHFV combined with HMB treatment could attenuate NMJ degeneration in sarcopenic mice.

Methods: Senescence-accelerated (SAMP8) male mice were randomized into control (CTL), HMB and combined HMB with LMHFV (COM) groups. Interventions were started at age of month 6 and assessed at 4-month post-intervention. The grip strength, muscle cross sectional area (MCSA), muscle wet weight, and ex-vivo muscle function were used to assess muscle mass and strength. Ex-vivo NMJ function and immunofluorescence (IF) of NMJ were applied to evaluate NMJ function and morphology respectively.

Results: After 4 months of intervention, the grip strength of control SAMP8 mice was significantly lower than those of HMB and COM groups. Tetanic force and specific tetanic force of VIB, HMB and COM groups showed significantly higher values than CTL group. The IF staining of NMJ showed that AChRs clusters in CTL group presented severe fragmentation, discreteness, and dispersion, whereas AChRs were significantly less fragmented in COM group. Furthermore, ex-vivo NMJ function was significantly improved in COM group at 4 months post-treatment.

Conclusions: HMB combined with LMHFV interventions could better enhance muscle strength and attenuated NMJ degeneration in SAMP8 mice as compared with either treatment alone.

FP3.26

The relationship between bile acids, vitamin D and muscle function in patients with knee OA

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Background: Vitamin D influences the incidence and progression of knee osteoarthritis. Recent studies indicated that gut microbiota (GM) diversity has an impact on overall bile acid levels, which in turn affects the activation of vitamin D and its role in regulation of muscle functions. Limited studies have investigated the relationships between bile acid and musculoskeletal functions. This study aimed to compare the bile acids, muscle strength and function between normal and deficient Vitamin D levels.

Methods: Vitamin D status was measured by serum 25-hydroxyvitamin D level (25(OH)D) and categorized into two groups: Vitamin D-deficient (G1, n=36, 15.9 ± 3.3 ng/mL) and normal Vitamin D groups (G2, n=27, 36.1 ± 5.7 ng/mL). Primary and secondary bile acids were measured. Hand-held dynamometer was used to assess isometric knee muscle strength. Muscle function was evaluated using 6 meter gait speed test and chair-to-stand test. Independent t-test was used to compare all the parameters in two groups.

Results: Vitamin D-deficient group was shown to have significantly lower muscle strength compared with normal vitamin D group ($p<0.05$). Vitamin D-deficient group also had significantly higher BMI ($p=0.031$). Compared with the normal vitamin D group, primary and secondary bile acids were found to be 46% and 15% lower in vitamin D deficient group, respectively ($p=0.211$, $p=0.37$).

Conclusion: Vitamin D deficiency patients have worse knee muscle strength and a tendency for lower bile acids. We recommend vitamin D supplement as a routine treatment for OA knee patients. Interventions to improve bile acids may also improve the activation of Vitamin D activity.

Free Paper Session IV: Sports Medicine

FP4.1

A rare case of large Morel-Lavallee lesion of the knee successfully managed conservatively: a case report

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Morel-Lavallee lesion in the knee is seldom reported. This is a case report on the largest documented size of Morel-Lavallee lesion of the knee to date (13.6×14.0×3.0 cm), successfully managed non-operatively. It was a case of 19-year-old boy who suffered from a bike accident. There were skin abrasion marks, bruises and gross swelling over antero-medial knee. Bedside ultrasound showed a large well encapsulated hematoma at subcutaneous plane. MRI showed consistent findings with ultrasound, suggestive of Morel-Lavallee lesion of the knee. Ultrasound guided aspiration showed no yield. He was managed conservatively with regular dressing, compressive bandage, non-steroidal anti-inflammatory drugs and hinge knee brace for protection. Frequent clinical and sonographic follow up were arranged. The patient achieved full active knee range at 4 weeks post injury and knee brace removed. There was further reduction in the knee swelling and lesion size at 7 weeks post injury. This report highlights the role of ultrasound in managing such lesion.

FP4.2

In vivo effect of single intra-articular injection of tranexamic acid on articular cartilage and meniscus in a rat model

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Introduction: Tranexamic acid (TXA) has been increasingly used in arthroscopic surgeries to prevent the hemarthrosis. Despite its effectiveness, safety concerns have been raised regarding the potential cytotoxicity on articular cartilage and meniscus following intra-articular injection.

Methods: To evaluate the impact of TXA on cartilage and meniscus, a rat model of knee instability was utilized, wherein an anterior cruciate ligament transection (ACL) surgery was followed by a single intra-articular injection of TXA at varying concentrations (0, 20, 50, 100, and 150 mg/mL) in saline. After 24 hours, cell viability assessment of the cartilage and meniscus was conducted (n=6), and gross observation and histological analysis of the medial tibial plateau and medial meniscus were conducted at the 2, 4, and 8 weeks (n=6).

Results: The chondrocyte viability was significantly decreased in 50, 100, and 150 mg/mL groups compared with the saline group, as did meniscus cell viability. At week 8, while the Saline, 20, and 50 mg/mL groups showed relatively normal appearances, the 100 and 150 mg/mL groups exhibited increased and varying severity of cartilage and meniscus degeneration. In the 150 mg/mL group, the OARSI scores were significantly higher than those in the Saline and 20 mg/mL groups.

Discussion and Conclusion: Our findings indicate that concentrations of TXA at or above 100 mg/mL can lead to decreased cell viability in both cartilage and meniscus, resulting in significant cartilage degeneration in rats with anterior cruciate ligament transection. Furthermore, the use of 150 mg/mL TXA led to significant meniscal degeneration.

FP4.3

Is there a difference in clinical outcomes at 5-year follow-up between patients suffering from re-tear of rotator cuff repair and those with intact repair on post-operation MRI?

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The high rate of retear associated with rotator cuff repair is well-known, but it is unclear whether this leads to poor clinical outcomes. This study aimed to investigate whether there was a difference in clinical outcomes between patients with a retear and those with an intact repair, in a mid-term follow-up of five years. The study enrolled patients who had undergone primary arthroscopic-assisted complete repair of the supraspinatus tendon, with post-operation MRI and a minimum follow-up of five years. Clinical outcomes, including visual analogue scale (VAS), American Shoulder and Elbow Surgeon Score (ASES), and active forward flexion (FF) of the shoulder, were assessed at two-year and five-year follow-ups. The rate of 5-year follow-up was 84%. Of the 105 patients who attended the five-year follow-up, 14 had a retear and 91 had an intact repair found on post-operation MRI. The retear rate was 13%. Both groups showed significant improvement in VAS, ASES, and FF between pre-operation and the two follow-up time-points. At the two-year follow-up, there was no difference in VAS and ASES between the two groups. However, at the five-year assessment, patients with an intact repair had better VAS (p=0.049) and ASES scores (p=0.019) than those with a retear. FF did not differ significantly between the groups. For patients with an intact repair confirmed by MRI, continuous improvement was observed in VAS (p=0.005) between the two-year and five-year follow-ups. This improvement was not seen in the retear group and may explain the difference in the two groups at 5-year follow-up.

FP4.4

Outcome of arthroscopic rotator cuff repair in massive rotator cuff tear with pseudoparalysis

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Introduction: Pseudoparalysis is a clinical condition that results from massive rotator cuff tears (RCT) in patients. It is defined by an inability to actively forward flex or abduct shoulder greater than 90 degrees, while having a relatively preserved passive range of motion. While many patients with massive RCT can still enjoy good overhead function with their affected shoulder, there is still a significant subset of patients who suffer from pseudoparalysis. Treatment for massive rotator cuff tear with pseudoparalysis can include reverse total shoulder arthroplasty or arthroscopic rotator cuff repair. Arthroscopic rotator cuff repair has been shown to have lower complication rates and joint preservation. Our centre has shown that arthroscopic rotator cuff repair can effectively reverse pseudoparalysis in a majority of cases.

Methods: This retrospective centre-based study evaluated 192 patients with cuff injuries who sought medical attention in Queen Mary Hospital between 2016-2021. Patients with pseudoparalysis were defined by active forward flexion <90 degrees or active abduction <90 degrees. Cases were identified and their clinical notes, imaging and operative records were reviewed.

Results: 27 cases of pseudoparalysis were identified. 24 cases within this subset of patients had undergone arthroscopic repair. Reversal of pseudoparalysis was defined as achieving active forward flexion and abduction of <90 degrees. In the arthroscopic repair group, 19 patients had reversal of pseudoparalysis following surgery (79.2%).

Discussion and Conclusion: Arthroscopic rotator cuff repair is an effective treatment option in reversing pseudoparalysis in patients with massive rotator cuff tear.

FP4.5

Retrospective comparative study of single-row versus double-row fixation in arthroscopic rotator cuff repair

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Introduction: Arthroscopic rotator cuff repair is a commonly performed surgeries for patients with traumatic or degenerative rotator cuff tear. Single-row and double-row fixation methods have both been reported in the literature with satisfactory clinical results.

The purpose of this study was to determine whether patients with arthroscopic rotator cuff repair using double-row fixation have superior clinical outcomes compared with patients with single-row fixation.

Methods: Patients with arthroscopic rotator cuff repair with suture anchor fixation from June 2020 to December 2022 were retrospectively reviewed. Group A consisted of patients with single-row fixation and Group B with double-row fixation. All patients were followed up at post-operative 6 month. Constant-Murley Shoulder Outcome Score and UCLA Shoulder Score for each patient were charted.

Results: 60 patients were reviewed with 4 patients who were lost to follow-up. 56 patients were included and classified into Group A (n=28) and Group B (n=28). The means age was 62.0 (range 49-75, SD 6.37) for Group A and 62.2 for Group B (range 49-75, SD 8.48) [p=0.46]. The mean UCLA Shoulder score was 72.2+/-10.9 for Group A and 67.8+/-23.9 (p=0.35). The means Constant Score was 75.4+/-10.2 for Group A and 65.1+/-19.7 for Group B (p=0.15).

Conclusion: Arthroscopic rotator cuff repair with double-row fixation produced similar and comparable short to medium term outcomes compared with single-row fixation.

FP4.6

Arthroscopic suture button fixation for acute acromioclavicular dislocation

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Introduction: High grade acromioclavicular joint (ACJ) dislocations are commonly treated surgically. Arthroscopic assisted suture button fixation is gaining popularity with the advantage of smaller incision and less implant related complication when comparing traditional open fixation with rigid implants.

Methods: From 2013 to 2022, there were 16 cases of ACJ dislocation treated with arthroscopic assisted suture button fixation in our institution. Background demographic, functional and radiological assessments were assessed retrospectively.

Results: Mean follow up period was 29.4 months. There were significant improvements in the coracoclavicular distance (CCD) immediately after the surgery (19.1±3.9 mm vs 8.4±2.5 mm, $p<0.0001$) and in the final follow up (19.1±3.9 mm vs 11.2±2.5 mm, $p<0.0001$). All patients enjoyed good to excellent outcome functionally. Final follow up X-ray showed button subsidence in 8 cases and ACJ arthritis in 2 cases without clinical symptom. No clinical complication was observed.

Discussion and Conclusion: Arthroscopic assisted suture button fixation is safe and effective in managing ACJ dislocation functionally and radiologically.

FP4.7

Large Hill-Sachs lesion. Finally, a better solution

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FP4.8

The effect of whole body vibration training on neuromuscular performance and knee biomechanics during landing for ACL injury prevention

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Introduction: An effective Anterior Cruciate Ligament (ACL) injury prevention program is needed to reduce the ACL injury risk. Whole body vibration (WBV) is a neuromuscular training method that has been widely used for muscle strengthening and rehabilitation. This study aims (1) to investigate the effect of 6-week WBV training on strength performance of quadriceps and hamstring and (2) to detect its effect on neuromuscular control and knee biomechanics during landing.

Methods: 10 healthy volunteers were recruited and randomly assigned to the WBV group or the control group. Subjects in the control group did regular exercise, while subjects in the WBV group received 6 weeks of WBV training (3 times/week) in addition to regular exercise. Isokinetic peak torque of quadriceps and hamstring was measured to evaluate strength performance, while knee biomechanics, and electromyographic (EMG) activity during single leg hop and vertical drop landing were measured to quantify neuromuscular control.

Results: In WBV group, quadriceps peak torque (219.08±14.25 vs 236.58±16.8, p=0.009), hamstring peak torque (97.41±8.88 vs 113.61±9.99, p=0.017), and H:Q strength ratio (43.95±2.15 vs 47.58±2.08, p=0.047) increased significantly after WBV training, whereas there were no significant changes in the control group ($p>0.05$). There were no significant changes in terms of EMG activity and knee biomechanics in both groups ($p>0.05$).

Discussion and Conclusion: Regular WBV training significantly increases hamstring to quadriceps muscle strength, which may reduce the risk of ACL injury. We may propose to incorporate this WBV training into current ACL injury prevention program.

FP4.9

Clinical outcome of arthroscopic lateral release for lateral patella compression syndrome

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Introduction: Lateral patella compression syndrome presents as compression pain over the lateral facet of the patella after prolonged sitting, contributed by the lateral retinaculum's tightness, leading to improper tracking of the patella in the trochlear groove. Lateral release of the retinaculum can be used when conservative treatment fails. In this study, we would like to evaluate the clinical outcome of arthroscopic lateral release for lateral patella compression syndrome in United Christian Hospital.

Methods: 6 patients (9 knees) who had undergone arthroscopic lateral retinaculum release from lateral patella compression syndrome between January 2013 to January 2023 in United Christian Hospital were recruited. Clinical outcomes including range of movement of the knee, X-ray findings of lateral patellofemoral angle, sulcus angle and congruent angle, and patient-reported symptoms measured by visual analogue pain scale (VAS) and Lysholm Knee Scoring Scale were measured. T-test was used in our study. P-value <0.05 is defined as statistically significant.

Results: There is a statistically significant improvement in both X-ray findings and patient-reported symptoms, including the lateral patellofemoral angle (-11.62±6.25 vs -8.57±5.13, p=0.008), congruent angle (7.75±21.18 vs 1.57±17.12, p=0.03), Lysholm Knee Scoring Scale (77.28±13.44 vs 95.42±6.20, p=0.003) and VAS (6.14±1.46 vs 2.71±1.69, p=0.002).

Discussion and Conclusion: Arthroscopic lateral release for lateral patella compression syndrome can improve both alignment and symptoms.

FP4.10

Identifiable factors preventing patellofemoral joint osteoarthritis after anterior cruciate ligament reconstruction

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Introduction: Persistent anterior knee pain is commonly observed after anterior cruciate ligament reconstruction, which is commonly associated with quadriceps wasting due to post-operative pathological muscle inhibition and disuse and possibly cause early patellofemoral joint osteoarthritis. A vicious cycle of quadriceps atrophy and weakness with PFJ pain may develop. We aim to identify the modifiable risk factors associated with anterior knee pain after ACL reconstruction.

Methods: Patients suffering from anterior knee pain and received arthroscopic assisted single-bundle ACL reconstruction using hamstrings graft for more than 5 years were retrospectively recruited. A thorough clinical history, physical examination, and basic radiographs were obtained. Outcome measures included leg quadriceps quality by ultrasound and functional scores (KOOS, Kujala, and IKDC).

Results: 19 patients were recruited. Quadriceps muscle atrophy and strength deficit were noted as shown by decreased quadriceps muscle thickness and increased quadriceps muscle stiffness Thinner vastus medialis and more stiffness in the vastus lateralis were observed in the affected knee. Patients also tended to shift their body weight towards the unaffected contralateral knee with increasing knee flexion due to the anterior knee pain. Compared with healthy individuals; components of the KOOS, Kujala, and IKDC scores were lower. Pain was also correlated with increased rectus femoris muscle stiffness.

Discussion and Conclusion: This study was able to identify details of persistent quadriceps muscle weakness which may lead anterior knee pain and possibly prevent the early development of patellofemoral joint osteoarthritis.

FP4.11

The role of 25OHD and 1,25OHD status in determining quadriceps strength and neuromuscular function in patients after anterior cruciate ligament reconstruction

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Introduction: Quadriceps weakness persists after anterior cruciate ligament reconstruction (ACLR). Previously, we found 25-hydroxyvitamin D (25OHD) deficiency was associated with poorer quadriceps strength after ACLR. There is no literature investigating the role of 1,25-dihydroxyvitamin D (1,25(OH) 2D) on muscle mass. It is important to establish which marker of vitamin D (VitD) status is better correlated with clinical outcomes after ACLR.

Methods: Patients with ACLR were recruited. Assessments including serum 25OHD and 1,25(OH) 2D level, quadriceps strength, rate of torque development (RTD) and central activation ratio (CAR) were performed. The ratio of difference between the injured limb and uninjured limb on the uninjured limb was used to do the Spearman rank correlation analysis. Independent t-test was used to do subgroup analysis to compare results between different VitD status.

Results: Twenty-five patients were enrolled. The serum 25OHD level had moderate correlations with RTD0-50 and RTD100-200 difference between two limbs ($r=0.68$, $p=0.04$; and $r=0.79$, $p=0.01$). When divided into 25OHD deficiency plus 1,25(OH)2D non-deficiency group and 25OHD non-deficiency plus 1,25(OH)2D non-deficiency group, the deficiency group showed poorer muscle strength ($p=0.029$) and worse RTD100-200 and CAR ($p=0.039$ and $p=0.013$).

Discussion and Conclusion: 25OHD level was associated with the quadriceps contraction ability and showed a trend of correlation with maximal strength and the voluntary activation ability. Patients with 25OHD deficiency and 1,25(OH)2D non-deficiency showed poorer quadriceps strength, ability of contraction and voluntary activation. The findings of this study suggest that 25OHD and 1,25(OH)2D test play a role in determining quadriceps strength and neuromuscular functions in patients after ACLR.

FP4.12

Single-bundle anterior cruciate ligament reconstruction with and without concomitant anterolateral ligament reconstruction

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Introduction: The anterolateral ligament (ALL) is an important secondary restraint against rotational instability of knee. The current study investigates whether concomitant ALLR and single-bundle anterior cruciate ligament reconstruction (SBACLR-ALLR) results in better clinical outcome, when compared with single-bundle anterior cruciate ligament reconstruction (SBACLR). The hypothesis is that there is no difference in clinical outcomes between patients receiving SBACLR-ALLR and SBACLR at the two-year follow-up.

Methods: To test this hypothesis, a study was conducted on 466 patients who underwent primary SBACLR between 2007 and 2019. Patients with skeletal immaturity, inflammatory joint disease, multiple ligament reconstruction (other than ALLR), a graft rupture, or no post-operation MRI within the second year were excluded. Patients with SBACLR-ALLR and isolated SBACLR were matched one-to-one based on various factors. 40 matched pairs were identified. Clinical outcomes, including return to sport, International Knee Documentation Committee (IKDC) subjective score, and residual ACL laxity signs, were collected at the two-year assessment.

Results: Of the 40 matched pairs, 31 pairs attended the two-year follow-up. The average follow-up period was 41 months, with an 80% follow-up rate in the SBACLR-ALLR group and 98% in the isolated SBACLR group. Despite the demographics being comparable between the two groups, the SBACLR-ALLR group had a higher rate of return to sport ($p=0.026$), and a more normal or nearly-normal Lachman test ($p=0.005$) and pivot shift grading ($p=0.004$) at two-year follow-up.

Conclusion: The study concludes that patients receiving concomitant SBACLR-ALLR have superior clinical outcomes at two years compared to those receiving isolated SBACLR.

FP4.13

Labral tear and paralabral cyst of shoulder—a case series

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Introduction: Paralabral cysts are thought to arise from the seepage of synovial fluid into the paralabral tissue as a result of labral tear or capsular defect. Fluid then accumulates due to a one-valve effect. They may present as shoulder pain with or without weakness. Here, we report 5 patients with different presentations.

Methods: In our case series, 5 patients were retrospectively reviewed. They all presented with chronic shoulder pain with or without injury. MRI confirmed the diagnosis of posterosuperior paralabral cyst with labral tear. Four patients were treated with arthroscopic decompression of cyst and labrum repair. One patient was treated conservatively as the symptom was mild and size of cyst was relatively small.

Results: For those patients treated surgically, they did not complain any shoulder pain and achieved a good range motion after the surgery.

Discussion and Conclusion: The diagnosis of paralabral cyst is still challenging as the history and physical examination are non-specific. MRI is needed to confirm the diagnosis. The treatment plan depends on clinical symptoms. Patients with small cyst without symptoms can be treated conservatively.

Operative treatment is indicated for failure of conservative treatment or suprascapular nerve compression. Arthroscopic labral repair and drainage of paralabral cyst via labral tear is the mainstay of treatment. These also indirectly decompress the suprascapular nerve, though direct neurolysis or decompression at spinoglenoid notch may be done but with potential risk of neurovascular injury.

FP4.14

Is the outcome affected when anterior cruciate ligament reconstruction (ACLR) is done by a supervised trainee?

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This retrospective cohort study aimed to investigate whether the outcomes of anterior cruciate ligament reconstruction (ACLR) are compromised when performed by a supervised trainee compared to a fellowship-trained orthopedic specialist. The study included 1635 primary ACLRs performed between January 2013 and January 2023 at a university-affiliated tertiary care institution, with 1410 performed by specialists and 225 by trainees under supervision. Perioperative characteristics, in-hospital outcomes, and mid to long-term outcomes were compared between the two groups.

The study found that operation duration was significantly longer in the trainee group (105 vs 77 mins, $p<0.001$) but the median length of stay was similar for both groups. There were no significant differences in early outcomes, including pain levels and range of motion. However, patients operated by specialists had a significantly higher percentage of returning to play (92.6% vs 84.5%, $p=0.005$) and a lower percentage of instability symptoms at last follow-up (2.5% vs 5.4%, $p=0.033$) than patients operated by trainees. There were no significant differences in re-rupture rates between the two groups (12.1% for specialists vs 16.3% for trainees, $p=0.116$) and objective assessment of knee stability by the Lachman test did not reveal any significant differences ($p=0.124$).

This study demonstrated that ACLR performed by a supervised trainee did not compromise patient safety and functional outcomes, but had longer operative times and lower rates of returning to sports. This information should be communicated to trainers, residents and also patients.

FP4.15

Prevalence of asymptomatic rotator cuff arthropathy on chest X-rays in elderly patients: a cross-sectional study

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Introduction: Rotator cuff arthropathy (RCA) is a debilitating condition that can result from massive rotator cuff tears and lead to joint arthritis. Despite the increasing popularity of reverse shoulder replacement surgery for RCA, the prevalence of asymptomatic cases has been poorly studied. This cross-sectional study aims to use chest X-rays to identify the prevalence of asymptomatic RCA in elderly patients.

Methods: Patients aged 60 to 90 years with recent chest X-rays were included in the study. Patients with known shoulder pathology or non-communicable diseases were excluded. The visible shoulders were assessed using the Hamada classification, and patients with positive findings were interviewed about their range of motion and pain.

Results: A total of 138 shoulders (69 patients; mean age: 76.3) were included. Of these, 20 shoulders (14.49%) were identified as having RCA (grade II=4, grade III=10, grade IV=6). Notably, 10.1% of shoulders with grade III or below (mean age: 75 [64-87]) did not experience any symptoms.

Discussion and Conclusion: This study reveals a significant prevalence of asymptomatic RCA among elderly patients. These findings highlight the importance of accounting for asymptomatic cases when diagnosing and prescribing treatment for RCA. A larger sample size is needed to confirm these results and further investigate the clinical implications of asymptomatic RCA.

FP4.16

Risk factors for graft rerupture after revision anterior cruciate ligament reconstruction

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Background: The literature on revision anterior cruciate ligament reconstruction (ACLR) is sparse. While it is well known that revision surgery is associated with significantly higher graft rerupture rates, the risk factors for repeated failure are not well defined. This study aims to explore the outcomes and risk factors of revision ACLR.

Methods: Revision ACLR performed between from January 2013 to January 2023 were included. Univariable logistic regression models explored the association between graft re-rupture and prognostic variables. Those achieving statistical significance were included in a multivariable logistic regression model to identify risk factors of graft re-rupture.

Results: 132 revision ACLRs were identified (91 males; 41 females) with a mean age of 23.1 years (range 15-48). Pivoting sports accounted for 87.9% (n=116) of preinjury sports, with the majority being football (n=48; 36.4%). The mean graft diameter was 9.26 mm (range 7.0-10.5 mm). MRI detected concomitant pathologies on the medial meniscus (n=45; 34.1%), lateral meniscus (n=41; 31.1%), and chondral pathologies (n=26; 19.7%).

The graft rerupture rate was 16.7% (n=22) and 11.4% (n=15) of the revision ALCRs were revised a second time. A cut-off value of 9 mm was the optimum graft diameter during revision ACLR (AUC=0.63; p=0.049). Risk factors for re-rupture were graft diameter <9 mm (OR=3.873; p=0.031) and return to pivoting sport (OR=4.105; p=0.049).

Conclusion: Small graft diameter <9 mm and return to pivoting sport are risk factors for re-rupture. Techniques to maximise graft diameter and lateral reinforcement procedures to constrain pivoting motion may help reduce the incidence of graft rerupture following revision ACLR.

FP4.18

Epidemiological study on springboard or platform diving related injuries in adult amateur diving athletes

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Introduction: Springboard or platform diving is a high contact aquatic sport. Previous studies mainly focused on competitive divers, whereas minimal data was known about the large number of recreational divers. This study aims to explore the injury patterns in adult amateur diving athletes, identify potential risk factors and preventive measures to enhance safety as a recreational sport.

Methods: Retrospective study is conducted in Jul-Aug 2023 via an online survey. Adult amateur diving athletes in Hong Kong and participants of the World Aquatics Masters Championships - Kyushu Aug 2023 are invited to participate. Incidence, injury patterns, potential risk factors and training patterns are reviewed and analyzed.

Results: This study is continued till August. Preliminary results of 22 responders revealed 40% had been injured in the past 1 year. 70% were minor injuries such as contusion, sprain neck or back injury. None required Orthopaedic surgeons' treatment.

50% had been injured since they have learnt diving. Most of the injuries occurred during training and during water entry. There were a variety of injuries including sprain of the limbs, dislocation and fractures. 27% of injured required treatment by medical doctors or Orthopaedic surgeons. The causes of injury are multifactorial including fatigue, insufficient practice and inadequate warm up. Age and training hours were not associated with increased injuries.

Discussion and Conclusion: The epidemiological data showed there was significant number and varieties of injuries in adult amateur diving athletes. Prevention strategies on tailormade training program, warm-up exercise, and core muscles training should be promoted.

FP4.19

A novel quantitative assessment of bone tendon junction healing in patients after ACL Reconstruction by high-resolution peripheral computer tomography: the development of an image-based deep-learning algorithm

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Introduction: Graft incorporation in ACL reconstruction presents challenges to the success of the surgery. This study aimed to develop a quantitative method to assess peri-tunnel bone shell formation and its correlation with bone morphological parameters and functional recovery.

Methods: Patients who underwent ACL reconstruction using hamstring tendon grafts were evaluated using high-resolution CT scans, self-reported questionnaires, ultrasound imaging and shear wave elastography. High-resolution CT scans were performed to analyze bone microarchitecture in the operated knees. A U-net algorithm was further developed to segment peri-tunnel bone shell, and the correlation of the pixel intensity with bone morphological parameters and functional outcome was investigated.

Results: Among 24 patients recruited, correlations were found between pixel intensity in the peri-tunnel bone shell and BV/TV (Tibia: R=0.549, p=0.005; femoral: R=0.608, p=0.002), as well as time post-op (Tibial: R=0.469, p=0.021) and Kujala score (Tibial: R=0.506, p=0.019; Femoral: R=0.458, p=0.037). The U-net algorithm demonstrated accurate segmentation, with a pixel accuracy of 85% and intersection of union values of 76%. To differentiate between those with muscle atrophy and without, with muscle regaining 80% set as criteria, 0.84 was determined as an effective cut-off value for tibial BV/TV (p=0.02).

Discussion and Conclusion: The developed deep-learning model provides an effective tool for assessing graft healing at the tunnel interface after ACL reconstruction. Further refinement of the model's accuracy and larger-scale clinical studies are warranted to better understand the association between functional recovery and morphological changes in the peri-tunnel bone shell.

Free Paper Session V: Adult Joint Reconstruction I

FP5.1

Development and comparative study of an image recognition-based augmented reality navigation system for high tibial osteotomy: a pilot study on bone model trials

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FP5.2

Outcomes between staged bilateral total knee arthroplasty and simultaneous bilateral total knee arthroplasty: a retrospective cohort study between 2001 and 2022

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Introduction: In the era of ageing population, a substantial number of patients suffer from osteoarthritis in both knees. Bilateral total knee arthroplasty (TKA) is one of the surgical options to relieve their pain. There are two methods: simultaneous bilateral TKA (SimBTKA) and staged bilateral TKA (StaBTKA). We aim to compare the clinical outcomes of these methods in our institution.

Methods: We retrospectively reviewed 2372 patients (SimBTKA:StaBTKA = 772:1600; female:male = 1780:592; mean age of SimBTKA:StaBTKA = 70.4±7.99:66.4±7.50 years, $p<0.001$) who had undergone bilateral TKA in our institution from 2001 to 2022. Patients were categorised according to their method of surgery. Inclusion criterion was patient undergoing bilateral TKA in our institution. Particularly for SimBTKA, patients were assessed to be medically fit before undergoing SimBTKA by anaesthetists according to their age, ASA status and severity of osteoarthritis. Primary outcome was length-of-stay (LOS) after surgery. Secondary outcomes were 30-day unintended readmission, intensive care unit (ICU) admission and death.

Results: Mean total LOS (acute hospital + rehabilitation centre) was shorter in SimBTKA (SimBTKA:StaBTKA = 18.48:22.40 days, $p<0.001$). Mean LOS in acute hospital was shorter in SimBTKA (SimBTKA:StaBTKA = 7.62:11.86 days, $p<0.001$). 30-day unintended readmission rate was lower in SimBTKA (SimBTKA:StaBTKA = 2.07%:6.06%, OR=3.04, $p<0.001$). Differences in ICU admission and death rates were statistically insignificant ($p>0.05$) among the two groups.

Conclusion: SimBTKA had a shorter LOS than StaBTKA, with comparable complication rates among the two groups. Promotion of SimBTKA should be enhanced in medically stable patients, since SimBTKA was able to shorten LOS and reduce expenditure.

FP5.3

Can proprioceptive knee brace improve functional outcome following total knee arthroplasty?

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Background: Total knee arthroplasty (TKA) aims to achieve proper mechanical alignment to reduce pain and restore function. However, restoration of neuromuscular control after surgery is often prolonged. Proprioceptive knee braces have been shown to promote neuromuscular control via proprioceptive feedback in both osteoarthritis patients and healthy individuals. However, few studies have evaluated its benefits on enhancing TKA recovery. This study aims to conduct a randomised controlled trial to evaluate the functional outcomes of using a proprioceptive knee brace following total knee arthroplasty.

Methods: Eighteen TKA patients were recruited pre-operatively for baseline knee function assessment and patient self-reported outcome measurements (PROM). They were randomized into two groups: (1) intervention group wearing a proprioceptive knee brace during mobilization for 6 weeks after TKA in addition to routine rehabilitation program, and (2) control group undergoing routine rehabilitation program. Patients were assessed again using the same measurements at 6 weeks post-operation.

Results: The intervention group showed better patient self-reported outcomes, as evidenced by a lower 6-week post-operation WOMAC score (p=0.038) and a greater increase in SF-12 (MCS) scores compared to baseline.

Conclusion: The preliminary findings suggest that the use of a proprioceptive knee brace post-operation can lead to better patient outcomes in the first 6 weeks after TKA compared to routine rehabilitation alone. These findings have important implications for clinical practice, as they suggest that proprioceptive knee braces may be a valuable addition to post-operative rehabilitation protocols.

FP5.4

The influence of alignment and tibial cementation on aseptic loosening in total knee arthroplasty: a long-term analysis of 351 knees with a mean follow-up of 17.5 years

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FP5.5

High variability in total knee arthroplasty cementing techniques and practices

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FP5.6

Bone bed preparation techniques will influence the cementation of total knee replacement: a cadaveric study

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Introduction: Aseptic loosening after TKA remains the common reason for failure, and is the major cause of TKA revisions. Desirable fixation relies on the biomechanical properties of the bone-cement interface. More specifically, different osteotomy tools may produce bone surfaces with varying roughness and surface area.

Methods: Three paired commercially available fresh-frozen pelvis-to-toe cadavers were used. Standard TKA was performed on each pair of knees. On one side, bone preparation was performed using bone burr, and on the other side, the bone was cut using oscillating saw. Cementation pressure was standardised using Verasense (Orthosensor, USA). Maximum failure load was determined using a pull-out test with a cross-head speed increment of the material testing machine (Hounsfield H25K-S, Salfords, Redhill, United Kingdom). Computer tomography scans were performed for all the samples before the pull out test. The cement layer was segmented from the CT scans and analyzed using 3D slicer software.

Results: The average pull-out strength for the burr group (2230 N) exceeded the saw group (1760 N). Cement penetration was significantly higher in the burr group compared to the saw group (3.22±1.82 cm^3 vs. 2.99±1.68 cm^3, p=0.0291).

Discussion and Conclusion: Bone preparation with the use of burr improves fixation strength and bone cement penetration when compared to conventional saw. Long term clinical studies are warranted to confirm whether the biomechanical advantage of burr bone preparation translates to superior implant survivorship.

FP5.7

Cementless versus cemented fixation in total knee arthroplasty: analysis of regional tibial bone density and clinical outcome

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Introduction: Cemented fixation has been the popular technique used in total knee arthroplasty (TKA) due to its excellent survivorship and clinical outcome. In contrast, despite the theoretical advantages of being biological and bone preserving, some surgeons are less confident in using cementless fixation given the previous reports of high failure rate in some implant designs. With the advancements in manufacturing technology, implant design and the use of precision device, there has been a renewed interest in cementless fixation recently. This study aims to compare the effect of fixation method on tibial bone density, clinical outcome and survivorship.

Methods: This study retrospectively included 53 cementless TKAs and 53 cemented TKAs of the same brand. Using digital radiological densitometry (DRD), the changes in regional tibial bone density (RTBD) within the first two years were measured. Clinical outcome scores and survivorship were also recorded.

Results: RTBD was significantly higher in 7 out of 8 regions in cementless TKA at six months. The significance persisted in 2 out of 3 regions in the lateral tibial condyle till the second year (p=0.014 and 0.029). Clinical outcomes (KSS, WOMAC and forgotten joint score) were similar. No case of aseptic loosening was reported.

Discussion and Conclusion: Tibial bone resorption is a common phenomenon observed in both cementless and cemented TKA. Cementless fixation preserves more tibial bone globally in the first six months and the bone preserving effect persists in the lateral tibial condyle at two years. Early clinical outcome and survivorship are comparable.

FP5.9

Preoperative Imaging may not improve the outcome of robotic total knee replacement (TKR): Accuracy and Early outcome of a novel Image-free robotic assisted system for TKR

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FP5.10

Surgical accuracy of image-free versus image-based robotic-assisted total knee arthroplasty

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FP5.11

Mendelian randomization studies of lifestyle-related risk factors for osteoarthritis: a PRISMA review and meta-analysis

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Introduction: Risk factors for osteoarthritis (OA) often exert effects over protracted time-courses. Mendelian randomization (MR) studies therefore have an advantage over conventional observational studies when studying the causal effect of long-term lifestyle-related risk factors on OA. However, given the heterogeneous design of existing MR studies on OA, the reported causal estimates of these effects remain inconsistent, thus obscuring the true extent of the biological effects of OA lifestyle-risk factors.

Methods: We conducted a PRISMA systematic review and specifically included MR studies that investigated the causal effect between lifestyle-related risk factors and OA, where causal estimates for various lifestyle factors were pooled for meta-analysis. Quality of studies was assessed according to STROBE-MR guidelines. A total of 1576 studies were evaluated and 23 were included. Overall, the studies included were of high quality and had a low risk of bias.

Results: Our meta-analysis demonstrates the positive causal effect of BMI (OR 1.49 [1.23-1.80]) and negative causal effects of serum calcium (OR 0.69 [0.57-0.83]) and LDL levels (OR 0.93 [0.90-0.96]) on OA.

Discussion and Conclusion: Despite the heterogeneous designs and estimates of causal effects provided by various MR studies, our meta-analysis suggests that lifestyle-related risk factors in the form of BMI, serum calcium, and LDL have true biological effects on the development of OA.

FP5.12

Comparing clinical results of cruciate retaining total knee replacement by MAKO, Verasense, and manual instrumentation

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Introduction: Cruciate retaining total knee arthroplasty (CR-TKA) offers advantages over posterior stabilised total knee arthroplasty, but achieving optimal soft tissue balance can be challenging due to the presence of the posterior cruciate ligament (PCL). This study aimed to compare the clinical outcomes of CR-TKA using manual instrumentation, MAKO and Verasense.

Methods: 200 patients received CR-TKA in AHNH between 2019-2022 were included. They were divided into: conventional (49 cases), MAKO (99 cases), and Verasense (52 cases). Pre-operative and post-operative measurements of knee range of motion (ROM), Knee Society Score (KSS) Function Score, Oxford Knee Score (OKS), and KSS Knee Score were compared using SPSS 22.

Results: There were no significant differences in patients' demographics among 3 groups. Verasense group showed a significantly better reduction in pain scores (7.7, 6.9, 7.1 p=0.03) and improvement in KSS Knee Score (125%, 98%, 83% p=0.01) compared to MAKO and conventional groups. However, there were no significant differences in knee ROM, KSS Function Score, and OKS post-operatively among 3 groups.

Discussion and Conclusion: The findings suggest that Verasense, with its real-time pressure readings in both compartments of the knee joint during surgery, can contribute to improved pain scores and KSS Knee Score. On the other hand, MAKO still relies on subjective tests and does not provide actual pressure readings. Enhancing the MAKO system with a pressure sensor could potentially further improve soft tissue balance and patient outcomes. Further research with larger sample sizes and longer follow-up periods is warranted to validate these findings and explore its possible benefits.

FP5.13

Promising short-term outcomes of free-hand burring technique to implant second-generation metaphyseal cone in Asian knees—a case series

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Introduction: The second-generation metaphyseal cone has been proven effective in managing bone defect in revision knee arthroplasty in the Caucasian literature. We report our surgical techniques and short-term outcomes in Asian knees.

Methods: We conducted a case series by consecutively recruiting 14 female and 12 male patients with a mean age of 71 years (range 54-88 years) with 26 knees, who underwent revision total knee arthroplasty during the period April 2017 to June 2022. 24 tibial cones and 4 femoral cones were used. The mean follow-up duration was 47 months (range 12-74 months). Due to the relatively small bone size and meta-diaphyseal center mismatch in the Asian knees, the free-hand burring technique instead of the cannulated reaming technique was adopted in preparing for cone implantation. The clinical outcomes were knee ranges of motion (ROM), the Knee Society Knee scores (KSS), end-of-stem pain, infection, and need for revision surgery. The radiological outcomes were osteointegration, fracture, and loosening.

Results: Mean knee range of motion improved from 84 degrees (range, 0-120) preoperatively to 107 degrees (range, 60-125) postoperatively ($p<0.001$). Mean KSS scores improved significantly from 28 (range, 0-70) to 67 (range, 5-100) [$p<0.001$]. All cones were osteointegrated. There were one case with transient end-of-stem pain, two intraoperative minor femoral fractures and one recurrent infection that did not require cone revision. Cone revision-free survivorship was 100%. There was no aseptic loosening.

Discussion and Conclusion: The second-generation cone with free-hand burring technique yielded promising short-term outcomes in Asian knees.

FP5.14

Comparison of the kinematics between cruciate retaining (CR) and bi-cruciate retaining (BCR) total knee arthroplasty

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Introduction: Prevalence of total knee arthroplasty is projected to substantially rise. Approximately 20% of patients remain unsatisfied with complaint of knee pain and poor functional outcome, prompting development of new surgical techniques. Current improvement in implant design includes preserving the PCL (Cruciate Retaining) or both the ACL and PCL (Bi-Cruciate Retaining). Replication of the normal kinematics and proprioception by preserving the cruciate ligaments with the aid of robotics may pave way in improving patient satisfaction.

Methods: This was a retrospective case-controlled study. The kinematics analysis includes gait cycle, sit-to-stand, and stairs. Measured outcomes include flexion-extension, varus-valgus, and internal-external rotation. Proprioception was measured by an isokinetic dynamometer at thirty and forty degrees. Functional outcomes were measured by the Knee Society Score and Knee Function Scores.

Results: 15 patients each were recruited. All of them were robotic-assisted. The maximum range of flexion and the range of flexion to extension during walking was significantly larger in BCR knees. There was a trend of better knee society score at early post-op and knee function score at 6 months post-op in BCR. The proprioception of BCR tends to better as well.

Discussion and conclusion: Preserving the anterior cruciate ligament in bi-cruciate retaining knees is preferential in kinematics and proprioception with promising functional scores.

FP5.15

Conventional vs robotic bicruciate retaining total knee arthroplasty: a randomised controlled trial

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FP5.16

Comparing outcome of posterior stabilized vs medial pivoting vs bicruciate substituting TKA

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Introduction: TKA is one of the most successful surgeries in orthopedic surgery but not all patients will be satisfied with the outcome. BCS was developed with the intention to closely mimic native knee kinematics. In this study, we aim to compare the outcomes among PS, MP and BCS TKA.

Methods: 35 knees in each prosthesis design were studied retrospectively. Demographic data included age, gender and BMI was collected. Preoperative parameters including MFTA, ROM, KSS and WOMAC were collected. The patient's 1-year postoperative outcome was studied. The primary outcome was KSS. The secondary outcomes included postoperative ROM, FJS, and WOMAC score.

Results: No significant difference in the preoperative parameters were found among the three prosthesis designs. The mean 1-year postoperative KSS of PS, MP and BCS TKA were 91.6±8.6, 88.7±14.0 and 91.9±5.5 respectively, and no significant difference were observed. All three designs had improvement in extension and total ROM arc and the difference was not statistically significant. All three designs had mild decrease in flexion with PS decreased by 5.0°±14.3°, MP by 8.1°±10.6° and BCS by 1.6°±12.1° and significant less decrease in flexion was observed in BCS when comparing it with MP. The mean 1-year FJS and WOMAC score of PS, MP and BCS TKA had no significant difference.

Discussion and Conclusion: PS, MP and BCS TKA had similarly good functional outcomes. BCS design may perform better in preserving knee flexion. However, the overall functional scores of these three implant designs were comparable and had no significant difference.

FP5.17

Functional impact of joint line obliquity and left-right symmetry in patients with Oxford unicompartmental knee arthroplasty (OUKA)

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Introduction: Post-operative joint line tilting >3° in OUKA was known to be associated with poor functional outcome. However, the effect of left-right joint line symmetry in bilateral OUKAs is still largely unknown.

Methods: Radiological analysis was conducted for patients who received unilateral or bilateral OUKA in Alice Ho Miu Ling Nethersole Hospital from year 2018 to 2021. Joint line obliquity angle (JLOA) was measured in post-operative standing anteroposterior X-rays. Total knee arthroplasties (TKA) were performed in those patients with unilateral OUKA.

Results: 73 patients were reviewed with 100 OUKAs performed. 60 knees were involved in bilateral OUKAs while 40 knees were involved in unilateral TKA and OUKA. 22 knees (22%) had symmetrical JLOA while 26 patients (26%) had bilateral JLOA difference ≥3 degrees. Mean postoperative JLOA was -1.98°±2.94° (medially tilted) and mean left-right (L-R) difference was 2.79°±2.55°. OUKAs with JLOA >3° had less improvement in Knee Society Functional Score (KSFS) than JLOA ≤3° (22.6 vs 31.7, p=0.006). Comparing the group with JLOA symmetry (=0° L-R difference), any asymmetry in JLOA (>0° L-R difference) would have worse Oxford Knee Score (OKS) improvement post-operatively (15.6 vs 20.9, p=0.01). And the degree of L-R asymmetry of JLOA was also moderately correlated with worse OKS improvement (r=0.397, p=0.0001).

Discussion and Conclusion: In bilateral OUKAs, maintaining JLOA<3° and achieving left-right symmetry are essential to maximize the post-operative improvement of functional outcomes.

FP5.19

The role of intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis: a placebo-controlled randomized controlled trial

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FP5.20

The Coronal Plane Alignment of the Knee (CPAK) classification in Chinese patients with knee osteoarthritis

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Introduction: Coronal Plane Alignment of the Knee (CPAK) is a pragmatic and comprehensive classification system for heathy and arthritic knees. This study aims to apply the CPAK classification in Chinese osteoarthritic knees.

Methods: Chinese patients undergoing total knee arthroplasty for primary knee osteoarthritis at an academic institution between January 2021 and January 2023 were included. Radiological analysis of the preoperative weight-bearing long-films was performed. The lateral distal femoral angle (LDFA) and medial proximal tibial angle (MPTA) were measured. The patients were grouped into 9 CPAK phenotypes based on the arithmetic hip-knee-ankle angle (aHKA) and joint line obliquity (JLO).

Results: 500 knees (269 patients) were included, mean age was 70.0±6.4. Female-to-male ratio was 2.2:1. Mean aHKA was 4.1° varus ± 4.1°, mean JLO was 174.3°±3.2°. The most common CPAK phenotypes were type I at 48.6%, II at 23.2% and IV at 18.2%. No patients had an apex proximal JLO (phenotype VII, VIII and IX). Mean aHKA was significantly more varus in males at 4.9° ($p<0.01$). They also had significantly greater tibial and femoral varus ($p<0.05$) with a mean LDFA of 89.6°±2.9° and mean MPTA of 84.7°±2.3°. There were no significant differences in JLO. The percentage of phenotype I knees were greater in males (59.9% vs 43.4%, $p<0.05$), while phenotypes II (25.9% vs 17.2%, $p<0.05$) and III (5.0% vs 1.3%, $p<0.05$) were greater in females.

Conclusion: Chinese knees are more constitutional varus when compared to western European knees. There is a left and up shift of the lower limb alignment distribution on the CPAK matrix with 90% of patients falling within phenotypes I, II and IV.

FP5.21

Radiographic parameters for predicting anterior cruciate ligament status in osteoarthritis of the knee

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Introduction: This study aimed to determine the accuracy of different radiographic parameters in predicting the functional deficiency of the anterior cruciate ligament (ACL) and to investigate whether a prediction model constructed by integrating significant radiographic signs can improve the predictive ability.

Methods: We recruited 95 patients who underwent primary osteoarthritis surgery at The Duchess of Kent Children's Hospital at Sandy Bay between January 18, 2023, and May 11, 2021. The ACL status was determined by intra-operative assessment and divided into four categories: intact, frayed, disrupted, and absent. Radiographic measurements, including the coronal tibiofemoral subluxation (CTFS), hip–knee–ankle angle (HKA), mechanical proximal tibial angle (mPTA), mechanical lateral distal femoral angle (mLDFA), maximum wear point of the proximal tibia% (MWPPT%), and posterior tibial slope (PTS), were measured using X-rays. Univariate analysis was used to compare these variables between groups with different ACL statuses, and significant variables ($p<0.05$) were further analysed using multiple logistic regression analysis. A logistic regression model was constructed using multivariable regression with generalised estimating models.

Results: The results showed that HKA, and PTS were significant predictive indicators of ACLD, with odds ratios (OR) of 1.51, and 1.88, respectively. Other parameters MWPPT%, CTFS, mPTA, and mLDFA did not show significant predictive value. Multiple logistic regression analysis was then used to construct a predictive model of ACLD using significant imaging indicators.

Discussion and Conclusion: HKA and PTS were identified as predictive factors for ACLD. And the predictive model could be used as a diagnostic tool.

FP5.22

Leg length discrepancy following bilateral knee arthroplasty (UKA with TKA)

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Introduction: Leg length discrepancy (LLD) is frequently discussed and has been shown to be related to poorer functional outcome in hip arthroplasties. Though less frequent, LLD after total knee arthroplasties (TKA) has been shown to occur. It has also been reported that significant LLD after TKA can lead to inferior functional outcomes. Of note, there are limited studies documenting LLD in patients who have undergone bilateral knee arthroplasties. This study investigates the incidence of LLD in patients following bilateral knee arthroplasties, specifically cases with a unicompartmental knee arthroplasty (UKA) and a contralateral TKA; attempting to identify correlations between leg length and the post-operative limb and joint line alignments.

Methods: From 2018-2021, 42 patients were identified, with a mean age of 70 years and a mean follow up period of 23 months. Radiological LLD, the mechanical tibial-femoral angle (mTFA), and the joint line obliquity angle (JLOA) were all measured using standing lower limb scannograms.

Results: Of the 42 patients, 16 patients had a longer limb on the UKA side, while 25 patients had a longer limb on the TKA side; however, only 7 patients had a radiological LLD of ≥1 cm. There is a statistically significant positive correlation between left-right mTFA difference and LLD in cases where the TKA is longer; and between left-right JLOA difference and LLD in cases where the UKA is longer.

Conclusion: Despite the correlation above, this study has found no statistically significant correlation between post-operative LLD and functional scores.

Free Paper Session VI: Foot and Ankle

FP6.1

Role of arthroscopy in ankle fracture: a review of intra-articular findings and outcome at 6 months

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Introduction: Intra-articular pathologies of ankle fracture are usually overlooked or missed during initial assessment at injury or during ORIF, especially for those complex, fracture and usually lead to poor outcome.

Methods: It was a retrospective study. We included case of complex ankle fracture with ORIF and ankle arthroscopy done by our team of foot and ankle surgeon during 2020 to 2023. All patients were followed for 6 months after surgery. Intra-articular pathology, associate treatments and early and 6-month-post-op radiological and functional outcome were reviewed.

Results: There were 24 cases of complex ankle fractures with arthroscopy included. For arthroscopic findings, 17 cases had syndesmosis injury, and all are fixed with tightrope or screw under arthroscopic assistant. 6 patients had intraarticular loose bodies removal and only 2 was shown in pre-op imaging. There were 13 patients with osteochondral or chondral defect. 6 patients had deltoid tear and 3 had repaired done. There were 8 patients having jammed soft tissue at the medial gutter. There were 14 patients with posterior malleolus fracture and 3 cannot be identified in pre-op imaging. All patients achieved minimal (2/26) or no pain (24/26) upon last FU. 4 out of 6 IOD cases returned to previous work. No cases of infection/implant loosening.

Discussion and Conclusion: Ankle arthroscopy in ankle fractures is safe and effective to identify ligament injury (syndesmosis, deltoid) or detection of small posterior avulsion fracture. It can assist reduction and provide better pain control.

FP6.2

Total ankle replacement using in-house designed patient-specific cutting jig

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Introduction: In total ankle arthroplasty, soft tissue balancing and accurate measurements of the tibia cut in coronal, sagittal and axial plane are important in the survivorship of primary TAR. Conventionally, the coronal and sagittal alignments are determined by using an intra-operative X-ray, while axial plane rotation alignment is determined by leaving an instrument in the medial gutter for guidance. However the interpretation of intra-operative X-ray could be challenging. Numerous X-rays taken during the procedure could also prompt health concerns to operation room personnel.

Methods: Two cases of TAR performed by in-house patient-specific distal tibia cutting jig. Pre-operatively, coronal, sagittal and axial alignments were measured according to the CT imaging of the lower limb and the cutting jig was designed by Mimics software. The jig was made with resin and was autoclavable. Intra-operatively, the distal tibial bone cut was performed with the specific cutting jig and talus bone cut was performed with the conventional jig.

Results: The tibial cut angle of coronal, anteroposterior, sagittal and lateral planes corresponded to pre-operative planning. No intra-operative or post-operative complications were reported. The anatomical alignment was restored with satisfactory pain relief in both patients post-operatively.

Conclusion: Our results demonstrate high accuracy of tibial bone preparation by using the in-house designed patient-specific cutting jig. Moreover, it reduces intra-operative X-ray exposure, decreases the steps of instrumentation, with smaller wound, less OT time and increases surgeon's satisfaction. We anticipate the in-house patient-specific cutting jig becoming the standard distal tibia cutting method in the near future.

FP6.3

Prospective trial comparing the efficacy of stretching vs insoles vs combined stretching and insoles in the treatment of plantar fasciitis

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Introduction: Plantar fasciitis is a common cause of heel pain in adults due to overuse and overloading of the plantar fascia. Stretching and custom insoles are commonly used as a conjunctive treatment, together with other therapies for treating plantar fasciitis. The purpose of this study is to evaluate the efficacy of a 5-week course of standalone stretching vs standalone custom insoles vs combined stretching and custom insoles in the treatment of plantar fasciitis.

Methods: Prospective cohort study with 30 subjects. Participants were assigned to 3 intervention groups (10 subjects in each group): stretching only, insoles only, and a combined stretching and insoles group. Visual analogue scale (VAS) and Foot Function Index (FFI) were the outcome parameters to measure the change between baseline and after 5 weeks of intervention. The VAS score of 3 situations, 1st step pain in the morning, weight-bearing>2 hours and average pain, was recorded.

Results: All groups showed a reduction in VAS scores and FFI. Stretching was more effective in reducing 1st step pain in the morning, while custom insoles were more effective in pain reduction during prolonged weight bearing.

Discussion and Conclusion: Combined therapy with stretching and insoles is the advised management strategy; since the two interventions appear synergistic, alleviating symptoms at different time points.

FP6.4

Investigation on the acute effect of adding whole-body vibration in the warm-up routine among the recreational athletes

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Introduction: Whole body vibration (WBV) is a popular training tool used for enhancing sports performance. However, its role in injury prevention is not well established. The role of warm-up exercise, apart from enhancing performance, is to prevent injuries. This study aims to determine if WBV could augment the effect of warm-up exercises in improving lower limb stability.

Methods: This is a prospective randomized cross-over trial design. Twenty-eight healthy young adult recreational athletes were randomly assigned to group A or group B. Each group received either intervention A (warm-up exercises + WBV) or intervention B (warm-up exercises only) on the first visit and crossed over to receive the opposite intervention on the second visit with a washout period of 1 week. The y-Balance test (YBT) was measured before and immediately after the intervention of each visit.

Results: Statistical analysis using paired t-tests showed significant improvements in YBT in anterior direction, posterolateral direction and posteromedial direction following both intervention A and intervention B. However, no time group interaction was detected using two-way repeated measures ANOVA, indicating that the improvement from intervention A was not more significant than intervention B's.

Conclusion: While both groups showed an acute improvement in lower limb stability, the addition of WBV to the usual warm-up routine did not provide a significant difference in lower limb stability when compared to warm-up exercises alone.

FP6.5

Pilot randomised controlled trial on the effectiveness of trigger point dry needling for treatment of plantar fasciitis

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Introduction: Plantar fasciitis (PF) is a common disorder with a lifetime prevalence of ~10%. Dry needling (DN), unlike acupuncture along meridian points in traditional Chinese medicine, involves inserting needles in the myofascial trigger points (MTrPs). MTrPs are defined as hyperirritable areas within taut bands of skeletal muscle, which produce signs of hyperalgesia and frequently allodynia upon compression. This study investigates the effectiveness of dry needling (DN) on pain, disability, ankle dorsiflexion ROM and dynamic balance in patients with PF.

Methods: Twenty participants with PF were randomised to either the intervention group receiving dry needling (DN) and stretching exercises or the control group receiving stretching exercises only. The primary outcome measure was first-step pain measured by the numeric pain rating scale, and secondary outcome measures were the Foot and Ankle Outcome Score (FAOS), range-of-motion as evidenced by the weight-bearing lunge test (WBLT) and lower limb balance measured by the modified Star Excursion Balance Test (mSEBT).

Results: Significant improvements were seen in the Chinese FAOS subscales of symptoms, pain, ADL and sports but not in the QOL subscale between DN and Control. There was also a significant improvement in the mSEBT in favour of the DN group ($p \leq 0.003$). However, there was no significance in the WBLT between the Control and Intervention.

Conclusion: Combining Dry Needling and stretching exercises could effectively reduce first-step pain and improve pain-related disability and dynamic balance in subjects with PF in the short term.

FP6.6

Case series investigating the effectiveness of bioinductive scaffold augmentation for the repair of Achilles tendon rupture complicated with underlying tendinopathy

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Introduction: Around 10% of patients with Achilles tendon rupture reported pre-existing tendinopathy. Augmentation of the tendon repair with a bioinductive collagen scaffold patch has been shown to facilitate healing for the repair of massive rotator cuff tears. This study will investigate if positive results is seen in augmentation of the repair of Achilles tendon with pre-existing tendinopathy.

Methods: A consecutive case series of Achilles tendon rupture patients with tendinopathy who have undergone surgical repair augmented with bioinductive collagen patch. Primary outcome measures include adverse events/complications and Foot and Ankle Outcome Score (FAOS). Secondary outcomes include ultrasound measurement of tendon thickness and intratendinous vascularity via the modified Ohberg score.

Results: Four male and one female patient were included, and the average age was 42.1 years. The average follow-up time was 4 months. Two patients had tendon rupture at the Achilles insertion, and 3 patients sustained a midportion Achilles rupture. One patient with underlying diabetes had postoperative wound dehiscence. The average FAOS at the 6-week follow-up was: symptom 62±13; pain 79±19; ADL 73±5; sports 47±20 and QOL 42±9. Four patients returned for a postoperative ultrasound; all had an intact Achilles tendon, with the average thickness of repaired Achilles 14.0±6.6 mm vs 7.1±1.3 mm on the non-injured side. For intratendinous vascularity, two patients had a modified Ohberg score of 2+ and two patients scored 3+.

Discussion and Conclusion: All 5 patients who underwent Achilles tendon repair with bioinductive collage patch use achieved satisfactory functional outcomes in the early postoperative period.

FP6.7

Dynamic tightrope fixation for the correction of the 1,2 intermetatarsal angle in hallux valgus deformities

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Introduction: Hallux valgus is a common deformity in which patients present with forefoot widening, bunion pain, shoewear limitation and cosmetic concern. Studies have shown correction in intermetatarsal angle (IMA) significantly reduced forefoot width and was associated with improved clinical outcomes. However, the impact of radiological correction varies with different surgical techniques. In this study, radiological and functional outcomes of hallux valgus reconstruction with IMA closure using mini-tightrope suture button were reviewed.

Methods: 61 patients who received minimally invasive surgical reconstruction of hallux valgus deformity with dynamic tightrope fixation during 1/2019 to 7/2022 were reviewed. Primary outcomes included IMA in weight-bearing X-ray and functional outcome via standardized Foot and Ankle Outcome Score (FAOS). Secondary outcomes included other radiological parameters including hallux valgus angle (HVA) and sesamoid position by Hardy and Clapham classification.

Results: The mean IMA before operation, at 3, 6, and 12 months were 14.7°, 8.38°, 9.86°, and 9.57° respectively. The mean HVA before operation, at 3, 6, and 12 months were 40.15°, 14.80°, 17.67°, and 16.35°respectively. Mean pre-operative sesamoid position was 5.78 and was reduced to 4.14 at 12 months. All radiological outcome data at all time points reached statistical significance. There was also statistically significant improvement in 4 out of 5 domains of FAOS at least 12 months after surgery.

Conclusion: Dynamic tightrope fixation is an effective surgical option for the correction of IMA and can contribute to improving HVA as well as overall functional outcome in patients with hallux valgus at least at 1 year after operation.

FP6.8

Clinical and radiological outcome of third-generation minimally invasive Chevron and Akin osteotomies (MICA) for hallux valgus in a single local center: a retrospective study

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FP6.9

Normalized Achilles tendon resting angle in a Chinese population

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Introduction: Achilles tendon ruptures are typically treated with repair in the physically active individual. The primary aim is to restore normal length and tension for ankle function recovery. Achilles tendon tension, with high variability, is an essential parameter in determining function after repair, with elongation being detrimental. Draping of both ankles and tension according to the contralateral side intraoperatively is standard but often cumbersome. The Achilles tendon resting angle (ATRA) is a validated method to measure the Achilles tendon length and tension; this can be a good tool for assessment of proper tension after repair. We aim to establish a normalized ATRA to simplify intra-operative tensioning and assessment during Achilles tendon repair.

Methods: 76 individuals (30 male, 36 female), with a mean (standard deviation, SD) age of 48(19.2) years, were recruited and the ATRA was measured on both sides in knee-flexed positions.

Results: The mean±SD ATRA was 50.8°±6.9° in males and 45.1°±6.7° in females, respectively. In males, ATRA in three different age groups (≤30 y; 31-60 y; ≥60 y) were 46.1°±5.0°, 53°±5.4° and 54.2°±6.8°. ATRA in three different age groups (≤30 y; 31-60 y; ≥60 y) were 42.6°±2.7°, 45.1°±7.8° and 48.3°±5.9° in females.

Discussion and Conclusion: Results have demonstrated that a variation in ATRA exists in a healthy population between genders and stratified according to age. An Achilles repair tension of ATRA 50° is recommended for males and 45° for females. An extra 5° can be added for patients ≥60 years old (males 55°, females 50°).

FP6.10

The clinical effectiveness of pulsed electromagnetic field therapy on the management of chronic ankle instability: a double-blinded randomized controlled trial (interim study)

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Introduction: Chronic ankle instability (CAI) affects both stability and physical activity. The current rehabilitation aimed to improve on neuromuscular control. However, the delay in peroneal muscle activation and atrophy impedes the effectiveness of treatment. Pulse electromagnetic field therapy (PEMF) improves muscle strength and recruit muscle fibre to improve stability and function. Therefore, this study aimed to evaluate the effectiveness of rehabilitation exercise and PEMF on adults with CAI.

Methods: Study design: a double-blinded, randomized controlled-trial. Main inclusion criteria: Cumberland Ankle Instability Tool (CAIT) score of ≤24. Random allocation: intervention group: a 8-week, biweekly 10-minute session of PEMF therapy and rehabilitation. Control group: PEMF sham and rehabilitation. Outcome assessments: baseline, week four and eight. Primary outcome: Foot and ankle ability measure (FAAM). Secondary outcomes: eversion muscle strength, balancing ability (eye closed) using the foot pressure analyzer for centre of pressure (COP) analysis.

Results: 20 participants (60% female, mean age of 33.13±10.43) were recruited excluding four participants withdrew. No significant differences were found. In the PEMF group, the median score in FAAM improved compared to the sham group. The area of COP during balance test decreased by 33.90% in the PEMF group, while it increased in the sham group. Evertor muscle strength increased greater in the sham compared to PEMF group.

Conclusions: PEMF therapy with rehabilitation may improve on the balance ability. The effect on other parameters needs further investigation. This is an interim-study and with the planned sample size and follow up time, this can determine the short- and long-term effects after treatment.

FP6.11

Pulsed electromagnetic field therapy improves pain and function for Achilles tendinopathy: a double-blinded randomised controlled trial

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FP6.12

Scarf osteotomy versus chevron osteotomy in hallux valgus surgery: a comparative study

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FP6.13

Postoperative use of incisional portable negative pressure wound therapy (NPWT) for closed ankle fracture

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Introduction: Ankle fractures are known to have a high rate of postoperative wound complications, while surgical site infection may cause morbidity and mortality. They may prolong hospital stay, and significantly affect rehabilitation. This study evaluates whether prophylactic use of incisional NPWT reduces rate of wound complications, infections and length of hospital stay.

Methods: Patients from a single orthopedics center, with closed bi-/trimalleolar ankle fractures, treated with open reduction internal fixation, within the study period, were all recruited. Treatment groups were recruited prospectively, with use of NPWT (Prevena Incision Management System); Control groups were analyzed retrospectively, with traditional wound dressing.

Results: Primary outcomes included superficial wound complications, 2.8% in the treatment group vs 28.6% in the control group (OR=0.06; p=0.02); superficial wound infection, 2.8% in the treatment group vs 14.3% in the control group (OR=0.51; p=0.62); deep wound infection, 0% in both groups. These were analyzed with a logistic regression model. Patient and fracture characteristics considered include age, sex, DM, smokers, days from injury to operation, and operation duration. The secondary outcome was the length of hospital stay, analyzed with a linear regression model, with an average of 4.89 days in the treatment group and 8.63 days in the control group (mean diff= -2.06; p=0.15).

Discussion and Conclusion: The use of prophylactic iNPWT can significantly help reduce superficial wound complications, may help reduce superficial wound infection rate, and reduce the length of hospital stay.

Free Paper Session VII: Trauma

FP7.1

Clinical effectiveness of a fracture liaison service for geriatric hip fracture patients in Hong Kong

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Introduction: Fracture liaison service has been implemented in Princess Margaret Hospital since July 2020. The aim of study was to evaluate its clinical effectiveness in reducing refractures and mortality following hip fractures. Investigation and treatment rate of osteoporosis were also assessed.

Methods: A retrospective cohort study was conducted for patients aged over 65 years admitted to our centre for hip fractures. Patients who were recruited in the FLS programme following hospital admission from October 2020 to September 2021 were in the intervention group, whereas those admitted from April 2019 to March 2020 were regarded as control. The follow up time was 15 months.

Results: 139 patients were included in total, with 68 in the intervention group and 71 in the control group. The refracture rate dropped from 5.6% to 0% after FLS implementation, while the 15-month mortality rate increased slightly from 0% to 2.9%, both of which did not demonstrate statistical significance, with a p-value of 0.120 and 0.238 respectively. Post injury bone density investigation rate increased from 8.5% to 60.3%, and antiosteoporotic treatment initiation rate increased from 19.7% to 97.1%. Both of them showed statistical significance ($p<0.001$). Treatment discontinuation rate decreased from 14.3% to 7.8% ($p=0.603$).

Conclusion: FLS in Hong Kong was an effective tool to increase investigation and treatment rate of osteoporosis in geriatric hip fracture patients. Its impact on refracture and mortality rate remained insignificant in this cohort of patients. Further study with a larger sample size and longer follow up time may help determine its impact.

FP7.2

Intramedullary nailing of tibial shaft fractures in the semi-extended position using suprapatellar approach: a case series in Hong Kong

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Introduction: The objective of this case series is to evaluate clinical outcome of patients with tibial shaft fractures treated by suprapatellar nailing at 2 years follow up and to review available literature concerning this approach.

Methods: This is a retrospective single centre case series to evaluate patient's post-operative status at 2-year interval. 15 patients underwent intra-medullary nailing with supra-patella approach during year 2019-2020 and consented to participate in this case series. Patients were regularly follow-up in out-patient clinic and evaluated in terms of range of movement, walking status and radiologically with RUST score and tibia alignment. Their functional outcome was assessed by various knee scores.

Results: At post-op 2 years interval, all patients had radiologically healed fracture as evidenced by RUST score and tibia alignment within 5 degrees in coronal and sagittal plane, functional outcome of suprapatellar approach was satisfactory in various knee scores. All patients achieved full range of movement and could walk unaided.

Discussion: Technical tricks and tips for suprapatellar approach are discussed. Literature review showed satisfactory outcome for intramedullary nailing for tibial shaft fracture in different parts of the world. Potential risk of suprapatellar approach is discussed including possible cartilage damage and intra-articular sepsis.

Conclusion: There is good clinical outcome of suprapatellar approach tibial nail radiologically and functionally. Results in-line with literature review, which also showed that compared with infra-patellar approach, supra-patellar approach is associated with better alignment and less knee pain but no significant difference in range of movement and disability.

FP7.3

A comparison study of reverse shoulder arthroplasty versus hemiarthroplasty for proximal humerus fracture in elderly

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Introduction: The treatment for comminuted proximal humerus fractures in elderly is challenging. Conventional treatment includes open reduction and internal fixation, percutaneous pinning, and hemiarthroplasty. Reverse total shoulder arthroplasty (RSA) is gaining popularity nowadays. However, it remains unclear whether RSA provides better range-of-motion (ROM) or function.

Methods: We retrospectively reviewed 24 patients in our center who had undergone a primary RSA or hemiarthroplasty for displaced three- or four-part proximal humerus fractures in recent 5 years. All patients received physiotherapy and at least 6-month follow-up. Patient demographics, intra-op and post-op condition were reviewed.

Results: 13 patients underwent hemiarthroplasty and 11 patients underwent RSA for proximal humerus fracture, with the mean age of 77.6 and 77.2 respectively ($p=0.8$). The mean operation time were 2-hour-29-minute and 3-hour-36-minute for hemiarthroplasty and RSA group respectively ($p<0.05$). For early complication, one hemiarthroplasty patient was observed to have musculocutaneous nerve traction injury with transient elbow flexion weakness, while one RSA patient had transient brachial plexus palsy. Upon at least 6-month follow-up, the final shoulder abduction range were 73.8-degree for hemiarthroplasty group and 96-degree for RSA group ($p=0.04$). For radiological outcome, 7 hemiarthroplasty cases had superior migration of humerus. There was no dislocation in RSA group. All RSA patients had no pain upon last follow-up.

Discussion and Conclusion: RSA group showed superior post-op abduction range and radiological outcome comparing with hemiarthroplasty group. The complication rate was low in both groups. Our study showed positive results on RSA for comminuted proximal humerus fractures.

FP7.4

Elastic-band resistance exercise or vibration treatment in combination with hydroxymethylbutyrate supplement to combat sarcopenia in the elderly: a randomised controlled trial

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FP7.5

Review of the use of lock plate for distal fibula fracture fixation. A retrospective study of 77 cases from 2019 to 2022

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Introduction: Ankle fractures are one of the most common lower limb traumas. Interfragmentary lag screw with neutralization plate has been one of the most classical operative modalities in fixing distal fibula fractures. The use of lock plate in distal fibula fracture has been increasing in popularity. Local patients will be analyzed in terms of background demographics, fracture pattern and operative methods. This research aims to review whether the use of lag screw is essential when using lock plate in fixing distal fibula fractures.

Methods: This study retrospectively analyzed a total of 123 patients with ankle fracture who underwent surgical treatment between April 2019 to May 2022. Cases with open fracture, concomitant tibial shaft fracture, less than 3 months follow up were all excluded. Joint congruity is used to assess the reduction. The study also evaluated the type of healing and the union rate.

Results: Total of 77 patients (48 females, 29 males, mean age=52.3) were included. Regarding fixation of distal fibula, there are 7 patients in the lag screw with lock plate group and 70 patients in the lock plate only group. Bone union is achieved in all patients regardless of the operative methods used.

Conclusion: Lock plate is a choice for distal fibula fracture with or without lag screw. Since all distal fibula fractures healed in the same mode with or without lag screw, we concluded that lag screw fixation is only an optional step when using a lock plate to fix distal fibula fracture.

FP7.6

Segmental forearm fractures—osteosynthesis using preset plate and less invasive approach

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Introduction: Segmental fractures of long bones often result from high energy trauma. Anatomical reduction of the intercalated segment results in further devascularization and increases risk of nonunion. In forearm, lack of an ideal intramedullary device means plate osteosynthesis is still the mainstay of treatment. A new approach is presented here in an attempt to handle these difficult fractures.

Methods: From 2009 to 2022, five consecutive cases of patients with segmental forearm fractures treated with pre-bend or anatomical plate using either minimal or less invasive approach were analysed retrospectively. The surgical techniques and relevant anatomy are explained and illustrated with cases.

Results: Five segmental ulna and three segmental radius fractures were fixed in this manner. Compound fractures were noted in two radii (both Gustilo grade IIIa) and one ulna (Gustilo grade II). One required skin graft resurfacing but none required flap coverage. There were 3 preoperative nerve palsies with all showed complete or near-complete recovery after treatment. One patient required tendon transfer for residual EPL weakness for a PIN palsy. All fractures healed without secondary bone graft. Four patients attained good or full range of movement and normal ADL function and one patient defaulted follow-up for functional assessment.

Discussion and Conclusion: Less invasive approach is a feasible alternative for segmental forearm fractures as opposed to full open reduction and anatomical reduction. High rate of bone union and avoidance of major wound complication can be achieved with less surgical damage to the injured forearm.

FP7.7

Clinical and patient-reported outcomes of surgical versus conservative treatment of severely displaced three- and four-part proximal humerus fracture in adults: a retrospective cohort study

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FP7.8

Determination of the ideal plate for medial femoral condyle fracture: a biomechanical study

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Introduction: The aim of this study is to determine the best plate to use as a substitute to fix a medial femoral condyle fracture.

Methods: The first part is to measure the best fit between several anatomical plates including the anterolateral proximal tibia plate (PT AL LCP), the medial proximal tibia plate (PT M LCP), the medial distal tibia locking plate (DT M LCP) and the PHILOS plate against 35 freshly embalmed cadaveric distal femurs. Measurements such as plate offset and number of screws in the condyle and shaft shall be obtained. The subsequent part is to determine the compressive force at which the plate fails. After creating an iatrogenic medial condyle fracture, the cadavers will be fixed with the two plates with the best anatomical fit and subjected to a compression force using a hydraulic press.

Results: The PT AL LCP offered the best anatomical fit whereas the PHILOS plate offered the maximal number of screws inserted. The force required to create 2mm of fracture displacement between the two is not statistically significant (LCP 889N, PHILOS 947N, p=0.39). The PT AL LCP can withstand a larger fracture displacement than the PHILOS (LCP 24.4mm, PHILOS 17.4 mm, p=0.004).

Discussion and Conclusion: Both the PT AL LCP and the PHILOS remain good options in fixing a medial femoral condyle fracture. Between the two, we would recommend the PT AL LCP as the slightly superior option.

FP7.9

New accelerated rehabilitation protocol for reverse shoulder arthroplasty—local centre experience in 2 years

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Introduction: The objective of this study is to evaluate the efficacy and safety of the accelerated rehabilitation protocol for reverse shoulder arthroplasty (RSA).

Methods: A retrospective analysis is conducted on 12 patients who underwent RSA between 2021 to 2022 in the Department of O&T, NDH. All patients received rehabilitation under the new accelerated rehabilitation protocol. The primary outcomes include range of motion (ROM) at 1, 6, and 12 months postoperatively and the functional score and pain score at 12 months postoperatively. The secondary outcomes include complications including but not limited to fracture, dislocation, and infection.

Results: The average ROM at 1 month is 80 degrees and 73 degrees for forward flexion and abduction. The average ROM at 6 months is 126 degrees and 119 degrees for forward flexion and abduction. The average ROM in 12 months is 134 degrees and 126 degrees for forward flexion and abduction. The average pain score was 1.9 by numeric rating scales (NRS) and average functional score is 42.4/48 by the Oxford Shoulder Score measured at 1 year interval. There is no dislocation, fracture, wound complication, or infection in all patients.

Discussion and Conclusion: This case series shows that the accelerated rehabilitation protocol is safe and effective for patients undergoing RSA. Further subgroup analysis might be able to identify some poor prognostic factors that can predict an inferior outcome compared to other cases. However, further studies with larger sample sizes will be needed to determine the optimal rehabilitation protocol for patients undergoing RSA.

FP7.10

Optimal rotation of glenoid component and angle of screws in reverse shoulder arthroplasty

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Introduction: While many studies have investigated the optimal roll angle of the glenoid component in reverse shoulder arthroplasty (RSA), few have examined the angle of the screws. This retrospective study aimed to determine the optimal roll angle of the glenoid component and the angles of the superior and inferior screws in order to achieve maximal screw length.

Methods: We retrospectively reviewed 56 patients who underwent reverse shoulder arthroplasty between 2020 and 2023. Using 3D-reconstructed models generated from preoperative planning CT scans and Autodesk-Meshmixer, we measured the roll angle of the glenoid component, as well as the cranial and posterior angles of the superior screws; the caudal and posterior angles of the inferior screws. The screw lengths achieved, version angle, AP- and CC-diameter of the glenoid fossa were also measured.

Results: The average superior screw cranial angle was 10.01 (SD4.16), the average superior screw posterior angle was 5.78 (SD4.53). The average inferior screw caudal angle was 12.38 (SD4.22), the average inferior screw posterior angle was -1.38 (SD5.95). The average anterior roll angle of glenoid component was -1.29 (SD6.12). The average lengths of superior and inferior screws were 40.06 mm (SD7.49) and 47.13 mm (SD8.23) respectively.

Conclusion: Our study provides valuable data on the angles of the superior and inferior screws and the roll angle of the glenoid component in RSA. While larger studies are needed to confirm our findings, the averages we observed may be useful in situations where preoperative planning CT scans are not available.

FP7.11

Investigation and treatment of osteoporosis for orthopaedic in-patient: implication for re-admission due to further fragility fracture

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Introduction: In this longitudinal study, we followed the surgically treated fragility fracture patients to see whether appropriate anti-osteoporotic investigation or treatment had been offered. On the other hand, the clinical outcome and financial implication related to these patients were also studied.

Methods: This is a 2-year longitudinal study about the patients admitted with fracture hip and distal radius. The clinical outcome was based on the comparison between the patients with and without additional osteoporotic therapy after index surgery in terms of readmission rate of fragility fracture and symptomatic osteoporotic collapse.

Results: From 2017 to 2021, 515 patients were admitted with hip and distal radius fracture and all of them were treated operatively. Overall, DEXA scan was arranged in only 8.2% (n=42) of the patients. Only 14% (n=72) of the patients were given both Calcichew and Bisphosphonate while 29.7% of them (n=132) had only Calcichew after surgery. 5.2% (n=27) of the patients were readmitted due to another fragility fracture and 3.7% (n=19) of them suffered from new onset of osteoporotic back pain. There was significant association between reduction in re-admission rate of fragility fracture and the active treatment group treated with both Calcichew and Bisphosphonate (p=0.031).

Discussion and Conclusion: There are a great proportion of patients readmitted due to another episode of fragility fracture. The patients receiving both Calcichew and Bisphosphonate were associated with significant reduction in readmission rate. The results implied that osteoporotic therapy should be started earlier after the first episode of fragility fracture.

FP7.12

A retrospective review of incidence and outcomes of femoral head fractures in local trauma center

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Introduction: Femoral head fractures are a rare but severe injury. Many classification systems were developed but lack guidance in terms of treatment and prognosis. Moreover, there is limited data available at local level regarding the incidence and functional outcomes.

Methods: Patients who were admitted to Queen Elizabeth Hospital for the diagnosis of femoral head fractures between 1998 and 2021 were retrieved from the Clinical Data Analysis and Reporting System. Patient demographics, radiological findings, treatment received and outcome measures were recorded. Statistical correlation between commonly used classifications system and outcome measures were examined.

Results: A total of 14 patients were identified (aged 19-72, M:F ratio=13:1). Pipkin classification (3 type II, 11 type IV). Chiron classification (3 type 1B, 5 type 2B, 3 type 3A, 3 type 5B). Only one patient was treated conservatively, and the rest underwent surgery (1 open reduction, 11 ORIF, 1 THR). Follow-up ranged from 1-20 years. For outcome measures, Harris Hip scores ranged from 52-96 and Thompson Epstein Criteria were (3 excellent, 5 good, 4 fair, 1 poor). On ANOVA analysis, both radiological classifications did not show statistical correlation with outcome measures (Pipkin p value=0.519, Chiron p value=0.347).

Discussion and Conclusion: Femoral head fractures remain rare but challenging injury to treat. Majority are associated with acetabular fractures and require operative intervention. From our local study, the size of the fracture fragment or presence of acetabular fracture did not lead to poorer outcomes.

FP7.13

Deep learning-based ultrasonic navigation system (DLUNS) for minimally invasive plate osteosynthesis (MIPO) in distal humeral intra-articular fractures: a pilot cadaveric study

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FP7.14

RSA vs ORIF in acute surgical management of geriatric proximal humeral fracture

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Introduction: RSA and ORIF are two surgical options for acute management of acute humeral fracture. In this local study, we aim to compare the functional outcomes of RSA and ORIF in patients with acute 3-part, 4-part fracture or fracture dislocation. We hope that the results of this study will help guide clinical decision-making in the treatment of acute proximal humeral fractures.

Methods: All patients who underwent reverse shoulder arthroplasty (RSA) or open reduction and internal fixation (ORIF) for acute 3-part, 4-part fracture, or fracture dislocation and were aged 55 years or older between 2015-2022 at our local hospital were identified from the Hospital Authority Clinical Management System (CMS). Parameters for comparison included patient demographics, operative characteristics, and postoperative outcomes such as the Oxford shoulder score at 1 year and range of motion in forward flexion and abduction.

Results and Conclusion: 45 patients underwent RSA and 33 patients underwent ORIF were included. Our findings revealed that RSA patients tended to be older and had more complex fractures. However, there was no significant difference in intraoperative characteristics between the two groups. At the 1-year follow-up, RSA patients showed better range of motion and Oxford shoulder scores compared to ORIF patients. Further research is necessary to assess the long-term efficacy and safety of RSA compared to ORIF.

FP7.15

Early results of minimally invasive surgery with screw fixation for geriatric patients with pelvic fracture

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Introduction: With the ageing population, the prevalence of fragility pelvic fracture caused by low energy trauma due to underlying osteoporosis have increased significantly in our locality. Advances in technology have led to the use of computer guided minimally invasive fixation for these patients, with the aim of reducing the drawbacks of conservative management by protected weight bearing. However, the optimal treatment modality of the pelvic fracture in elderly patients remains controversial.

Methods: This retrospective study compares the clinical outcomes of pelvic fracture treated conservatively or operatively by computer guided minimally invasive fixation techniques in geriatric patients. Outcome parameters included pain score, ability to return to pre-morbid walking status, length of hospital stay and complications or mortality if any.

Results: From 2021 to 2023, minimally invasive screw fixation was performed in 17 patients with pelvic fracture. Retrospective cohort of 50 patients who were treated conservatively was recruited for comparison. The operative group showed a significant improvement in pain score post-operatively. A greater portion of patient was able to return to the previous walking status in the operative group. The length of stay was also shorter in the operative group. There were no surgical complications or mortalities in the operative group.

Discussion and Conclusion: Minimally invasive fixation surgery in geriatric patients with pelvic fracture achieved superior clinical outcomes compared with those treated conservatively. This type of surgery also minimised the morbidities associated with tradition open surgery. Therefore, computer guided screw fixation of pelvic fracture is an effective and safe operation.

FP7.16

Effects of COVID pandemics on geriatric hip fracture services in acute setting—a general perspective (Part I)

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Introduction: Geriatric hip fracture service needs a lot of resources, which were largely compromised during 3 years of COVID pandemic. This research investigated the effect of COVID pandemic on geriatric hip fracture care.

Methods: All patients over 60 years old admitted to a local hospital for hip fractures with operations done in the 3 year before (2017-19), and the 3 years during COVID pandemic (2020-22) were included. Their patient journeys in acute setting were compared.

Results: 1437 patients were included in pre-COVID era, 2081 during COVID. 46.76% were operated within 2 days in pre-COVID, 36.55% during COVID. Inpatient mortality was 1.67% before COVID, 3.10% during COVID. After acute setting, continued rehabilitation was provided in 79.96% before COVID, 62.29% during COVID. In particular, for those discharged directly from acute hospital, 65.81% received outpatient rehabilitation in Geriatric Day Hospital before COVID, 21.37% during COVID. For osteoporosis treatment naive patient, 21.34% was treated in acute setting before COVID, 17.35% during COVID. DEXA was referred for 23.17% before COVID, 25.96% after COVID.

Discussion and Conclusion: COVID has significantly affected patient care in each step of hip fracture journey, from time to operation to rehabilitation services to secondary prevention. Only DEXA referral rate was not affected.

FP7.17

Evaluation of using grip strength and hand muscle cross-sectional area to predict secondary fractures post distal radius fracture.

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Introduction: To examine the use of grip strength measurement and hand muscles cross-sectional area, as surrogate of sarcopenia diagnosis, to predict the risk of secondary fractures in patients with history of distal radius fracture (DRF).

Methods: Cox proportional hazards regression analysis was performed to determine the most significant independent predictor of secondary fractures. Receiver operating characteristic analysis was performed to stratify patients according to their grip strength. Kaplan-Meier analysis was performed to predict the probability of secondary fractures after primary DRF over 15 years time. The same approach was performed on hand muscles cross-sectional area.

Results: Patients with history of primary DRF were predicted to experience a 3.9% higher likelihood in experiencing a secondary fracture per kg reduction in their grip strength ($p<0.008$), regardless of age and sex. The grip strength data of patients were classed under 3 strata, High-risk ≤16 kg, Moderate-risk 17-24 kg, Low-risk ≥ 25 kg ($p<0.001$). Patients with the lowest grip strength demonstrated the highest occurrence and risk of secondary fractures ($p<0.001$). Patients in the high-risk strata have a 2.2-fold (95% CI=1.55-3.17) higher fracture risk than patients in the low-risk strata. The probability of secondary fractures 5, 10, 15 years after the primary DRF are 16%, 30% and 54%, respectively.

Conclusion: Grip strength measurement has been proven, as a surrogate of sarcopenia diagnosis, to be a simple but effective tool to predict the risk of secondary fractures in patients with history of wrist fractures.

FP7.18

Effects of COVID pandemics on geriatric hip fracture services in acute setting—a focus on cognitively impaired patients (Part 2)

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Introduction: Patients with cognitive impairment generally received less intensive care despite potentially higher needs. Would such difference get worse during COVID pandemic?

Methods: Patients in 3 years pre-COVID and during COVID were subdivided to cognitively impaired and unimpaired, using abbreviated mental test score 6 as cut-off. Differences between 2 groups before and during COVID were compared.

Results: 55.53% patients were cognitively impaired before COVID, 55.08% during COVID. 40.98% cognitively impaired versus 53.99% unimpaired were operated within 2 days before COVID (difference 13.01%), 34.81% versus 38.68% during COVID (difference 3.87%). In-patient mortality was 2.26% for cognitively impaired versus 0.94% for unimpaired before COVID (difference 1.32%), 4.19% versus 1.77% during COVID (difference 2.87%). Continued rehabilitation after acute setting was provided for 74.96% cognitively impaired versus 87.32% unimpaired before COVID (difference 12.36%), 58.64% versus 66.77% during COVID (difference 8.13%). In particular, for those directly discharged from acute hospital, outpatient rehabilitation in Geriatric Day Hospital was provided for 59.72% cognitively impaired versus 75.56% unimpaired before COVID (difference 15.84%), 15.91% versus 29.17% during COVID (difference 13.26%). For treatment naive patient, 6.78% cognitively impaired versus 40.33% unimpaired were treated before COVID (difference 33.55%), 8.19% versus 28.48% during COVID (difference 20.29%). DEXA was referred for 9.02% cognitively impaired versus 40.85% unimpaired before COVID (difference 31.83%), 11.91% versus 43.18% during COVID (difference 31.27%).

Discussion and Conclusion: Patients with cognitively impairment received much poorer care in each step of their patient journeys. The difference was similar before or during COVID, except bigger difference of mortality during COVID.

Free Paper Session VIII: Rehabilitation, Tumour, Others

FP8.1

Lessons learned from the COVID-19 pandemic: a PRISMA review of the role of home-based exercise therapy on knee osteoarthritis

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Introduction: Physiotherapy is the standard non-pharmacological management strategy for patients with knee osteoarthritis at early-stage disease or those waitlisted for surgery. However, the COVID-19 pandemic has restricted access to in-person rehabilitative care. Home-based exercise therapies (HBET) thus represent a convenient solution to manage knee osteoarthritis in resource-constrained healthcare settings.

Methods: We searched MEDLINE, EMBASE, Cochrane Library, and CINAHL for studies that assessed HBET in improving knee osteoarthritis regarding pain, ADL and function domains. This is measured by total and sub-scores of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). WOMAC scores were metaanalysed by forest plots; confounder analysis was assessed by metaregression. Risk of bias and other qualitative findings were assessed.

Results: 2102 studies were identified, of which 14 RCTs (n=1364) met the inclusion criteria and were further analysed, demonstrating an overall decrease in post-HBET WOMAC total score by -11.29 (-16.62, -5.96), and a significant overall decrease in WOMAC subscores in the domains of pain by -1.83 (-2.92, -0.73), stiffness by -1.53 (-2.30, -0.76), and function by -7.28 (-10.16, -4.41), demonstrating the clinical efficacy of HBET for pain control and ADL management in patients with knee osteoarthritis. These clinical improvements were found despite high heterogeneity across studies (I^2≥96.1%). No confounding co-variates were identified by metaregression. High risk of bias regarding study design and reported results of certain studies were identified.

Conclusion: Despite the high heterogeneity, HBET shows promising outcomes in pain reduction and functional improvement in knee osteoarthritis. It is effective as an adjunctive treatment in combination with existing management strategies, particularly in access-restrictive or resource-constrained healthcare settings.

FP8.2

A structured non-operative treatment programme for traumatic triangular fibrocartilage complex tears: a quasi-experimental study

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Introduction: Triangular fibrocartilage complex (TFCC) injury is a common cause of ulnar-sided wrist pain. However, treatment protocols vary across clinical settings and a standardised treatment protocol is warranted to improve the quality of care of these patients. We have devised a rehabilitation regime which comprised of both orthotic intervention and therapeutic exercises. We speculated that the programme can effectively reduce pain and improve functional performance.

Methods: Thirty-two subjects participated in the 5-phase rehabilitation programme. Their progress was monitored every 3 weeks. Outcome measures included numeric pain rating scale (NPRS), activities of daily living (ADL) pain score, wrist range of motion (ROM), ADL performance score, patient-rated wrist evaluation (PRWE), power grip and grade of distal radioulnar joint (DRUJ) instability.

Results: The NPRS reduced from 5.3/10 to 0.5/10 while the ADL pain score improved from 10/20 to 19.1/20. ROM in flexion/extension and supination/pronation improved by 35%. Functional performance was evaluated by the ADL performance score and PRWE, and the scores improved from 21/40 to 38/40 and 49.5/100 to 14.6/100, respectively. A 59.5% increment in power grip was recorded and subjects' DRUJ stability has improved.

Discussion and Conclusion: The combination of orthotic intervention, progressive strengthening and proprioception training was effective in re-establishing DRUJ stability, and improving strength and functional performance of the subjects' wrists. This study provided insight for the development of a rehabilitation protocol for patients with TFCC injuries.

FP8.3

The effects of exoskeleton training on neurogenic bowel dysfunction in spinal cord injury/ disease

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Introduction: Neurogenic bowel dysfunction (NBD) is one of the numerous complications seen in spinal cord injury/ disease (SCI/D). In one study, more than one third of the SCI/D patients thought that NBD was most significantly affecting their life. Exoskeleton training (ET) is becoming more available for rehabilitation, and we performed this study to explore the effect on NBD.

Methods: Chronic traumatic or non-traumatic SCI/D patients who attended ambulatory rehabilitation in MacLehose Medical Rehabilitation Centre (MMRC) were recruited. They received 24 45-minute sessions of ET in a period of 12 to 16 weeks. The subjects were assessed with International SCI bowel function basic data set (version 2.0) with Neurogenic Bowel Dysfunction (NBD) calculated, defaecation time, and frequency of bowel incontinence pre-training, at the end of ET, and 24 weeks after the start of training.

Results: Initial data from 3 male subjects who have completed the courses of ET were collected. 1 subject is a T12 AIS A SCI 1-year post-injury. The other 2 are AIS D central cord syndrome, 6- and 11-years post-injury respectively. Improvement of NBD scores are seen in 2 subjects while bowel opening time and frequency of bowel accident did not show obvious changes.

Discussion and Conclusion: ET can potentially improve NBD in chronic SCI/D patients. Further research with a larger sample is needed to confirm the findings.

FP8.4

Effects of pulsed electromagnetic field (PEMF) for the promotion of cartilage regeneration and pain relief in patients with early knee osteoarthritis—a double-blinded placebo-controlled randomised clinical trial

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Introduction: We aimed to conduct a double-blinded, placebo-controlled RCT to investigate PEMF's effects on physical functions, articular cartilage degeneration, and patient-reported outcomes of patients with early knee OA.

Methods: Fifty knee OA patients with KL grade 2-3 and VAS≥4 were treated with PEMF or placebo for 8 weeks. At various times, different outcomes were assessed.

Results: Forty-nine patients completed the intervention and 11 subjects additionally completed the 6-month follow-up. Despite time-dependent improvement in physical functions, patient-reported outcomes, and muscle strength of patients immediately post-treatment, there was no difference between the PEMF and placebo groups. Analysis including the 6-month follow-up data showed a trend of improving knee extension and flexion of both limbs in the PEMF group compared to the placebo group. Subgroup analysis showed that PEMF interacted with time and maintained minimum joint space width (mJSW) of lateral compartment of treated limb in females and improved knee extension of treated limb compared to the placebo treatment in males. PEMF also interacted with time and maintained mJSW of lateral compartment of treated limb, KOOS-daily living subscale and contralateral knee extension of KL grade-3 patients.

Discussion and Conclusion: PEMF showed no improvement on outcomes immediately post-treatment but a trend of better knee extension and flexion of treated and contralateral limbs was observed at 6-month follow-up. A longer follow-up might be required for PEMF to show its effects. Subgroup analysis showed that PEMF might exhibit differential effects on males and females; and PEMF might be more effective in more severe OA patients.

FP8.5

Impact of fracture liaison service: early results from regional hospital

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Introduction: Aging population has resulted in climbing incidence of fragility fractures in Hong Kong. Identification and subsequent management of patients with osteoporotic fracture could reduce the occurrence of imminent fracture. Fracture liaison services (FLS), which has been maturely implemented in various countries, is proven to be cost-effective in preventing secondary fragility fracture. By enhancing prescription rate and compliance of bone health medication (BHM), increasing referral for rehabilitation and boosting follow-up attendance via FLS, imminent fracture risk could be reduced. Since 2022, Alice Ho Miu Ling Nethersole Hospital (AHNH) has initiated a post-operative clinic which is designated for consultation on dual X-ray absorptiometry (DEXA) scan and BHM for ambulatory cases upon follow-up.

Methods: This is a retrospective study that includes all patients who suffered hip fracture and had subsequently undergone operation in AHNH in 7/2018-6/2019 and 7/2022-6/2023. These patients represent respectively the groups before and after the initiation of designated post-operative clinic. Their rates of DEXA scan and BHM prescription were compared.

Results: A total of 124 and 85 patients were included in the 2018-2019 and 2022-2023 group. The two groups are comparable in age and previous fracture rate. Both the rates of DEXA scan and BHM prescription showed marked increase from 2.50% to 31.80% ($p<0.0001$), and from 5.65% to 34.10% ($p<0.0001$) respectively.

Discussion and Conclusions: FLS brought marked improvement in both DEXA scan and BHM prescription rates. The clinical impact on follow-up rate and re-fracture rate are yet to be established as the service continues.

FP8.6

Application of machine learning models on predicting the length of hospital stay in fragility fracture patients

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FP8.7

Prediction of in-patient stay time for hip fracture patients in a rehabilitation hospital—a regression model of cases from 12 years

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FP8.8

Update on the effect of sarcopenia in elderly women with vertebral compression fracture on global sagittal alignment and its relationship with quality of life

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FP8.9

Biomechanical effects of lateral wedged insoles and ankle foot orthosis on medial compartment knee osteoarthritis by in-shoe pressure analysis and lower limb posture scanning

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Osteoarthritis knee (OA knee) is usually affected by increased medial contact forces and knee adduction moment (KAM). Lateral wedged insoles (LWI) were found to reduce the medial joint loading and pain. However, there is a contradiction in the biomechanical effects of LWI which may be due to the compensatory ankle motions and gait patterns. Limited research investigates its relations with weight-bear loading of lower limbs and in-shoe pressure. This study aims to examine the combined biomechanical impact of LWI and ankle foot orthosis (AFO) and knee pain improvement. 16 subjects were categorised into LWI group and LWI with AFO group. In-shoe pressure analysis and weight-bearing line scanning were taken in the first attendance. Results of Knee Injury and Osteoarthritis Outcome Score (KOOS), pain intensity and OA knee functional tests were compared at 0 weeks and 8 weeks. Maximum force in medial heel was significantly reduced in LWI with AFO group by providing additional inversion and eversion control, arch support and stability. Shifting of lower limb weight-bearing lines showed no significant results in two groups. In KOOS and VAS, knee pain and symptoms were significantly reduced in LWI with AFO group. In OA knee tests, walking speed in Timed Up-and-Go test was significantly reduced in LWI with AFO group. This study provided a comprehensive review for enhancing the prescription of LWI and/or AFO depending on different foot type. The measurement method of this study could be a cost-effective and objective method for investigation of the effect of load-modifying footwear.

FP8.10

Health related quality of life assessment in joint replacement procedures: a comparative study

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FP8.11

Identifying the risk of sarcopenia in patients with knee Osteoarthritis

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Introduction: As patients with osteoarthritis (OA) often have concomitant sarcopenia, these conditions have been recognised as important health issues affecting the aging population. This study aimed to identify the predictors of sarcopenia in patients with OA, and to document the impact on physical function and quality of life.

Methods: In this cross-sectional study, 100 patients with knee OA were recruited. Quality of life, appendicular muscle mass index (ASM), handgrip strength, and gait speed were assessed. Logistic regression models were used to identify risk factors of sarcopenia in knee OA patients.

Results: ASM (OR=0.028; 95% CI=0.003, 0.254) and handgrip strength (OR=0.441; 95% CI=0.003, 0.254) were the independent predictors of sarcopenia. Among the patients with knee OA, those with end stage tended to be older, having longer history of knee OA and have slower gait speed (p=0.038) than those with early stage knee OA, which consequently correlated with poorer self-report physical (p=0.028) and social functioning (p=0.046).

Discussion and Conclusion: Handgrip strength instead of gait speed shows more reliability in screening sarcopenia in knee OA patients. Further research could explore the effects of improving muscle strength for knee OA patients and prevention of sarcopenia.

FP8.12

Development of a novel deep learning model in the detection of symptomatic knee osteoarthritis by sit-to-stand video recording using smartphone camera

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FP8.13

Neoadjuvant radiotherapy is associated with fewer acute skin adverse reactions without increased risk of postoperative wound complications in high-grade soft tissue sarcoma of the extremity—a retrospective comparative study with a mean follow-up of 7 years

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FP8.14

Two-incision approach for pelvic tumour resection: single centre case series

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Introduction: Wide resection of pelvic tumours are ultra-major surgeries associated with high complication rates. The standard utilitarian incision has a wound complication rate approaching 30%. The situation is compounded by the fact that many patients have an urgency for uneventful post-operative recovery in order to proceed with adjuvant chemotherapy. Our centre has pioneered the use of the 2-incision approach (Ilioinguinal+Kocher-Langenbeck & their variants) which has low wound complication rates and we present the results in this study.

Methods: There were 24 patients with pelvic tumour resection performed in a tertiary referral hospital between 1/1/2011 and 1/1/2021. 6 of which underwent the two-incision approach. The decision was made by the operating surgeon after detailed assessment and pre-operative planning.

Results: There were 5 female and 1 male patients. The average age was 55.5 years. 5 cases were chondrosarcomas of the pelvis with 1 bone metastasis from cervical carcinoma. The tumour involved more than 1 zone (Enneking & Dunham classification of pelvic resection) in 4 cases. The average operating time was 15.1 hours and blood loss was 2875 mL. All wounds healed uneventfully without skin necrosis. There was 1 case of stitch abscess that resolved after debridement. The average length of stay in acute hospital bed was 44.8 days.

Discussion and Conclusion: This study demonstrated the feasibility of major pelvic tumour resections with low wound complications. The criteria for case selection and limitations of this approach remains to be further defined.

FP8.15

A network analysis approach to understanding medical claims by ChatGPT: where is the information coming from?

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Introduction: ChatGPT represents a potential paradigm shift in information acquisition. We investigate the sources of information ChatGPT uses in response to medical inquiries, and the reliability of ChatGPT responses depending on the level of academic consensus for a topic.

Methods: Three questions were investigated:
- What is the cause of carpal tunnel syndrome?
- What is the cause of tennis elbow?
- Platelet-rich plasma for thumb arthritis?

20 responses from two versions of ChatGPT and the top 20 Google results were gathered for each question. Websites were classified as manuscript, academic, government, or private. A text network was generated with each response and search result as a node with edges based on term-frequency inverse-document frequency (TF-IDF) between nodes. After aggregating ChatGPT responses, similarity to Google results was ranked using aggregate weight vectors.

Results: Websites with the highest TF-IDF similarities to aggregate GPT responses remained largely unchanged between versions. There was a higher TF-IDF similarity for GPT-4 compared to 3.5 with a p-value (95% CI) of <0.001 (0.42-1.18), 0.001 (0.41-1.40), and <0.001 (0.44-1.22) for CTS, TE, and PRP, respectively. Stratified by website type, the highest TF-IDF similarity across GPT versions was academic for CTS and private for TE and PRP.

Conclusion: Our study illustrates that ChatGPT provides information closely correlated to top Google results for the same query. When fewer reliable resources are available, like for TE and PRP, ChatGPT becomes increasingly similar to non-academic sources. Ensuring accurate information and preventing misinformation are essential for building trust in these AI models.

FP8.16

Local experience with the use of romosozumab in patient with severe osteoporosis

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Introduction: Romosozumab was introduced in Hong Kong in November 2020. A retrospective review of patients that have received the recommended 12 months of treatment was reviewed.

Methods: From November 2020 to June 2023, 54 patients with severe osteoporosis as defined by WHO or with a high risk of fractures received Romosozumab for treatment. The DXA results of 22 patients that have completed 12 months of recommended treatment course were reviewed. The reason for 15 patients that did not complete the full course of treatment was also looked into.

Results: DXA result shows significant improvement in most patients with the lumbar spine showing better response than the hip region. With a careful selection of patients excluding those with a history of significant cardiac condition and a history of stroke, major side effects were not observed.

Discussion and Conclusion: Romosozumab is an effective anabolic agent for indicated patients in the management of osteoporosis. It provides an option for patients that are not able to perform self-injection and also for those who prefer a shorter course of treatment.

Free Paper Session IX: Paediatric Orthopaedics and AGM of Paediatric Orthopaedic Chapter

FP9.1

Three-in-one protocol for the management of hemodynamically unstable paediatric pelvic fracture—A level one trauma centre 15 year review

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FP9.2

Novel AI machine learning algorithm with volumetric bone quality and microarchitecture cluster phenotyping in the early prediction of curve progression and progression to surgical threshold in Adolescent idiopathic Scoliosis—a 6-year longitudinal study

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FP9.3

Quasi-experimental study to compare the intermediate intervention outcomes between passive and dynamic helmet design in positional plagiocephaly

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Introduction: Positional plagiocephaly, denoted the craniofacial deformity of growing skull by extrinsic forces in infants, characterised by the asymmetric head shape. Helmet therapy was known as one of the interventions. Passive and dynamic helmet were evaluated in previous literature, yet no gold standard of helmet design was suggested. This study aims to compare the intervention outcomes of these two helmet designs for 10 weeks usage.

Methods: Prospective study on passive and dynamic helmet with total 18 subjects was done from May 2022 to June 2023 respectively on infants aged 3 month-1 years old with level III-V in Argenta's Classification with the measurement of head circumference, cephalic ratio (CR) and cranial vault asymmetry index (CVAI).

Results: The circumferential growth between initial–2nd follow up and initial–final follow up were noted in within passive and dynamic helmet respectively ($p \leq 0.002$ and $p < 0.001$ respectively). However, no significant difference was noted between groups in each follow-up sessions. Similar patterns were noted in CVAI ($p \leq 0.05$ and $p < 0.005$ respectively). It was also noted that no significant difference on CR in both within-group and between-group measurement.

Discussion and Conclusion: This study illustrated that both helmet designs provided significant occipitoparietal growth development while with significant reduction of cranial deformity for at least 6 weeks usage. These designs did not show significant effect on the comparison of intervention outcomes. Thus, it was suggested that the designs could be considered according to patient expectation, for example, cosmetic concern and heat tolerance.

FP9.4

Can we predict curve progression in adolescent idiopathic scoliosis patients with Cobb angles <10°? A pilot study with vertebra vector sequencing by recurrent neural networks (RNN)

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FP9.5

Online mindfulness intervention to enhance psychosocial well-being for adolescent idiopathic scoliosis (AIS)—a pilot randomised single-blinded controlled trial

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FP9.6

Role of sagittal plane malalignment on the etiopathogenesis of frontal plane deformity in idiopathic scoliosis—a prospective longitudinal study

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FP9.7

Effect of upper limb cast on Chinese handwriting speed in paediatric patients

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Introduction: School-children prescribed with an upper limb cast may face difficulty in writing tasks and require extra time allowance. This study aimed to evaluate effect of upper limb cast on Chinese handwriting in children and provide recommendation to schools.

Methods: This cohort study recruited Chinese students from Primary 2 to Primary 6 in mainstream local schools who had been prescribed an upper limb cast for any injury. Participants were asked to perform Tseng's handwriting speed test, and their results were compared with reported norms in the literature from Taiwan and Hong Kong. The dexterity of both hands was also assessed using the 9-hole peg test.

Results: We recruited 42 children for the study. Overall, children with a cast on their dominant hand (n=25) had a significantly lower mean percentage of writing speed compared to their non-dominant hand (n=17) (44.0% vs 87.3% Taiwan norm; 35.5% vs 72.7% Hong Kong norm). Both short-arm and long-arm casts on the dominant hand resulted in a significantly lower mean percentage of writing speed compared to the non-dominant hand. Children with a long-arm cast on their dominant hand (n=14) had a significantly lower mean percentage of writing speed compared to those with a short-arm cast on their dominant hand (n=11) [34.9% vs 88.1% Taiwan norm; 28.3% vs 73.2% Hong Kong norm].

Discussion and Conclusion: This study quantified the significant effect of upper limb cast on Chinese handwriting, in particular long-arm cast on dominant hand. An extra 60% to 65% of time allowance is recommended.

FP9.8

Infections after paediatric orthopaedic surgery—culture culture in the broth, who is the most infectious of them all

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FP9.9

Should finding of an incidental discoid meniscus change your practice?

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FP9.10

Written in the stars? Prognosticating long-term outcomes for developmental dysplasia of the hip at skeletal maturity—analysis of 50 years' experience with mean follow-up of 18 years

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FP9.12 ***The Royal College of Orthopaedic Surgeons of Thailand Ambassador Paper***

Selective hip ultrasound screening for developmental dysplasia of the hip (DDH) in newborns

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Background: Universal ultrasound screening for early diagnosis of developmental hip dysplasia (DDH) may not benefit in low incidence context.

Objective: To externally validate the new established criteria for selective ultrasound screening for DDH in newborns.

Materials and methods: A cross-sectional study was undertaken at Ramathibodi Hospital between October 2021 and July 2022. After informed consent, screening clinical examination and ultrasound in all eligible newborns at the obstetric ward were performed by two certified pediatric orthopedists. Dynamic screening hip ultrasound (Harcke's technique) was used to identify a positive case. The enrolled newborns were categorized into low-risk and high-risk group via the new established criteria (breech presentation, positive Ortolani's test, positive Barlow's test, and limited hip abduction). The accuracy and the concordance index of the screening criteria were analyzed.

Results: A total of 81 newborns (162 hips) were included. Seven hips (4.3%) were positive; 4 dysplastic and 3 unstable hips. Regarding the criteria with cutoff value 15.02, 13 hips were classified as high risk given sensitivity 71.4%, specificity 94.8%, positive predictive value 38.5%, negative predictive value 98.7%, likelihood ratio of positive test 13.8, likelihood ratio of negative test 0.3, area under receiver operating characteristic curve = 0.83, and concordance index = 0.7142 (95% confidence interval: 0.52, 0.91).

Conclusion: The new established criteria has promising external validity to discriminate abnormal hip ultrasound for DDH. This model would benefit for selective ultrasound screening protocol in Thai newborns.

Free Paper Session X: Adult Joint Reconstruction II

FP10.1

Deep patellar shape analysis aided with diffusion model for predicting knee replacement surgery risk on lateral radiograph

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Introduction: Knee-osteoarthritis (OA) affects both tibiofemoral (TF) and patellofemoral (PF) joints, but the PF joint are often overlooked. Here, we leveraged diffusion models to perform a novel patella morphology prediction about future OA progression. This method visualizes and extracts crucial shape information of the patella bone to predict future risk of requiring knee surgery.

Methods: Our patella shape analysis pipeline includes a course-to-fine patella segmentation pipeline, a diffusion model generating synthesized 60-month follow-up patella shapes, and convolutional neural network (CNN)-based knee arthroplasty (KA) risk prediction model. We compared the prognostic performance of the KA prediction model when trained with baseline patella shapes and when trained with synthesized data, using lateral view radiographs obtained from Multicenter Osteoarthritis Study dataset.

Results: Patella-segmentation achieved excellent 0.9729 Dice score. The diffusion model correctly predicted morphological changes in patella shapes. For KA risk prediction, the CNN trained end-to-end with baseline patella shapes achieved an AUCROC score of 0.7319. Trained with synthetic follow-up patella shapes, the model's score significantly improved to 0.8033, demonstrating the superiority of our synthetic prediction approach.

Discussion: Incorporating diffusion models improves deep-learning prognostic applications for OA with patella shape information. The synthetic prediction methodology could also be applied to other bones related to Knee OA or other chronic diseases. While patella is not conventional consideration in clinical practice, this methodology provides new insights into the correlation between patella morphology and Knee OA development. The synthesized follow-up images provide a better understanding of AI decision-making, reducing its opacity as a deep learning approach.

FP10.2

Effect of posterior tibial slope in patient's outcome for cruciate retaining total knee arthroplasty—experience in a regional joint replacement center

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FP10.3

Posterior tibial slope on preoperative CT scans of patients undergoing UKA

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Introduction: This study measures the medial posterior tibial slope (MPTS) and lateral posterior tibial slope (LPTS) of patients who underwent UKA using their pre-operative CT scans. The differences between measurements using the tibia anatomical and mechanical axes as references are compared.

Methods: Preoperative CT scans of patients who underwent primary UKA were collected from the local hospital in Hong Kong. Standardised measurement approaches were developed to obtain the MPTS and LPTS of the tibia plateau through both the anatomical and mechanical axes. CT scans were viewed and measured using open-source imaging software (Medical Imaging Interaction Toolkit).

Results: 20 patients (Female: Mechanical axis le=13:7; Mean age: 70.3±7.2) were included. Mean MPTS and LPTS measured using anatomical axis are 7.8°±4.5 and 7.6°±4.2. Mean LPTS measured using the mechanical axis are 6.2°±3.1 and 6.2°±3.0. The value of the Pearson correlation coefficient between MPTS and LPTS using the tibia anatomical and mechanical axes are r= 0.925 ($p<0.001$) and r=0.838 ($p<0.001$), respectively. The mean difference between the anatomical and mechanical axes is (0.1°±1.68).

Discussion and Conclusion: Contrary to previous studies conducted using X-ray, this study found that anatomical and mechanical-measured PTS can be equally over or underestimated; whether this is unique to the Chinese population requires further investigation. The effect of standing versus supine positions on the measurement of PTS may also require further investigation. A larger sample size is needed to obtain reliable conclusions.

FP10.4

Modifications of the cemented tibial tray in a modern total knee arthroplasty system: is the new design better?

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FP10.5

Common complications after total knee arthroplasty: current trends

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FP10.6

Investigating the role of metagenomic next-generation sequencing in the diagnosis of periprosthetic joint infections

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Introduction: Despite ongoing efforts to improve the sensitivity of microbiological cultures in implant-associated infections, the global prevalence of culture-negative PJI remains significant at 6.4%. Metagenomic Next-Generation Sequencing (mNGS) is an increasingly adopted tool in the field of diagnostic medicine and may arise as a promising diagnostic tool in the diagnosis of PJI.

Methods: A group of nine patients who underwent revision hip or knee arthroplasty were enrolled prospectively. Synovial fluid and Tissue samples were collected from all patients for culturing and mNGS analysis. mNGS analysis was conducted by Illumina sequencing services, with taxonomic classification by Kraken2.

Results: A total of seven PJI and two noninfected patients were included in our preliminary study, amounting to a total of 18 samples. Amongst the 14 samples from the seven PJI cases, five samples were culture-positive and seven samples were mNGS-positive. Concordance was observed between mNGS and conventional culture in nine of the 14 samples (64%). Among the seven samples of culture-negative PJI, mNGS was able to identify microbes in five samples (71%). mNGS detected microbes in one of four samples of aseptic revisions with negative cultures, and in two of four samples from PJI cases on long-term antibiotics.

Discussion and Conclusion: The results reported are the preliminary findings of a larger cohort study that is currently underway at our institution. Although the evidence supporting the use of NGS is limited, an increasing number of studies have emerged over the past decade, reporting on the utility of NGS in clinical practice.

FP10.7

Development of a novel machine learning model for the prediction of periprosthetic joint infection following primary total knee arthroplasty: a 23-year retrospective study

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Introduction: Periprosthetic joint infection (PJI) is a significant complication of primary total knee arthroplasty (TKA). A prediction tool to assist clinical preoperative risk assessment is important. However, no such model is tailored for Hong Kong patients. This study aimed to develop a machine learning (ML)-based model for predicting PJI following primary TKA in Hong Kong.

Methods: A retrospective analysis was conducted in a local teaching hospital on 3,483 primary TKA (81 with PJI) from 1998 to 2021. We gathered 61 features, encompassing patient demographics, operation-related variables, laboratory findings and comorbidities. Six of them were selected by univariate and multivariate analysis. We trained an Easy Ensemble classifier with Random Forest as the base estimator using stratified 10-fold cross-validation and compared it with Logistic Regression to verify ML performance.

Results: The ML model demonstrated stable and robust performance across ten folds, with average metrics of 0.913 for area under the receiver operating curve, 0.831 for balanced accuracy, 0.839 for sensitivity, and 0.822 for specificity, outperforming the logistic regression model (AUC=0.739). The significant risk factors identified were long operative time (HR= 9.15; p=0.017), male (HR=3.09; p<0.001), ASA>2 (HR=1.65; p=0.028), history of anaemia (HR=2.18; p=0.023) and history of septic arthritis (HR=4.38; p=0.029). Spinal anaesthesia (HR=0.55; p=0.023) was a significant protective factor.

Discussion and Conclusion: We developed the first ML-based model for predicting PJI following primary TKA in Hong Kong, demonstrating its superiority over statistical methods. It may assist the preoperative treatment decision-making and patient health optimization.

FP10.8

10 years experience of periprosthetic joint infection in a joint replacement centre: clinical characteristics, microbiology, and treatment outcomes

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FP10.9

Introduction of a novel spacer technique that can reduce the complication in the management of periprosthetic infection after total hip arthroplasty: early outcome from a retrospective review

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FP10.10

C-reactive protein (CRP) is the most important determinant factor on the success of debridement, antibiotics and implant retention (DAIR) in patients with periprosthetic joint infection—a 15-year retrospective study of 2 major joint arthroplasty centres

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FP10.11

Multicenter validation of an automatic analysis platform for full-length lower limb X-rays based on convolutional neural networks

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Introduction: Assessment of lower limb force line is an important part of the diagnosis and treatment of hip and knee joint diseases. However, current automatic analysis software for lower limb force line often lacks a certain level of accuracy. This study aims to develop a hybrid model based on convolutional neural networks, named LimbHRnet, and validate its effectiveness in cohorts from four centers in China.

Methods: From December 2010 to January 2023, 1426 patients who visited four centers (QMH, DKH, PUMCH, and SPH) and underwent full-length standing X-rays of both lower limbs were recruited. All imaging data were collected by the EOS machine, and images were securely stored after being captured via screenshot and de-identified. Key points and alignment parameters manually annotated by two senior orthopedic doctors were considered as the ground truth (GT). All data were divided into training, testing, and validation sets at a ratio of 7:2:1, and the two datasets were used for LimbHRnet model training. Quantitative analysis was performed on the detection of key points, and the reliability of lower limb force line evaluation was assessed using linear regression and Bland-Altman plots.

Results: LimbHRNet achieved accurate keypoint detection on full-length lower limb X-rays, with average Euclidean distance errors of 2.78 and 5.52 pixels, respectively. All predictions were closely correlated with the GT ($p<0.001$, $R2>0.97$), and the smallest overall differences were observed in the Bland-Altman plots.

Discussion and Conclusion: The automatic analysis work has the potential to assist in clinical work.

FP10.12

Association of preoperative fat infiltration in hip muscles with functional outcomes after total hip arthroplasty

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Introduction: Some patients complained limited daily function after total hip arthroplasty, although implant alignment or position was well controlled. This study aimed to identify the association between preoperative hip muscle composition and postoperative functional outcomes.

Materials and Methods: Longitudinal data from 77 patients (36 male and 41 females, 23-85 years old) who underwent unilateral primary total hip arthroplasty were retrospectively analyzed. Preoperative bilateral muscle composition: lean muscle mass (LMM), low-density lean tissue (LDL), intramuscular fat (mFAT) and intramuscular adipose tissue (IMAT) in the iliopsoas, piriformis, gluteus maximus, medius and minimus were evaluated separately by computed tomography. Bilateral differences of limb length, femoral offset and acetabular offset were evaluated using postoperative pelvic plains. 6 m walking test and 5 times chair standing test (5CST) were measured at 3 months postoperatively.

Results: Cross sectional area of bilateral included muscles, bilateral differences of limb length, femoral offset and acetabular offset showed no significant association with functional outcomes. Higher area ratio of contralateral gluteus maximus IMAT demonstrated significantly longer 6m walking time and more steps. Higher area ratio of contralateral iliopsoas, gluteus medius and minimus IMAT demonstrated significantly longer 5CST time. Higher area ratio of contralateral iliopsoas IMAT also showed significantly longer 6 m walking time.

Discussion and Conclusion: IMAT in contralateral iliopsoas and gluteus maximus was mainly associated with postoperative walking ability. IMAT in contralateral iliopsoas, gluteus medius and minimus was highly associated with postoperative stand-sit function. Preoperative assessment of hip muscle composition could help guide postoperative rehabilitation after total hip arthroplasty.

FP10.13

The effects of pulsed electromagnetic field (PEMF) therapy on muscle strength and function in patients with end stage knee osteoarthritis: a double-blinded randomized control trial

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Introduction: Osteoarthritis (OA) of the knee is one of the most common chronic degenerative joint conditions affecting our aging population. Improving knee extensor strength has been suggested as an effective means for pain relief and improving function in patients with OA knee. This study aimed to compare the effectiveness in improving muscle strength with home-based exercises alone vs home-based exercises together with pulsed electromagnetic field (PEMF therapy) in patients with OA knee.

Methods: A total of 60 patients with end-stage OA knee were randomly assigned to home-based exercise alone or with the addition of PEMF. Quadriceps and hamstring muscle strength with two trials were recorded. The 5-time sit-to-stand and 6 meters gait speed tests were assessed to reflect the muscle function.

Results: Significant time difference was found in symptomatic knee extension muscle strength ($p=0.003$), flexion muscle strength ($p=0.015$), contralateral knee extension ($p=0.002$), and flexion muscle strength ($p=0.032$) in both treatment groups. Home-based exercises + PEMF resulted in significantly higher knee extension ($p=0.019$) and flexion strength ($p=0.027$) compared with the home-based exercise group. A significant time difference was found in gait speed ($p=0.016$) and 5STS stand test ($p<0.001$) in the home exercise + PEMF group.

Discussion and Conclusion: Home-based exercise + PEMF may be a better treatment to improve knee muscle strength. Both groups received home-based exercise programs that can help them improve the physical function of performing chair-stand, but PEMF could achieve better physical function of performing chair-stand and gait speed.

FP10.15

Predictive factors for prolonged length of hospital stay following primary total hip replacement in one joint replacement center in Hong Kong

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Introduction: There are overseas studies focusing on predictors of prolonged length of hospital stay after primary total hip arthroplasty. Shortening length of stay leads to reduction in medical cost. No similar local data and studies are established. Since there are significant difference in length of stay and patient demographics between overseas and local hospitals, the aim of this retrospective investigation is to explore the factors of prolonged length of hospital stay following primary total hip replacement at a joint center in Hong Kong.

Materials and Methods: All primary total hip replacements performed at Tseung Kwan O Hospital Joint Centre from 2018 to 2023 was retrieved from clinical medical system (CMS). Potential preoperative, perioperative and post-operative factors, suggested by overseas studies, were analysed by univariate regression method.

Results: A total of 120 cases were identified. The mean length of stay was 12 days. Significant predictors of prolonged hospital stay for primary total hip replacement were American Society of Anesthesiologists (ASA) class 3, in-patient complications, post-operative intensive care unit care and low Risk Assessment Prediction Tool score (RAPT). Other factors demonstrated in previous studies, including advanced age, high body mass index, length of operative time, blood loss and requirement of blood transfusion failed to demonstrate statistically significant result.

Discussion and conclusion: No local studies were done before to evaluate factors which suggested prolonged hospital stay for primary total hip replacement. With knowledge of these predictors, clinicians could identify potential cases with possibility of prolonged stay and to facilitate discharge plan.

FP10.16

Revision total hip arthroplasty with modular femoral stem—a retrospective study

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Introduction: Modular femoral stems are one of the options for femoral revision. It offers flexibility to address offset, rotation and leg length discrepancy independent of each other. The purpose of the study is to analyse the clinical and radiological outcomes of using Restoration Modular Hip System in our institution.

Methodology: We retrospectively reviewed patients who had undergone revision THA using Restoration Modular Hip System during the period of December 2016-June 2022. Patients' demographics (age, gender, indication), surgical factors (implant size and shape), clinical outcomes (Harris Hip Score [HHS], revision surgery) and radiological outcomes (subsidence, loosening) were reviewed.

Results: Twenty-four patients (25 hips, 16 males, 8 females) were reviewed in the study. The mean age at surgery was 71.4 years old. The mean follow-up period was 2.7 years. Surgical indications were periprosthetic joint infection (9 hips), periprosthetic fracture (7 hips), aseptic loosening (6 hips), failed hip fracture fixation (2 hips) and instability (1 hip). Twenty-four conical distal stems and one cylindrical distal stem were used. The median diameter of conical stem used was 16 mm (range 14-21 mm). The mean HHS improved from 48.34 points preoperatively to 76.26 points at the most recent follow-up. One patient required re-revision due to periprosthetic infection. No subsidence or loosening was identified.

Conclusion: The use of modular femoral stem in revision THR demonstrates favourable clinical and radiological outcomes in this cohort of patients.

FP10.17

Relationship between hip osteoarthritis and degenerative disc disease in Chinese

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Introduction: Spinopelvic motion has been compared to cogwheel system. We postulate patients with degenerative disc disease (DDD) are more likely to suffer from hip osteoarthritis (OA). The aim of the study was to identify the incidence of hip osteoarthritis in patients with DDD.

Methods: This is a retrospective cohort study looking at radiographic features of hip OA in our DDD cohort, an open population recruitment cohort of patients with back pain. Whole spine radiographic measurements include sacral slope (SS), pelvic tilt (PT), L1 to S1 kyphotic angle (L1S1), T5 to T12 lordotic angle (T5T12) and pelvic incidence (PI). Patients with available hip X-rays were included. Hip measurements included narrowing of superior or medial joint space, presence of osteophyte, subchondral sclerosis, subchondral cyst and Kellgren Lawrence grading. Pearson correlation was calculated between components of hip OA with sagittal spinal parameters.

Results: A total of 125 patients with available hip X-rays were analysed. Narrowing of superior hip joint space is negatively correlated to L1S1 ($r=-0.439$, $p=0.025$) and T5T12 ($r=-0.648$, $p=0.003$) respectively. The width of superior hip joint space is positively correlated with PI ($r=0.414$, $p=0.036$), while medial hip joint space has a negatively correlated with PI ($r= -0.419$, $p=0.033$). Other hip OA parameters did not show statical significant with spinal parameters.

Discussion and Conclusion: Joint space narrowing of the hip was more prevalent in patients with worse sagittal spinal parameters due to posterior pelvic tilt with less superior acetabular coverage predisposing to degeneration. This urges the importance of recognition of possibility of hip OA in patients with symptomatic DDD.

FP10.18

Clinical & radiological outcomes of dual mobility total hip arthroplasty: a retrospective review

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FP10.19

Virtual impingement tests in 113 patients undergoing total hip arthroplasty

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FP10.21

Spinopelvic relationship in Hong Kong: analysis of 345 primary total hip arthroplasties

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FP10.22

Streamlining surgical instruments sets for greener arthroplasty

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Introduction: The healthcare sector accounts for a significant proportion of resource consumption in society. The operating theatre consumes a large proportion of this due to the vast amount of both human and material resources required to allow for safe and efficiency running of such services. Joint replacement procedures require a huge number of resources in the preparation and processing of reusable surgical instruments. In the current era of rapid climate change and global warming, creative and conscientious solutions are needed to allow for "greener" joint replacement.

Methods: An audit on the number of re-usable surgical instruments was carried out for 5 total and 5 unicompartmental knee replacements. All surgical instruments used in each procedure were recorded and the number of items unused was recorded and weighed. Calculations regarding the amount of material e.g., electricity and water and human resources were performed.

Results: 109 instruments were prepared for each knee replacement, however, only an average of 36 items were utilised in each operation. A streamlined knee replacement instrument set was designed which only contains 40 items and is 38% of the original weight of the original instrument sets (streamlined set: 5.9kg, original set: 15.2kg).

Conclusion: Significant amounts of surgical instruments were unused during a knee replacement procedure. Use of streamlined tailored sets for routine procedures such as knee replacement should be adopted to allow for efficient use of material and human resources.

FP10.23 *New Zealand Orthopaedic Association Ambassador Paper*

Oral and intravenous tranexamic acid are equivalent at reducing blood loss following total shoulder arthroplasty: a multicentre prospective randomised controlled trial

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Aim: Tranexamic acid (TXA) is an antifibrinolytic medication that has been shown to significantly reduce perioperative blood loss in the context of shoulder arthroplasty. Oral TXA is twenty times cheaper than the intravenous formulation. There has been no published literature comparing oral and intravenous TXA in the setting of shoulder arthroplasty. The aim of this study was to compare the efficacy of oral versus intravenous administration of TXA in elective shoulder arthroplasty. We hypothesised that the oral and intravenous formulations of TXA are equivalent with regards to minimising perioperative bleeding during shoulder arthroplasty.

Methods: This multicentre, prospective, randomised controlled trial was approved by the New Zealand Health and Disability Ethics Committee (HDEC) and registered with the Australian and New Zealand Clinical Trials Registry (ANZCTR). Patients with osteoarthritis undergoing elective shoulder arthroplasties were prospectively randomised into one of two groups using block randomisation. In the oral group, 2g of TXA was administered in the pre-operative setting and in the intravenous group, 1.5g of intravenous TXA was administered just prior to skin incision. The primary outcome was reduction in haemoglobin concentration, which was defined as the pre-operative haemoglobin minus the lowest postoperative haemoglobin. The secondary outcomes included drain output, number of blood units transfused, length of hospital stay and incidence of thromboembolic events. Haemoglobin reduction of 10g/L was deemed as a clinically relevant difference between groups. Thus, to achieve 80% power and an alpha of 5%, 28 patients were required in each treatment group.

Results: A total of 135 consecutive patients were screened and 80 patients were randomised to one of the two study groups. There was no loss of follow-up. The baseline demographics were comparable between the two groups. There was no difference in the primary outcome measure or any of the secondary outcome measures. With regards to the primary outcome measure, the mean reduction of haemoglobin was 23.30±1.62 g/L versus 22.45±1.30 g/L for the oral and the IV groups, respectively (P=0.68). Post-operative drain output was 74.58±11.27 mL versus 90.03±14.53 mL for the oral and the IV groups, respectively (P=0.41). Furthermore, there was no difference in post-operative complications, the number of blood units transfused or length of hospital stay between the two groups.

Discussion: To the best of our knowledge, this is the first study in the literature demonstrating oral and intravenous TXA are equivalent at reducing blood loss following total shoulder arthroplasty. Surgeons should be encouraged to use the oral formulation of TXA as a means to minimise health care expenditure.

Electronic Poster Presentations

P01

Magnetic injectable hydrogel-mediated precise vagus nerve stimulation for improving postmenopausal osteoporosis under Mild Pulsed Magnetic Field

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Introduction: Osteoporosis is increasingly becoming a significant degenerative disease that poses a threat to people's health and quality of life. Its mechanism lies in long-term non-significant imbalance in bone metabolism caused by changes in the endocrine system, leading to a decrease in the number and activity of osteoblasts, as well as relative increase in osteoclast activity. Regulating bone remodelling and intervening in bone reconstruction process to increase bone mass has become a hot topic in osteoporosis treatment research.

Methods: We incorporated magnetic iron oxide nanoparticles into an injectable hydrogel to construct magnetic micro-devices, which can be directly injected into the neck of rats, covered the vagus nerve. We investigated the safety, efficacy, and long-term retention of the magnetic injectable hydrogel in regulating postmenopausal osteoporosis through neuro-electrophysiology, magnetic resonance imaging tracking, animal behavioural studies, and histological analysis.

Results: Significant enhance the safe and stable retention of the nanoparticles in vagus nerve could be observed (at least 20 weeks). Precise magnetic stimulation of the vagus nerve using a mild pulsed magnetic field of 100mT directly demonstrated the synergistic effect of the magnetic medium and magnetic field in activating the vagus nerve through electro-physiological measurements, which showed real-time response characteristics. It was found that magnetic stimulation (20 Hz, 15 mins, twice/day) for 16 weeks significantly improved postmenopausal osteoporosis.

Discussion and Conclusion: Magnetic injectable hydrogel-mediated precise vagus nerve stimulation hold promising potential to provide beneficial theoretical and practical foundations for the development of effective strategies in treating osteoporosis, possessing significant theoretical research significance and clinical translational prospects.

P02

Two-dimensional superlattice films of gold nanoparticle-polystyrene composites: a bioactive platform for bone homeostasis maintenance

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Introduction: Osseo-integration between the implant and bone is a crucial factor to create a strong, durable bond that allows the implant to function effectively. However, regular implant surface with poor osseo-integration ability may cause aseptic loosening, resulting in the failure of implants.

Methods: We proposed a serial of macroscopic one-particle thick superlattice films generated by self-assembly of diverse gold nanoparticles (GNPs), as bioactive implant coatings for enhancing osseo-integration. A hydroquinone-assisted seed method is established to fabricate homogenous GNPs with controllable sizes (diameter 20-90 nm), which were further employed as building blocks to generate macroscopic one-particle thick superlattice films of GNPs (SFGs-20, SFGs-60 and SFGs-90) with the assistance of polystyrene. Effects of SFGs on osteogenic stimulation of osteoblasts and osteoclastogenic inhibition of osteoclasts through analysing expression of genes, proteins as well as immunofluorescence staining.

Results: Morphological results demonstrated that SFGs possessed highly ordered structure with close-packed one-particle thick arrays. Results exhibited that SFGs showed excellent biocompatibility and size-dependent dual effects (osteoclastic-inhibition and osteogenic-stimulation) on maintaining the bone homeostasis. SFGs-90 exhibited the most pronounced facilitation of osteogenic differentiation of osteoblasts as well as deactivation of osteoclasts compared with SFGs-20 and SFGs-60.

Discussion and Conclusion: These findings shed light on the role of one-particle thick superlattice films in promoting osteogenic differentiation and deactivating osteoclasts. The use of SFGs in orthopaedic implants has shown promise in enhancing osseo-integration abilities, which can effectively address the issue of aseptic loosening and offer a new perspective and potential solution for improving the integration of orthopaedic implants in bone tissue.

P03

Reflections from adolescent idiopathic scoliosis (AIS) patients after 20 years of surgery—A follow-up study on the changes in their body appearance and feeling

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Introduction: More and more post-operative Adolescent Idiopathic Scoliosis (AIS) patients have passed the 20th year of clinic follow-up. Their reflections on appearances and feelings could have been changed over time. This is a follow-up longitudinal study on patients' reflections particularly on any major changes in their body appearance and feelings.

Methods: Every post-operative AIS patient was invited to complete SRS-22r and SAQ when they visited scoliosis clinic. They were also requested to report any conditions happening around them. Clinical records were also reviewed.

Results: We analysed 1103 longitudinal records from 320 patients. Mean age was 35.6±4.6 (30-55). They had followed-up in an average of 5 (3-13) times after surgery, of which an average of 4 times after 20th years of clinic follow-up. Among the 4 time points, mean follow-up years were 27.3 (20.7-32.5), 29.3 (21.5, 35.1), 35.1 (30.1, 42.0) years, and change in major Cobb's angles compared with pre-op major angles were -10 (-28, 0), -18.7 (-37, 0), and -18.4 (-38, -6). 61.5% expressed different attentions after the 20th years. Attentions were shifted to wrist balance (28.9%), body balance (24.4%) and scar (13.3%), while shoulder imbalance (26.9%), back imbalance (16.0%), and pain (13.5%) were major concerns before 20th year.

Discussion and Conclusion: AIS patients, who operated in their teens, changed their major concerns from upper trunk appearance/balance to lower trunk appearance/balance and pain at surgical points. This could be a result of progressive and irreversible changes in bone composition at the vertebral level right beneath the lowest surgical level. Attentions have to be made to patients' feedback particularly at their lumbar regions.

P07

Adolescent idiopathic scoliosis (AIS) patients who have operated 30 to over 40 years–their surgical characteristics and present health outcomes

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Introduction: Our scoliosis centre has started seeing Adolescent idiopathic scoliosis (AIS) patients who have operated for over 40 years. Their ages are now sixties. This is time for us to review their operation history and patient-related outcome measures (PROMs) at present. This study aims to present and compare surgical details and PROMs for patients who have passed 30th years after surgery, particularly those who have passed the 40th years.

Methods: All post-operative AIS patients were invited to complete 1) Scoliosis Research Society-22r (SRS-22r) and 2) Spinal Appearance Questionnaire (SAQ). They were also requested to report on any conditions happening around them. Clinical records were also reviewed. Patient records from patients who have passed the 30th years after surgery were extracted. Comparisons were made among visits.

Results: There were 7 patients in our surgery list who have passed 30th year after surgery. Median age at last visit were 46 (39-62) and all were female. Curve types were Lenke 1A,2A, and 2B in 2, 2, and 3 patients respectively. Median major Cobb angle before surgery were 68.5 (50-64), median Cobb angle at last visit were 44 (26-60) and difference were -23 (-43 to -8) degrees. Function, average, and shoulder scores were significantly lower after 40 years of follow-up (both p=0.05). Patients who have followed-up for 42 years had implant skin impingement. The patients suffered from osteoporosis and walked with walking aid.

Discussion and Conclusion: AIS patients start entering their sixties. Function and body balance were significantly different from "younger" AIS patients. Osteoporosis and mobility are their concerns which clinical should pay attention to "elder" idiopathic scoliosis patients.

P08

A case report of validity of manual segmentation of metal implant

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Introduction: 3D printing technology is adopted to visualise 2D images, including CT scans and MRI scans, and prints 3D models. The printed models can be used in preoperative planning. Metal implants were known to have artifacts in CT scans which produces noise signals that is needed to remove in manual segmentation process. The accuracy of a manual segmentation should be validated. In a case of revision of cementless total hip replacement case, a prosthesis was removed during surgery. We compare the difference between the removed implant and the manual segmented model.

Methods: Materialise MIMICS was used to segment a series of preoperative CT scan of the patient by a P&O practitioner. An STL file of the manual segmentation of the implant was then exported. A 3D-scan of the removed implant was done by EinScan Pro HD desktop/handheld scanner. The resulting image was exported as STL file. The two resulting STL files were compared in Materialise 3-MATIC. The indexes which were used to recognise their similarity and difference were Dice coefficient and average Hausdorff distance.

Results: The Dice coefficient signified that the manual segmented implant and the actual implant has 91% of overlapping. The average Hausdorff distance showed there is an average of 0.53 mm between the manual segmented implant and the actual implant.

Discussion and Conclusion: By comparing the STL files generated by manual segmentation and 3D scanning of the actual implant could help in validating the accuracy of a P&O practitioner on manual segmentation of CT scanning.

P09

Systematic review on the effectiveness of cryotherapy in the treatment of lateral ankle sprains

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Introduction: Lateral ankle sprain (LAS) is a common musculoskeletal injury with an annual incidence rate of 1.9%-2.66%, particularly affecting physically active individuals. Cryotherapy is an application of substances that remove heat from the body. It is a widely used treatment for LAS due to its easy application in clinical settings. However, the optimal protocol for cryotherapy is not yet established, and its efficacy remains inconsistent. Therefore, this study aims to investigate the effect of cryotherapy to LAS on the patient-reported outcome measure and the optimal application method of cryotherapy.

Methods: This is a systematic review conducted according to the PRISMA 2020 statements. Search database includes MEDLINE, Embase, Cochrane, PubMed, and PEDro up to January 2023.

Results: 6 studies met the inclusion criteria and were included. There was a large discrepancy between the treatment protocols.

Discussion and Conclusion: Bleakley found that the intermittent ice group significantly reduced pain in the first week. If the treatment goal is to decrease secondary tissue damage in regions with greater amounts of adipose tissue, higher dosage and longer duration are needed. Cryotherapy can achieve better effects when started within 24 hours post-trauma but not beyond 72 hours. Early treatment with cryotherapy improves the metabolism, but its therapeutic impact may diminish overtime. The available evidence on cryotherapy's efficacy is inadequate. More high-quality randomized controlled trials are needed to establish definitive evidence.

P10

Limb salvage in diabetic foot infection: retrospective review of a case series using DIRECT wound coding system

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Several classification systems have been developed to grade diabetic foot ulcers (DFU), but neither can predict limb salvage. Recently, the DIRECT system was reported as a more accurate tool to assess DFU. It consists of six aspects including Debridement of necrosis, Infection control, Revascularization, Exudate control, Chronicity and Top surface. Its application was reviewed in a case series of salvageable DFU admitted from 1/2022 to 6/2023.

A total of 18 patients were included, with mean age of 67.5 years. Fifteen patients had grade 3 or 4 disease according to the Wagner system, and the mean DIRECT score was 3.68. Fourteen (77.8%) patients scored ≤4 and only one patient scored >4.7, which was the mean score of the major amputation group in previous study.

Regarding risk factors for major amputation, 50% of patients had co-existing osteomyelitis. The mean WBC level was 14.2 (4.5-26.5), and the mean CRP level was 102.9 (1.9-332.1). The majority (88.9%) of patients had mixed bacterial infections. Nine patients had infection localised to the forefoot, and thirteen patients were treated with either debridement only and/or ray amputation of toe(s), while five patients had partial foot amputation performed. Half of the patients were able to walk unaided or with aids independently.

In this case series of salvageable DFU, the mean DIRECT score was lower than the reported mean score of amputation in previous study. Application of the DIRECT score may aid in the prediction of outcome and surveillance of treatment progress in diabetic foot infections.

P11

Intracranial haemorrhage after spinal surgery: a case report and literature review

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Intracranial haemorrhage (ICH) is an extremely rare but potentially severe complication of spine surgery. Most are related to durotomy, cerebrospinal fluid (CSF) leak and intracranial hypotension. Most are presented within first week after surgery. We report an elderly patient underwent open L4/5 transforaminal interbody fusion with occult dural tear and delayed presentation of ICH. CT brain revealed uncommon sites of bilateral parietal haemorrhage and small subarachnoid haemorrhage. MRI spine confirmed CSF leakage. Surgical exploration noted 6 mm dural defect with repair done. Patient experienced full neurological recovery after dural repair.

P12

Development of a novel distraction device for the establishment of a mouse model of distraction osteogenesis

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Introduction: Distraction osteogenesis (DO) has been widely used for the treatment of bone defects as its effectiveness in bone regeneration. Current device for DO animal models are mainly developed in large animals. However, a device compatible for the mouse DO model is still lacking. Here, we describe a novel distraction device for establishing a mouse DO model.

Methods: A distraction device weighted around 1 g was custom-made with titanium alloy. This device is characterised by a unilateral frame with four horizontally aligned holes with a diameter of 0.6 mm and 1.8 mm apart. 12-week-old male C57/BL6J mice were used. Animals were divided into 3 groups: fracture (F), acute distraction (AD) and gradual distraction (GD). In F group, mice were treated with femoral osteotomies only. In AD group, a 3-mm distraction was performed at post-operation day (POD) 6. In GD group, distraction at a rate of 0.3 mm daily for 10 days was performed at POD 6. Samples were harvested at POD 43 for digital radiography, micro-CT and histological analysis.

Results: Bone regeneration three groups were measured. Compared to the AD group, the F and GD groups showed significantly higher bone volume to total volume ratio. Safranin-O/Fast green staining showed more trabecula in F and GD groups compared to AD group.

Discussion and Conclusion: We have developed a novel and reliable distraction device for the mouse DO model. Future research will be conducted to investigate the underlying mechanism and potential therapeutics for enhancing osteogenesis in bone regeneration.

P13

Systemic supplementation of magnesium attenuates bone loss via acting on central nervous system

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Introduction: Osteoporosis is a prevalent disorder that disrupts bone quality in aged people. Current treatments for osteoporosis include antiresorptive and anabolic drugs. Recently, the bone tissue is found to be densely innervated by nerves and dominated by the brain. Magnesium is found to promote bone regeneration both locally and systematically. Our previous work has demonstrated that magnesium-based implants exert promising effects on bone healing by stimulating dorsal root ganglion. However, whether magnesium acts on the central nervous system to regulate bone homeostasis remained unclear.

Methods: Retrograde tracing pseudorabies virus and activity-dependent genetic labelling are used to identify the brain region response to central nervous system permeable magnesium-L-threonate (MgT). Chemogenetics and calcium fibre photometry are used to manipulate and measure the activity of brain regions. Micro-CT analysis and TRAP staining are used to study bone phenotype.

Results: Certain brain regions, including paraventricular nucleus and parabrachial nucleus (PBN) are identified affected by MgT stimulation. The CGRP positive neurons in PBN are found to be activated be MgT significantly. Chemogenetic activation of Calca-positive neurons increased bone density in OVX mice. Knocking out MAGT1 in CGRP-positive neurons resulted in decreased bone mass and abolished the beneficial effect of magnesium supply on bone.

Discussion and Conclusion: MgT promotes bone regeneration in mice via a CNS-dependent mechanism. The CGRP positive neurons in the PBN region mediated brain response to MgT. Further studies are needed to elucidate the exact cellular and neuronal circuits that underlay this mechanism.

P14

Acute biomechanical effects of a functional knee brace and medial arch support on anterior cruciate ligament (ACL) deficient knee in drop-landing

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Introduction: Team ball-sports involved repeated landings have a high incidence of non-contact ACL injuries. However, the correlation between orthoses, ACL deficient knee, and drop-landing has not been detailly clarified. Therefore, this study investigates the acute biomechanical effects of a functional knee brace and medial arch support on ACL deficient knees in drop-landing.

Methods: 10 recreational athletes with non-operated ACL deficient knees were recruited. Subjects were provided a functional knee brace and 2 different pairs of insoles and they were instructed to have 20 dynamic drop-landing trials from a 0.4 m height for 4 testing conditions. Biomechanical data were captured and a one-way analysis of variance was conducted.

Results: Significant differences were found in maximum knee valgus moment, knee flexion at initial contact, and minimum knee flexion. Subjects in control group had the greatest knee valgus moment and less knee flexion while the smallest knee valgus moment and more knee flexion were spotted in subjects with the orthotic interventions involved the functional knee brace in drop-landings.

Discussion and Conclusion: The functional knee brace could reduce the potential of suffering non-contact ACL injury and offer additional stability to the ACL impaired knee. However, insoles with medial arch support did not show a significant influence on the landing parameters. Therefore, a functional knee brace is suggested for patients with ACL deficient knees when they play sports involved drop-landings. It may lower their potential of having a second ACL trauma or subsequent injury and eliminate the physical burden to the injured ACL.

P15

Effect of high-fat diet-induced obesity on collagenase-induced tendon injury

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Introduction: Obesity increases tendinopathy's risk and may be mediated by its low-grade inflammation. This study examined the effect of high-fat diet (HFD) on the outcomes of collagenase-induced tendon injury (CI).

Methods: Mice were fed with standard chow (SC) or HFD for 12 weeks. Bacterial collagenase I or saline was injected over the middle region of the left patellar tendon of each mouse. At week 2 and week 8 post-injection, the patellar tendons were harvested for H&E histology and immunohistochemical staining of IL-1 and MMP-1 (both n=6/group/time point), and gait analysis (n=8/group/time point). The limb-idleness index (ILL) and difference of normalised swing time post-injury compared to baseline (STinj-baseline) were calculated. Biomechanical test was also assessed at week 8 post-injection (n=15/group/time point).

Results: HFD aggravated CI tendon injury with an increase in vascularity and cellularity compared to the SC group. Except STinj-baseline at week 8, the histopathological score, ILL and STinj-baseline were significantly higher in the HFD group compared to those in the SC group at both week 2 and week 8. Tendon stiffness, ultimate stress and Young's modulus were significantly lower in the HFD group compared to the SC group at week 8. HFD induced higher expression of IL-1 and MMP-1 compared to the SC group after CI tendon injury at both time points.

Conclusion: HFD exacerbated histopathological, mechanical, and functional changes in tendons in the CI model, which might be due to the increase in tendon inflammation.

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P16

Osseus morphological difference of osteoarthritis knees in southern Chinese Population

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Introduction: Enhanced comprehension of the morphological characteristics of osteoarthritis knees can optimise implant size selection, implant positioning and balancing in unicompartmental knee arthroplasty (UKA). Therefore, the aim of this study was to outline the morphological differences in the distal femur of osteoarthritis knees in Southern Chinese Population.

Methods: Preoperative CT images of patients who underwent primary UKA were collected from the local hospital in Hong Kong. Standardised measurement approaches were developed to obtain three-dimensional morphological parameters of the femur, including 1) the posterior condylar angle (PCA), the angle between the surgical transepicondylar axis and posterior condylar line; 2) the condylar offset ratio, ratio of medial to lateral posterior condylar offset; 3) the condylar radius ratio, ratio of medial to lateral posterior condylar radius.

Results: 74 patients (Female: Male=43:31; Mean age: 68.57±7.05) were included. Mean PCA, condylar offset ratio, and condylar radius ratio were 1.65°±1.61°, 1.06±0.06, and 1.01±0.05 respectively. Compared with male patients, the female patients had a significantly lager condylar radius ratio (1.03±0.05 compared with 0.99±0.05, p=0.004). In terms of PCA and condylar offset ratio, there was no significant difference between male and female patients.

Discussion and Conclusion: This study found that the posterior femoral condyles were asymmetrical in southern Chinese population. The radius of the medial condylar flexion facet was significantly larger than that of the lateral condyle in female patients, whereas the opposite was observed in male patients. This gender-related difference may require further investigation to determine whether gender-specific femoral component is needed in UKA.

P17

Tibial Cortex Transverse Transport (TTT) enhances mesenchymal stem cell (MSCs) mobilization via SDF-1/CXCR4 signalling pathway for accelerating diabetic foot ulcer (DFU) healing

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Introduction: Diabetic foot ulcer (DFU) is a severe complication of diabetes that carries a higher risk of amputation and mortality. Tibial Cortex Transverse Transport (TTT) has shown promising results in treating peripheral ischemic conditions, including DFU. However, the underlying biological mechanisms of TTT treatment require further clarification. This study aimed to examine the mechanism by which the TTT technique confers therapeutic benefits for DFU treatment, with a specific focus on MSCs mobilisation and homing.

Methods: A rat model of TTT was established to investigate its therapeutic effects on DFU. Wound healing index (WHI), histology and immunohistochemistry were used to evaluate the wound healing processes. MSCs mobilisation and homing were tracked using flow cytometry analysis and immunohistochemistry. Additionally, molecules related to MSC mobilisation were evaluated using qRT-PCR and Western Blotting.

Results: TTT technique accelerated DFU closure and improved the quality of newly formed skin tissues. Furthermore, TTT treatment enhanced MSCs migrating to peripheral blood and homing to wound site. The expression of SDF-1, CXCR4/7 and FAK was upregulated after cortex transport.

Discussion and Conclusion: TTT technique can accelerate the healing of DFU by enhancing mobilisation and homing of MSCs. SDF-1/CXCR4 signalling pathway may be responsible for the systemic mobilisation of MSCs, which may promote angiogenesis and regulates immune response at the site of ulcer. These findings shed light on the potential biological mechanisms underlying TTT treatment and may pave the way for the development of new therapeutic targets in DFU management.

P18

Scoliosis in osteogenesis imperfecta: identifying the factors affecting severity and progression from longitudinal data

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Background: Scoliosis is prevalent in osteogenesis imperfecta (OI) patients, but factors affecting severity and progressions are not known.

Methods: We retrospectively retrieved longitudinal radiographic and clinical records of all OI patients seeking treatments at our hospital from 2015 to 2022, scored their pre-operative spinal conditions into four scoliosis grades, estimated their progression rates, and analysed the genetic and non-genetic factors that may affect the outcomes and progression rates, using both descriptive and inferential methods.

Results: In all, 290 OI patients met the inclusion criteria, where 221 had genetic records. With an average age of 12.6 years (interquartile range [IQR] 6.9 to 16.1), 70.7% of the cohort had scoliosis (Cobb angle >10°), including 106 (36.5%) mild (10-25°), 40 (13.8%) moderate (25-50°), and 59 (20.3%) severe (>50°) scoliosis patients. Patients with either COL1A1 and COL1A2 were strongly biased towards having mild or no scoliosis, where patients with mutations in IFITM5, WNT1 and other recessive genes were more evenly distributed among the four outcome grades. Lower-limb discrepancy (LLD), bone mineral density (BMD) and age of first drug used were all significantly correlated with severity outcomes. Higher BMD Z-scores was protective in advancing into severe outcomes. We estimated a cohort-wide progression rate of 2.7 degrees per year (confidence interval 2.4 to 3.0), which peaked at ~12.5 years.

Conclusion: The severity and progression of scoliosis in OI were affected by genetic factors including genotypes and mutation types, and non-genetic factors including age and BMD. Progression rates were fastest in the adolescent group.

P19

Delayed ACL reconstruction has no significant impact on ACL graft healing compared with time-zero reconstruction in a non-invasive ACL rupture rat model

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Introduction: Anterior cruciate ligament reconstruction (ACLR) is performed between 4-10 weeks post-injury clinically, coinciding with the subsided acute inflammatory response. However, present animal models, used for studying ACL graft healing, engage in immediate reconstruction post-ACL dissection, potentially introducing a significant bias within preclinical assessments.

Methods: Male 12-week-old Sprague Dawley (S-D) rats were randomly assigned to two groups: (1) immediate reconstruction group (immediate group) and (2) delayed reconstruction group (Delay group) [n=3/group]. Non-invasive methods were employed for ACL rupture, and ACLR was performed either immediately or one-week post-rupture. Histological assessments of ACLR graft healing were conducted two weeks post-reconstruction surgery.

Results: 85.3±6.5 N single over-load force could induce ACL rupture in SD rats. Inflammation and healing of the distal femoral tunnel were slightly better in the Delay group compared with the immediate group at 2 weeks. However, deterioration of intra-articular grafts was not observed.

Discussion and Conclusion: Preliminary findings suggest that delayed reconstruction, post-ACL rupture, may not significantly enhance graft healing within the rat model. The credibility of the established ACLR rat model remains unaffected due to varying time frames of reconstruction. Further investigations integrating larger sample sizes, biomechanical analyses, and in-situ inflammatory factor detection are indispensable for solidifying the conclusion.

P20

The role of mitochondria in the aging neuromuscular junction system: A systematic review

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Introduction: The pathophysiology of neuromuscular degeneration is known to be affected by mitochondrial dysfunction. However, the morphological and functional changes in mitochondria and the role they play in the degeneration of the neuromuscular junction (NMJ) during aging remain unclear. This systematic review aims to examine the role of mitochondria in the degeneration of NMJ with aging.

Methods: A systematic literature search was conducted in Web of Science, PubMed, and Embase with relevant keywords by two independent reviewers. Original studies reported mitochondrial changes and roles in the NMJ system during aging with available full text in English included.

Results: In total, 20 publications were eventually included for systematic review. In senescent rodents, mitochondria showed significant swelling, cristae breakage and loss, and accumulation in the axon terminal region. Morphological changes in mitochondria in axon terminals precede those in muscle. Changes in mitochondrial biosynthesis (PGC-1α) and mitochondrial dynamics (Mnf2, OPA1), a decrease in mtDNA number, mitochondrial enzymes (citrate synthase) and complexes (I, II, and IV), and levels of mitophagy (ATG7, LC3II/LC3I) all proceeded with aging.

Discussion and Conclusion: Mitochondrial dysfunction leads to NMJ denervation and AChR fragmentation, resulting in muscle atrophy and reduced motor phenotype during aging. Restoration of mitochondrial function through exercise, diet, etc. can improve this situation. However, the mechanisms of mitochondrial oxidative respiratory chain function, mitophagy, mitochondrial fusion and fission, mitochondrial biosynthesis, and mitochondrial apoptotic proteins in the treatment of NMJ degeneration and sarcopenia still need to be further investigated.

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P21

Effect of high fat diet on the histopathology and inflammation of Achilles tendons in mice

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Introduction: Recent studies have suggested that obesity-induced chronic inflammation is a more important mechanism for driving the onset and progression of tendinopathy. Most pre-clinical studies only reported the inferior mechanical properties of tendons after intervention with high-fat diet (HFD). This study aimed to examine the effect HFD on the histopathology and expression of inflammatory cytokines and matrix remodelling enzymes in mouse tendon.

Methods: C57BL/6J mice were fed with SC or HFD for 12 weeks. The Achilles tendons were harvested for histology and immunohistochemical staining of inflammatory cytokines (IL-6, IL-10) and matrix remodelling enzymes (TIMP-1, MMP-3).

Results: HFD induced early histopathological changes in tendons. Hypercellularity, hypervascularity, chondrocyte-like cell phenotype, cell mal-alignment, fat accumulation, ectopic bone, loss of collagen birefringence were observed in the HFD group. The histopathological score was significantly higher in the HFD tendons compared to the SC tendons. The expression of IL-10, MMP-3, IL-6, but not TIMP-1, was higher in the HFD group compared to the SC group and was mainly observed in the round cells, fat deposit, chondrocyte-like cells, calcified region.

Discussion and Conclusion: HFD-induced obesity disrupted tendon homeostasis and recapitulated early histopathological changes of tendinopathy. The increased expression of MMP-3 and matrix degeneration, and the presence of fat and calcified deposits might explain the inferior mechanical properties of HFD mouse tendons reported in the literature. The increase in inflammation in HFD tendons might contribute to the higher risk of tendinopathy in obese individuals.

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P22

Resection of hemivertebra in congenital scoliosis using ultrasonic bone cutter under computerised navigation

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Introduction: Hemivertebra excision is the treatment of choice for congenital scoliosis with progressive or significant deformity. Single posterior approach is a high risk procedure due to significant bleeding from osteotomy site, neurological injury, vascular injury or pseudoarthrosis. The use of navigated ultrasonic bone cutter for hemivertebra excision has not been described in literature. It allows safe and accurate removal of bone with reduced risk to nearby soft tissue structures including the dura and vessels.

Methods: From Jan 2022 to May 2022, patients with hemivertebra with significant or progressive deformity were recruited. Pre-operative CT was performed and transferred to Stryker Navi III machine for osteotomy planning. Posterior approach were adopted. Pedicle screws were inserted first under navigation. Osteotomy of hemivertebra were performed under navigation after laminectomy. It was followed by closure of osteotomy site. Free mobilisation were allowed post-operatively and X-rays were taken for measurement of coronal and sagittal alignment.

Results: This technique were performed in 2 patients aged 16. Satisfactory correction of main curve (40% and 47%), compensatory curve (45% and 47%, shoulder balance and truncal balance were observed for both patients. No dura tear, neurological injury or wound complications were observed.

Discussion and Conclusion: This novel technique allows safe and accurate excision of hemivertebra in congenital scoliosis patients.

P24

Early Mycobacterium fortuitum infection complicating healing wound and osteotomy gap in high tibial osteotomy

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P25

Bilateral simultaneous total knee arthroplasty with ERAS protocol, where are we at?

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Background: Bilateral simultaneous total knee arthroplasty (TKR) has great financial and recovery advantages over bilateral staged TKR. Together with Enhanced Recovery After Surgery (ERAS) pathways these advantages are further potentiated. This study aimed to determine the outcomes of simultaneous bilateral TKR performed in a joint replacement centre and university teaching hospital in Hong Kong for the last two years.

Methods: This study retrospectively reviewed patient data from Prince of Wales Hospital and Alice Ho Miu Ling Nethersole Hospital. A total of 110 patients underwent bilateral TKR from 1st April 2021 to 1st April 2023 were included, while unicompartmental knee arthroplasty and staged bilateral TKR procedures were excluded. All patients underwent standardised ERAS protocol. Post-operative complication, transfusion, readmission frequency and the length of stay were recorded. Functional outcomes were evaluated by Knee Society Score (KSS) and Knee Functional Score (KFS) up to 2-years of post-operative follow-up.

Results: The average length of stay of patients was 5.23 days. No reoperations were needed. Transfusion rate was 6.36% and with one pint of transfusion given on average. No post-operative surgical complication that required readmission or reoperation was recorded. One case required readmission for medical complications. Mean KSS for both knees were above 92 (Right knee 92.39; Left knee 92.07) and mean KFS was 80.6.

Conclusions: The outcomes of bilateral simultaneous TKR were satisfactory and comparable to staged TKR, and with the advantage of shortened length of stay and rehabilitation time, yet there was no significant increase in post-operative complications.

P28

Retrospective analyses of clinical features in 28 Chinese patients with type V osteogenesis imperfecta: new perspectives in an old issue

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Introduction: Type V osteogenesis imperfecta (OI) is a form of OI characterised by radial head dislocation (RHD), calcification of interosseous membrane (CIM), and hyperplastic callus (HPC). In this study, we characterised the clinical features of 28 type V OI patients. The study aims to systematically characterise the skeletal phenotypes of patients with type V OI and suggested possible surgical solutions.

Methods: A total of 28 patients were admitted for inpatient care at The Hong Kong University-Shenzhen Hospital diagnosed with type V OI (either clinically diagnosed or genetically confirmed with the IFITM5 c.-14C>T mutation).

Results: Prevalence of type V radiological features was comparable to previous literatures (RHD, 100%; CIM, 100%; HPC, 44%; and scoliosis, 50%). Novel skeletal phenotypes were presented including extension of coronoid process, acetabular labrum, acetabular protrusion, spontaneous autofusion of the hip, bulbous epiphysis, and popcorn calcification. Significant increase in BMD was observed in patients with bisphosphonate treatment. Twenty-five percent (3/12) of patients with preoperative use of indomethacin developed HPC postoperatively, and HPCs were absorbed in 2 young patients 2 years later.

Discussion and Conclusion: This retrospective study summarised the clinical features. Our study contributed to a more comprehensive clinical spectrum of type V OI. We also characterised the natural progression of HPC formation and resorption in patients in different ages. The use of bisphosphonate treatment is effective in improving bone mineral density in type V OI patients, and whether indomethacin can reduce incidence of HPC formation deserves further investigation.

P29 ***Indian Orthopaedic Association Ambassador Paper***

Catch 22: What to do next?

Tanay Prabhoo

A young administrative person presented with pain in the gluteal region and leg pain for 3 months. He was not getting better with all the conservative management tried. This case is his journey of further management. Was there a happy clinical result in the end?

After conservative line of treatment for 3 months with medications and rest, he was not getting better clinically. He was eventually operated for the pathology in the form of decompressive surgery. After the surgery he was clinically better but after doing vigorous exercises one day he developed similar symptoms which were mild initially. This occurrence took place about 10 days post surgery. The next line of management is always a dilemma for the surgeon. Whether to continue to follow conservative line of management in the form of medications (injectable, oral), rest or to intervene is always a tough decision. Further investigations were done to get better clarity for the cause of the pain.

Eventually after seeing the images, decision was taken to do further treatment in a step-wise manner in the form of conservative, if not better, then block, and finally if not better, then re-surgery. Detailed counselling was done with the patient and relatives, which is an essential step. Eventually patient improved with conservative line of management in the form of medications and adequate rest. It was a successful outcome in the end with a happy patient.

You do not need to always re-operate every spine patient. Proper step-wise guidance and counselling of the patient is the key to a successful outcome.

Author Index

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We would like to express our deepest gratitude to the organising partners for their honorable contributions and support throughout this Annual Congress:

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