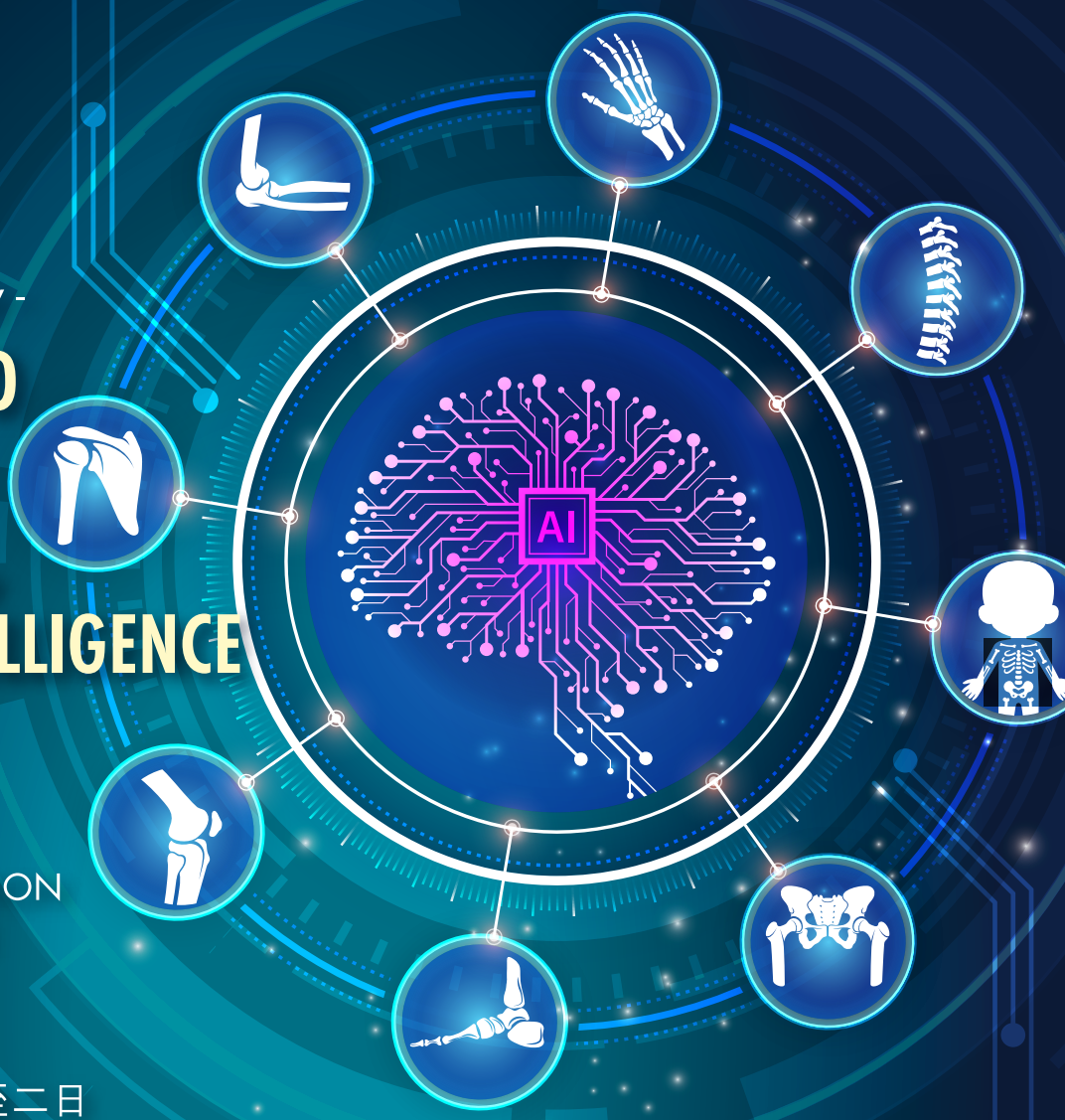
HKOA 60th Anniversary -

FROM ROOTS TO INNOVATIVE TECHNOLOGIES, ARTIFICIAL INTELLIGENCE & BEYOND



HONG KONG CONVENTION
AND EXHIBITION CENTRE
香港會議展覽中心

1-2 NOVEMBER 2025
二零二五年十一月一日至二日

THE HONG KONG ORTHOPAEDIC ASSOCIATION
45TH ANNUAL CONGRESS
香港骨科醫學會第四十五屆週年大會

Programme & Abstracts

香港醫學專科學院出版社
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Welcome Message from the President of The Hong Kong Orthopaedic Association

Dear Fellows, Members, and Honoured Guests,

It is my great privilege and pleasure to welcome you all to the Diamond Jubilee Meeting of the Hong Kong Orthopaedic Association (HKOA) as we celebrate our 60th anniversary.

To mark this significant milestone, we have organised a series of commemorative events throughout the year. These include radio and television interviews, public education talks during the Bone and Joint Action Week, the 60th Anniversary Photo Contest, a Wine and Dine Gathering, a Cocktail Workshop, and the publication of our 60th Anniversary Booklet. As an added highlight, we are also introducing the HKOA pin as a special congress souvenir. Through these various activities, we strengthen our bonds and celebrate the fraternity and mutual support that are essential to our shared success.

At the heart of our association lies the core value of advancing education, training, and research to ensure the highest quality care for our patients. This year's congress theme—From Root to Innovative Technologies, Artificial Intelligence & Beyond—reflects our commitment to embracing the latest advancements in the field.

We are honoured to host an impressive lineup of distinguished overseas and local speakers from diverse subspecialties who will enrich this meticulously organised two-day programme. Additionally, this year's congress features a new concurrent session in collaboration with the Hong Kong Science and Technology Park. For the first time, the HKOA Annual Congress will showcase focused presentations from local innovation and technology companies. This session will be followed by a matching consultation and demonstration, providing participants with the unique opportunity for one-on-one discussions with representatives from these companies. Our goal is to provide a platform to foster collaboration across upstream research and development, midstream pilot applications, and downstream service provision and networking.

I would like to extend my heartfelt gratitude to the organising committee, led by Dr Ronald Wong and Dr Michael Tse, for their dedication and exceptional efforts in making this event possible. I am also deeply thankful to our Past Presidents, mentors, and colleagues for their unwavering support and commitment to the field of orthopaedics. Without their continuous support and valuable contributions, the success of our annual congress would not be possible.

Finally, I wish everyone a rewarding and enriching experience at this Diamond Jubilee HKOA 2025. Let us celebrate our achievements, share knowledge, and look forward to a future filled with innovation and collaboration.

Warm regards,
Dr Kam-kwong WONG
President, Hong Kong Orthopaedic Association

Welcome Message from the Co-Chairmen of the Organising Committee

Dear Fellows, members, and friends,

Welcome to the 45th Annual Congress of the Hong Kong Orthopaedic Association (HKOA), one of the most significant events in our calendar year. This year, we are proud to celebrate the 60th Anniversary of the HKOA. In celebration of this milestone, our congress theme—From Root to Innovative Technologies, Artificial Intelligence & Beyond—reflects the remarkable evolution of orthopaedics and the exciting future that lies ahead.

We explore various aspects of this transformation, including enabling technologies, artificial intelligence, mixed realities, precision medicine, and big data. Our thoughtfully curated programme is designed to inspire and engage, offering valuable insights into the latest developments across these fields.

We are honoured to welcome esteemed speakers from around the world who will share their expertise, pioneering research, and thought-provoking discussions. We trust this gathering will foster collaboration and the exchange of ideas.

We extend our sincere gratitude to the Organising Committee members of the Annual Congress for their dedication, to the Council members of the Hong Kong Orthopaedic Association for their steadfast support, and to all speakers for their invaluable contributions. We also thank our sponsors for their generous support. Most importantly, we thank you, our distinguished guests, friends, and colleagues, for your enthusiastic participation and continued support of this year's Annual Congress.

We hope you find the congress both rewarding and enjoyable.

Dr Michael Siu Hei TSE and Dr Ronald Man Yeung WONG
Co-Chairmen
HKOA 45th Annual Congress

Organising Committee

Co-Chairmen	Dr Michael Siu Hei TSE Dr Ronald Man Yeung WONG
Honorary Secretary	Dr Adam Yiu Chung LAU
Honorary Treasurer	Dr Kam Lung TUNG
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Co-Conveners	Dr Felix LEUNG Dr Jonathan Patrick NG
Members	Professor Louis Wing Hoi CHEUNG Dr Esther Ching San CHOW Dr Gloria Yan Ting LAM Dr Sheung Wai LAW Dr Richard Hin Lun LEE Dr Anderson Siu Ming LEUNG Dr Stephanie Ka Ki LIU Dr Lucci Luggee LIYEUNG Dr Cho Yau LO Dr Ophelia Yue Ting WAN
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Publication, Publicity, ITAV & Venue Subcommittee	
Convener	Dr Tsz Lung CHOI Professor Elvis Chun Sing CHIU Dr Raymond Chung Wai WAN Professor Ning ZHANG
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Congress Secretariat	Ms Gloria Oi Yin CHAN

Overseas, Regional, and Local Faculties

OVERSEAS AND REGIONAL SPEAKERS – PLENARY SESSION AND CONCURRENT SESSIONS

Dr John YS CHOI
Director
Spine Ortho Clinic Pty Ltd
Australia

Prof Justin COBB
Consultant Orthopaedic Surgeon
Chair in Orthopaedic Surgery
Department of Surgery & Cancer, Faculty of Medicine
Imperial College London
London, UK

Prof Peter GIANNOUDIS
Professor and Chairman
Trauma & Orthopaedic Surgery
School of Medicine
University of Leeds
Leeds, UK

Prof Yong HAI
Professor and Chairman
Department of Orthopedic Surgery
Beijing Chao-yang Hospital
Capital Medical University
Beijing

Dr Chris HARRIS
Orthopaedic Consultant
The Royal Children's Hospital Melbourne
Melbourne, Australia

Dr Thin HONG
Shoulder and Elbow Surgeon
Waikato Hospital,
Hamilton, New Zealand

Dr Oscar Su JIANG
Clinical Associate Professor
Department of Hand Surgery
Huashan Hospital, Fudan University
Shanghai

Prof Michael P KELLY
Professor, University of California, San Diego
Director, Scoliosis and Spinal Deformities, Rady Children's Hospital

Prof Ekavit KEYURAPAN
Assistant Professor
Mahidol University
Thailand

Prof Shoichi KOKUBUN
Professor Emeritus, Tohoku University, Sendai Japan
Director
Research Center for Spine & Spinal Cord Disorders
NHO Sendai Nishitaga Hospital
Sendai, Japan

Prof Ting LI
Department of Orthopedic Trauma
Beijing Jishuitan Hospital
Capital Medical University
Beijing

Prof Anna Noel MILLER
Professor and Chair
Department of Orthopaedics
Dartmouth Hitchcock Medical Center and Geisel School of Medicine at Dartmouth
Hanover, NH, USA

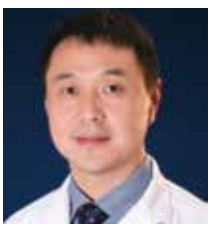
Prof Michael SCHUETZ
Director Jamieson Trauma Institute Metro North Health
Chair of Trauma, Queensland University of Technology
Royal Brisbane and Women's Hospital
Queensland, Australia

Prof Sheng-Tzung TSAI
Director, Department of Neurosurgery
Hualien Tzu Chi Hospital
Hualien

Prof Shun-ping WANG
Director
Division of Fracture and Traumatology
Division of Hand and Foot Orthopaedic Surgery
Department of Orthopaedic, Veterans General Hospital
Taichung

Prof Max Meng Huang WU
Department Chair
Department of Orthopedics, Taipei Medical University Hospital
Taipei

Prof Yixin ZHOU
Professor & Chairman
Joint Surgery Department
Beijing Jishuitan Hospital
Beijing



LOCAL SPEAKERS – PLENARY SESSIONS AND CONCURRENT SESSIONS

Dr Ping Tak CHAN
Dr Amy CHEUNG
Prof Kenneth Man Chee CHEUNG
Prof Jason Pui Yin CHEUNG
Dr Alex Chi Ping CHOW
Dr Esther Ching San CHOW
Mr Ling DING
Dr Henry FU
Dr Paul Aarne KOLJONEN
Dr Jeffrey Justin Siu Cheong KOO
Dr Xihe KUANG
Dr Evelyn KUONG
Dr Gloria Yan Ting LAM
Dr Ying Lee LAM
Dr Sheung Wai LAW
Dr Qunn Jid LEE
Dr Samuel Ka Kin LING
Prof W William LU
Dr Chun Man MA
Dr Michael Chu Kay MAK
Prof QH Max MENG
Dr Jonathan Patrick NG
Dr Graham SHEA
Mr Louis SZE
Dr Keith Hay Man WAN
Dr Kwok Chuen WONG
Prof Jerry Jiankun XU
Dr De YANG
Dr Raymond Ching Hin YAU
Dr Yeung YEUNG
Prof Patrick Shu Hang YUNG
Dr Grace ZHANG

OVERSEAS AND REGIONAL SPEAKERS – LUNCH SYMPOSIUM

Dr John YS CHOI
Director
Spine Ortho Clinic Pty Ltd
Australia

Dr Zhen Wei LIM
Director Acute Pain Service / Anaesthesiology
Singapore General Hospital
Singapore

Prof Xin WANG
Doctor of Medicine, Postdoctoral Fellow, Doctoral Supervisor
Director of the First Orthopedics Department, the first hospital of Lanzhou University;
Director of the Department of Surgery, Lanzhou University
Lanzhou

Prof Zhuo ZHANG
Associate Professor
Chinese PLA General Hospital
Beijing

LOCAL SPEAKERS – LUNCH SYMPOSIUM

Dr Eric Cheung Hing LAM
Honorary Consultant in Orthopaedics & Traumatology
Gleneagles Hong Kong Hospital

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

Dr Paul Yun Tin TSE
Orthopaedic Surgeon
Congruence Orthopaedics & Rehabilitation Centre

Dr Raymond Churk Lun YIP
Consultant In Orthopaedics & Traumatology
Matilda Hospital
Hong Kong Adventist Hospital – Stubbs Road

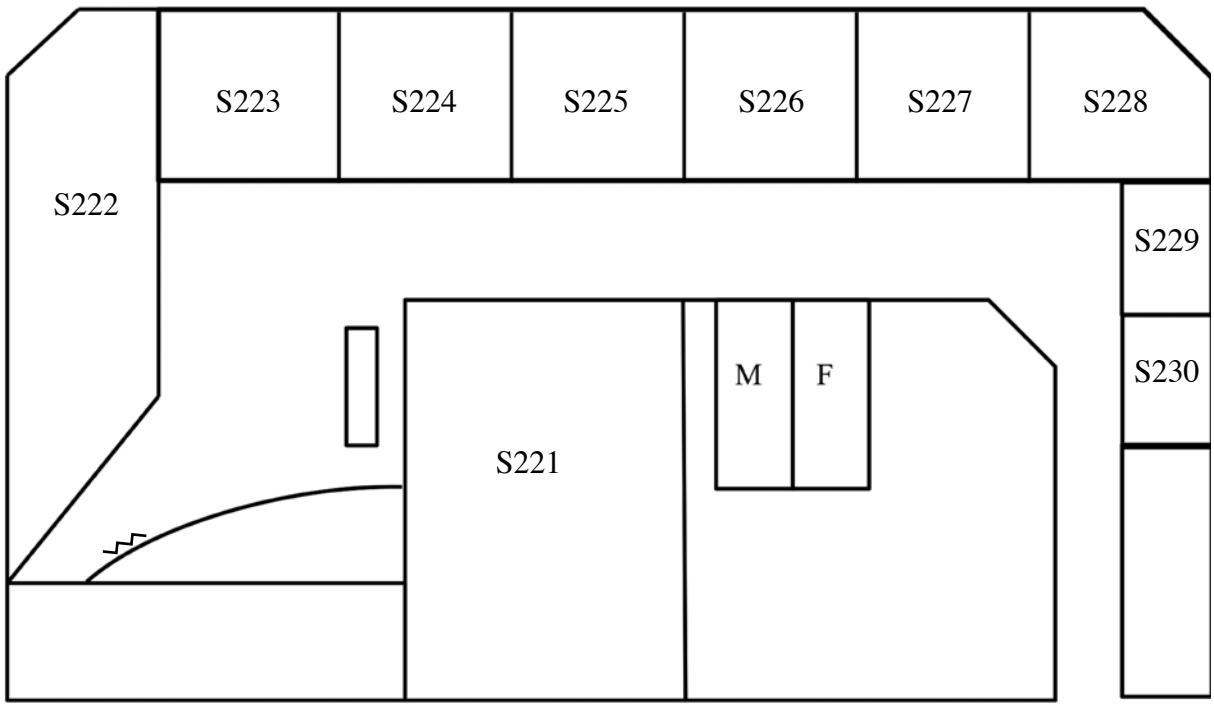
PRESIDENTS, REPRESENTATIVES, AND AMBASSADORS OF SISTER ASSOCIATIONS

PRESIDENTS, REPRESENTATIVES
Prof Keerati CHAREANCHOLVANICH, The Royal College of Orthopaedic Surgeons of Thailand
Dr Timothy Tsin Jien CHENG, Malaysian Orthopaedic Association
Prof Kenneth Man Chee CHUENG, Asia Pacific Orthopaedic Association
Dr Mark MORONEY, Australian Orthopaedic Association
Dr Nur Flora NITA, Indonesian Orthopaedic Association
Dr. Peter S. QUIAOIT, Philippine Orthopaedic Association
Dr Takuaki YAMAMOTO, Japanese Orthopaedic Association
Mr Edward Shouen YEE, New Zealand Orthopaedic Association

AMBASSADORS, TRAVELLING FELLOWS
Mr Woo-sung KIM, New Zealand Orthopaedic Association
Dr Athip KONGKLAM, Thai Orthopedic Society for Sports Medicine
Dr Korawish MEKARIYA, The Royal College of Orthopaedic Surgeons of Thailand
Dr Jun OUCHIDA, Japanese Orthopaedic Association
Dr Wachirawit PENRAT, Thai Orthopedic Society for Sports Medicine
Mr Paul Lambton RODHAM, British Orthopaedic Association
Dr Syed Mohd Esmat Hussaini B Syed Mohd RIDZUAN, Malaysian Orthopaedic Association
Dr Shih-Chieh TANG, Taiwan Orthopaedic Foot & Ankle Society

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, 226, 227, 228

Programme at a Glance

Saturday, 1 November 2025

07:30 – 10:00	**Free Paper Sessions**	
10:00 – 10:30	**Coffee Break / Exhibition**	
10:30 – 12:00	**Opening Ceremony**	
12:00 – 13:00	**Plenary Session I** HKOA 60th anniversary – From Roots to Innovative Technologies, Artificial Intelligence & Beyond	
13:00 – 14:00	**Lunch Symposia**	
14:00 – 16:00	**Award Papers Presentation**	
16:00 – 16:30	**Award Poster Presentation**	**Coffee Break / Exhibition**
16:30 – 18:00	**Plenary Session II** Enabling Technology in Orthopaedics	**Concurrent Sessions** I – Paediatric Orthopaedics II – Adult Joint Replacement III - Trauma IV – Hong Kong Science and Technology Parks
18:00 – 18:30	**The Hong Kong Orthopaedic Association Annual General Meeting**	**Hong Kong Science and Technology Parks – Matching and Demonstration Session**
18:30 – 22:00	**Cocktail Reception and Congress Banquet**	

Sunday, 2 November 2025

07:30 – 10:00	**Free Paper Sessions**	
10:00 – 10:30	**Coffee Break / Exhibition**	
10:30 – 12:00	**Plenary Session III** Artificial Intelligence in Orthopaedics	**Concurrent Sessions** V – Foot and Ankle VI – Orthopaedic Rehabilitation VII – Hand VIII – Sports Medicine
12:00 – 13:00	**Lunch Symposia**	
13:00 – 14:30	**Plenary Session IV** Precision Medicine and Big Data in Orthopaedics	**Concurrent Sessions** IX – Spine X – Orthopaedic Training XI – Orthopaedic Oncology
14:30 – 15:00	**Coffee Break / Exhibition**	
15:00 – 16:30	**Plenary Session V** Translational Research in Orthopaedics	
16:30 – 16:45	**Closing Remarks**	

Programme in Detail

Saturday, 1 November 2025

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S221**	**Free Paper Session I: Trauma** (Felix LEUNG, Raymond Wai Kit NG)	
1.1		3D-guided navigation percutaneous screw fixation for displaced pelvi-acetabular fractures	Adrian Bing Fung Ang
1.2		Prediction of incident fragility fracture using high-resolution peripheral quantitative computed tomography: an 8-year follow-up study in Hong Kong	Zoey Tsz Lok Tsang
1.3		Retrospective comparison between helical blade and screw in geriatric hip fracture fixation with cephalomedullary devices	Man Kit Ho
1.4		Prevalence, risk factors, prediction of robust callus formation and accelerated fracture healing in patients with traumatic brain injury: a 5-year study	Zhengming Shan
1.5		Surgeon-administered regional anaesthesia for ankle fracture fixation	Chun Lok Chow
1.6		Intra-operative intra-articular cocktail injection for patella open reduction and internal fixation: a single-centre, double-blind, randomised controlled trial	Johnson Pok-Him Tam
1.7		Automated prediction of bone mineral density and T-score from radiographs via deep learning: a multi-centre study	Chun Sing Chui
1.8		Patients' decision-making delay prolongs surgical waiting time among older adults with hip fractures: a retrospective cohort study	Zihong Lin
1.9		Territory-wide comparative analysis of all-cause mortality in geriatric patients with hip fractures, femoral shaft fractures, and distal femur fractures: a retrospective cohort study	Ho Yin Raymond Kwok
1.10		Does outcomes at the first follow-up predict outcomes in subsequent follow-ups in patients with wrist fracture: prospects in reducing future outpatient visits	Ho Yin Raymond Kwok
1.11		Automated 3D bone defect reconstruction using UNet_selfNet: a multicentre AI validation study	Ericsson Chun Hai Fung
1.12		Pericapsular nerve group analgesia by indwelling catheter to facilitate rehabilitation after intertrochanteric hip fracture fixation: a pilot study	Florence Ou Suet Pang
1.13		Comparative evaluation of large language models for hip fracture-related patient questions: DeepSeek-V3-FW, Gemini 2.0 Flash, and ChatGPT-4.5	Hong Tao
1.14		Implant innovation or illusion? A critical analysis of cut-out risk reduction in osteoporotic bone	Wai Kiu Thomas Liu
1.15		Performance of large language models in sarcopenia-related patient queries: a comparative study of ChatGPT4.5, Deepseek-V3, and Gemini 2.0	Huang Tao
1.16		Hip fracture surgery delayed by operating room capacity is an independent risk factor for 120-day mortality *(British Orthopaedic Association Ambassador Paper)*	Paul Lambton Rodham

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S225**	**Free Paper Session II: Paediatric Orthopaedics I** (Janus Siu Him WONG, Lucci Lugee LIYEUNG)	
2.1		Bone healing is delayed in osteogenesis imperfecta patients with WNT1 and COL1A1 mutations	Ivan Suet-nam Cheung
2.2		Are patients with Down syndrome at risk of residual acetabular dysplasia at skeletal maturity? A multicentre radiographic study	Yuk-heng Tang
2.3		Helmet therapy for deformational plagiocephaly: a single centre's experience	Adora Sum Yuet Ching
2.4		Trigger thumbs in the paediatric population: changes in the last 40 years	Wen Ching Jeannette Ting
2.5		Contributing factors of coxa vara development after femoral osteotomy in patients with osteogenesis imperfecta	Daniel Li-Liang Lin
2.6		Comparison of skeletal age and chronological age in Hong Kong Chinese population using the Greulich and Pyle method and the Tanner and Whitehouse 3 method	Ka Man Sally Lau
2.7		Prevalence of coxa vara among patients with osteogenesis imperfecta	Brian Xiongyuan Xie
2.8		Outcomes of children treated for non-traumatic avascular necrosis of the femoral head	Merilyn Sik-yu Wong
2.9		Is leg length discrepancy in childhood associated with long leg acetabular dysplasia at skeletal maturity? A follow-up study up to skeletal maturity	Satoshi Yoshida
2.10		Femoral head avascular necrosis risk is low among osteogenesis imperfecta patients undergoing orthopaedic surgery involving anterograde femoral intramedullary fixation: a multicentre cohort	Patrick Pak-ching Chu
2.11		Epidemiology and mid-term follow-up of slipped capital femoral epiphysis in Hong Kong	Yau Mei Cheung
2.12		Long term outcomes of hip salvage procedures at a mean of 16-year follow-up	Yeh Joon Park
2.13		Radiographic acetabular development in patients with FGFR3 disorders	Bernard Mong-hei Chan
2.14		'Rule of thumb' arithmetic method with bone age is most accurate in predicting limb length discrepancy at skeletal maturity after epiphysiodesis	Denise Danyi Huang
2.15		Significant discrepancies between bone age and chronological age among Hong Kong children undergoing growth modulation surgeries	Chak-bong Hui
2.16		Assessing the effects of upper limb casting on Chinese handwriting in primary students in Hong Kong	Chi Lap Yam
2.17		Dangling extra thumbs: is excellent outcome guaranteed after simple excision?	Man Chun Tsang
2.19		Congenital knee dislocation: a series of successful conservative treatment *(Malaysian Orthopaedic Association Ambassador Paper)*	Syed Mohd Esmat Hussaini B Syed Mohd Ridzuan

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S226**	**Free Paper Session III: Spine** (Ho Lam CHAI, Carmen KUNG)	
3.1		Comparison of effectiveness of pedicle screw with polyaxial/monoaxial conversion capabilities with conventional pedicle screws in the reduction of focal kyphosis of burst fracture	Yu Chung Wong
3.2		Efficacy and complications of unilateral biportal endoscopic lumbar spine surgery: clinical results for 293 patients	Wing Ngai Yim
3.3		Cervical vertebral maturation method for staging skeletal growth and curve progression in patients with adolescent idiopathic scoliosis	Samuel Tin Yan Cheung
3.4		Unilateral biportal endoscopy versus open microscopic approach for lumbar spinal stenosis: a comparative case series	Timothy Aaron Kuan
3.5		A bedside comprehensive assessment tool for assessing degenerative cervical myelopathy	Karlen Ka Pui Law
3.6		Efficacy of erector spinae block in wound pain control following unilateral bi-portal endoscopic surgery for lumbar spinal stenosis: a prospective cohort study	Cheuk Yin Tam
3.7		Efficacy analysis of separation surgery combined with stereotactic body radiotherapy in spinal metastasis: a two-centre study	Wai Him Lam
3.8		Early experience with a fully automated robotic arm navigation system in the first 20 cases of lumbar spinal fusion	Cheung Hing Eric Lam
3.9		Accuracy of pedicle screw insertion in initial 20 lumbar spine fusion cases using a fully automated robotic arm navigation system	Cheung Hing Eric Lam
3.10		Clinical significance of Schroth scoliosis-specific exercises during bracing in adolescent idiopathic scoliosis: a prospective, randomised clinical trial	Yat Hong Kenny Kwan
3.11		Curve undercorrection is predictive of postoperative distal adding-on in flexible Lenke 1AR curves	Victoria Yuk Ting Hui
3.12		Morphological analysis of upper lumbar pedicles in a southern Chinese population using computed tomography	Ka Yin Matthew Yan
3.13		Efficacy of preoperative morphological measurement of contralateral facets, lamina, and spinous process in reducing the incidence of excessive bone resection in unilateral biportal endoscopy for lumbar spinal stenosis	Hon Chun Chong
3.14		Low-dose chest computed tomography for bone mineral density screening: a study based on European Spine Phantom models	Mian Huang
3.15		Prediction of osteoporotic vertebral compression fracture using phantom-less quantitative abdominal computed tomography	Mian Huang
3.16		Fully automatic regional bone mineral density measurement of lumbar endplates and adjacent vertebral bone by phantom-less quantitative computed tomography	Mian Huang
3.17		Femoral and tibial length growths were not predictive of curve progression in adolescent idiopathic scoliosis	Kee Lok Fong
3.18		Prediction of scoliosis progression using longitudinal radiographs and attention-based long short-term memory networks	Elvis Chun Sing Chui
3.19		T4-L1-hip axis is not correlated with long term health related outcomes after fusion for adolescent idiopathic scoliosis	Fai Suen Bernice Chan
3.20		Caregiver burden in adolescent idiopathic scoliosis: a prospective study of rising stress and falling overprotection	Chak Yan Calvin Cheng
3.21		Racial differences in whole-body sagittal alignment between Asians and Caucasians based on international multicentre data *(Japanese Orthopaedic Association Ambassador Paper)*	Jun Ouchida

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S227**	**Free Paper Session IV: Adult Joint Reconstruction I** (Gerry HO, Hoi Yeung IP)	
4.1		Factors affecting cementless femoral stem alignment in direct anterior approach hip arthroplasties: a review of 100 cases	Yan Ting Lam
4.2		Surgical accuracy of implant positioning in robotic-assisted versus conventional total hip arthroplasty: experience of a joint replacement centre in Hong Kong	Chun Lai Wong
4.3		Computer-assisted total hip arthroplasty improves acetabular prosthesis placement accuracy: a multicentre, randomised controlled clinical study in China	Xiao Geng
4.4		Comparison of the outcomes of high tibial osteotomy and unicompartmental knee arthroplasty in patients with bone-on-bone medial tibiofemoral joint osteoarthritis	Cheryl Cheuk Wing Kong
4.5		Functional outcomes comparison: bicruciate-retaining total knee arthroplasty versus fixed- and mobile-bearing unicompartmental knee arthroplasty	Hiu Hong Wong
4.6		Unicompartmental knee arthroplasty: an analysis of postoperative alignment and outcome	Siu Nam Jimmy Wong
4.7		Postoperative joint line convergence angle but not coronal plane alignment of knee phenotype affects the high tibial osteotomy midterm outcomes at 5.5-year follow-up	Cham Kit Wong
4.8		Coronal plane alignment of the knee changes in functionally aligned versus mechanically aligned total knee arthroplasty	Chun Ho Lau
4.9		Functional versus mechanical alignment in total knee arthroplasty: a prospective double-blinded superiority randomised controlled trial	Thomas Ka Chun Leung
4.10		Coronal plane alignment changes do not affect in vivo kinematics for robotically performed total knee arthroplasty	Cham Kit Wong
4.11		Applicability of coronal plane alignment of the knee classification in total knee arthroplasty	Chi Kin Lo
4.12		Effect of coronal plane alignment phenotypes on postoperative outcomes following total knee arthroplasty: Hong Kong experience	Alex Yuning Zhang
4.13		Outcome of restricted kinematic alignment technique versus mechanical alignment technique using computer navigation in total knee replacement: a retrospective cohort study	Ghi Ying Jaimie Chan
4.14		Preliminary results of an image-free saw-based robotic knee replacement platform	Amy Cheung
4.15		Inter- and intra-rater reliability of pre-resection ligament tension assessment using a digital tensioner in imageless robotic–assisted total knee replacement	Joshua Sze Jun Chung
4.16		Management for peri-prosthetic hip infections: survivorship and infection recurrence after debridement, antibiotics, and implant retention 1-stage, 1.5-stage, and 2-stage revisions	Michelle Hilda Luk
4.17		The ENDOspacer technique in 1.5-stage and 2-stage revisions for peri-prosthetic hip infections	Michelle Hilda Luk
4.18		Whole body vibration therapy in prehabilitation to enhance physical performance and subjective outcome during total knee replacement journey: a randomised controlled trial	Agnes King Yan Lam
4.19		Enhanced thermal safety in arthroplasty: quantitative assessment of WEREWOLF FASTSEAL 6.0 for total joint replacement procedures	Joshua Sze Jun Chung
4.20		A pragmatic and economical approach to achieving 'greener' knee arthroplasty	Amy Cheung
4.21		Open platform image-based robotic system in total hip and total knee arthroplasties	Wang Fung Rex Mak

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S228**	**Free Paper Session V: Sports Medicine I** (Keith Hay Man WAN, Jonathan Patrick NG)	
5.1		Margin convergence is effective in improving symptoms in patients with large-to-massive rotator cuff tear, despite a high chance of full-thickness retear	Wai Pan Yau
5.2		Prevalence of meniscal tears in anterior cruciate ligament–deficient knees: a prospective epidemiological study of 731 cases	Sandra Wan
5.3		Timing of anterior cruciate ligament reconstruction to prevent meniscal tears: a systematic review and meta-analysis	Sandra Wan
5.4		Predictors for graft rupture after anterior cruciate ligament reconstruction: a study of 731 cases with a mean follow-up of 5.5 years	Wai Pan Yau
5.5		Epidemiology of tendinopathy and non-traumatic tendon rupture in Hong Kong: a comprehensive population-based analysis of incidence rates	Kenney Ki Lee Lau
5.6		Pulsed electromagnetic field therapy for patients with mild to moderate knee osteoarthritis: a double-blind, randomised, placebo-controlled trial	Joseph Huai Yu Li
5.7		Comparative efficacy of surgical interventions for irreparable massive rotator cuff tears in the elderly: a systematic review	Chak Yan Calvin Cheng
5.8		Comparative outcomes of all-inside versus traditional anterior cruciate ligament reconstruction: a minimum 4-year matched cohort review	Sammi Wai Sum Wong
5.9		Is patient-specific instrumentation worth the effort in reverse shoulder arthroplasty?	Huk Yin Edwin Cheng
5.10		Outcome of arthroscopic rotator cuff repair in patients with massive rotator cuff tears complicated with pseudoparalysis	Brian Siu
5.11		Comparative effectiveness of surgical versus conservative treatments for rotator cuff tears: a meta-analysis of pain and functional outcomes	Zihong Lin
5.13		How accurate is Blueprint software in predicting range of motion after reverse shoulder arthroplasty?	Geoffrey Tao Ho
5.14		Fluoroscopic analysis of scapulothoracic motion after reverse shoulder arthroplasty	Jonathan Patrick Ng
5.15		Knee biomechanics during single-leg squat at 4 months predicts 1-year functional outcomes after anterior cruciate ligament reconstruction	Wang Fung Rex Mak
5.16		Impact of wedged baseplates on reverse shoulder arthroplasty outcomes: a radiographic and clinical analysis	Ka Ho Jerrick Lee
10:00 – 10:30		**Coffee Break / Exhibition**	

Time	Room	Topic (Moderators)	Speakers / Presenters
10:30 – 11:45	**S221**	**Opening Ceremony** (MC: Florence PANG, Lauren SUN)	
10:30 – 10:40		Welcome Address by HKOA Congress Co-Chairmen	Michael Siu Hei TSE Ronald Man Yeung WONG
10:40 – 10:50		Welcome Address by HKOA President	Kam Kwong WONG
10:50 – 11:05		Speech of the Guest of Honour	Shoichi KOKUBUN
11:05 – 11:30		Presidential Lecture: The art of bone grafting for bone repair	Peter Giannoudis
11:30 – 11:35		Q&A	Moderator: Michael Siu Hei TSE Ronald Man Yeung WONG
11:35 – 11:45		HKOA President to present a souvenir to the guests & group photo	Kam Kwong WONG
11:45 – 12:45	**S221**	**Plenary Session I: HKOA 60th Anniversary – From Roots to Innovative Technologies, Artificial Intelligence & Beyond** (Michael Siu Hei TSE, Ronald Man Yeung WONG)	
11:45 – 12:00		Myogelosis: extraordinary magneto-receptive muscles cause a variety of orthopaedic disorders	Shoichi KOKUBUN
12:00 – 12:15		Transforming sport medicine with artificial intelligence: opportunities and challenges	Patrick Shu Hang YUNG
12:15 – 12:30		From regional breakthroughs to worldwide impact: how Hong Kong can contribute to global health innovation	Kenneth Man Chee CHEUNG
12:30 – 12:45		Innovative implants in orthopaedics	Ting LI
12:45 – 13:00		Q&A	
13:00 – 14:00		**Lunch / Lunch Symposium**	
	S228	Lunch Symposia I (Sponsored by Yuanhua Robotic, Perception & AI Technologies (HK) Limited)	
		Precision outcomes, personalised solutions: harnessing the KUNWU open platform robotic system for augment and complex arthroplasty	Michael Tim Yun ONG
		Robotic arm–assisted hip and knee revision: some experience	Zhuo ZHANG
14:00 – 16:00	**S221**	**Award Paper Session** (Michael Siu Hei TSE, Ronald Man Yeung WONG)	
AP01		Prevalence of meniscal tears in anterior cruciate ligament–deficient knees: a prospective epidemiological study of 731 cases	Sandra WAN
AP02		Predictors for graft rupture after anterior cruciate ligament reconstruction: a study of 731 cases with a mean follow-up of 5.5 years	Wai Pan YAU
AP03		Sensory neuron activation by brain-derived nerve growth factor harnesses stem cells to promote bone regeneration after traumatic brain injury	Zheyu JIN
AP04		Factors affecting cementless femoral stem alignment in direct anterior approach hip arthroplasties: a review of 100 cases	Yan Ting LAM
AP05		Using ultrasound to reduce unnecessary X-ray irradiation for screening scoliosis in school children: a diagnostic validation study in 892 participants	Cheuk Kin KWAN
AP06		Triple-hit polydopamine-based dual-enzymatic implant coating with DNase I and lysostaphin for osteoporotic fracture–related infection	Ronald Man Yeung WONG
AP07		Minimising revision: long-term outcome and survivorship of porous tantalum acetabulum components in complex primary and revision total hip arthroplasty: a 10 to 20 year study	Lawrence Chun Man LAU
AP08		Prediction of scoliosis progression using longitudinal radiographs and attention-based long short-term memory networks	Elvis Chun Sing CHUI
AP09		Low-magnitude high-frequency vibration combined with β-hydroxy-β-methylbutyrate treatment to prevents neuromuscular junction degeneration in age-related sarcopenia	Qianjin WANG
AP10		A novel bone microarchitecture phenotyping model for predicting curve progression in adolescent idiopathic scoliosis at the first clinical consultation: a prospective longitudinal study of 292 girls followed up to skeletal maturity	Kenneth G YANG

Time	Room	Topic (Moderators)	Speakers / Presenters
16:00 – 16:30	**S221 Foyer**	**Best Poster Presentation** (Kam Lung TUNG)	
BP01		Optimum age for surgery in patients with severe adolescent idiopathic scoliosis: an AI-driven retrospective analysis	Adam Yiu Chung LAU
BP02		Alpha-ketoglutarate as an intermediate in tricarboxylic acid cycle attenuates muscle atrophy in sarcopenic mice	Chaoran LIU
BP03		Short-term effect of pulsed electromagnetic field therapy on hamstring muscle strength after anterior cruciate ligament reconstruction with hamstring autograft: a randomised, double-blind, placebo-controlled, clinical trial	Kenney Ki Lee LAU
BP04		Association of anterior pelvic tilt with curve progression to bracing threshold in patients with mild adolescent idiopathic scoliosis	Vincent Ho Lam WU
BP05		Synthetic dermal substitute for treating lower limb wound infection	Esther Man Wai CHOW
16:00 – 16:30		**Tea Break / Exhibition**	
16:30 – 18:00	**S221**	**Plenary Session II: Enabling Technology in Orthopaedics** (Anderson Siu Ming LEUNG, Jonathan Patrick NG)	
16:30 – 16:50		Synergic effect of spinal cord stimulation and dynamic exoskeleton rehabilitation for severe spinal cord injury with trunk imbalance	Sheng-Tzung TSAI
16:50 – 17:10		Robotic-assisted techniques in peripheral nerve microsurgery	Oscar Su JIANG
17:10 – 17: 30		The use of enabling technology in simplifying complex shoulder arthroplasty	Thin HONG
17:30 – 17:50		Technologies enabling precise bone and soft tissue tumour resection: computer navigation	Ying Lee LAM
17:50 – 18:00		Q & A	
16:30 – 18:00	**S225**	**Concurrent Session I: Paediatric Orthopaedics** (Arthur King Hay MA, Lucci Lugee LIYEUNG)	
16:30 – 17:00		Managing the surgical vulnerability of neuromuscular children with spine deformity	Michael P KELLY
17:00 – 17:30		Paediatric elbow trauma: the place where your ego goes to die	Chris HARRIS
17:30 – 17:45		Updates of mandatory reporting of child abuse ordinance for orthopaedic surgeons	Evelyn KUONG
17:45 – 18:00		Q&A	
16:30 – 18:00	**S227**	**Concurrent Session II: Adult Joint Reconstruction** (Gloria Yan Ting LAM, Kenneth HUI)	
16:30 – 16:45		Surgical approach or assistive technologies which matters more for in hip arthroplasty?	Justin COBB
16:45 – 17:00		The joy of abstracting: rim, point, and column oriented acetabular reconstruction	Yixin ZHOU
17:00 – 17:15		Specialist knee surgeon or ChatGPT: who makes better surgical decisions?	Justin COBB
17:15 – 17:30		Analytical revision total hip arthroplasty for recurrent dislocation	Yixin ZHOU
17:30 – 17:45		Crossfire discussion: Imageless vs image based robotic total knee arthroplasty: is there a winner?	Henry FU Qunn Jid LEE
17:45 – 18:00		Crossfire discussion: Direct anterior approach versus posterior approach in total hip arthroplasty: is the transition justified?	Gloria Yan Ting LAM Amy CHEUNG

Time	Room	**Topic** (Moderators)	Speakers / Presenters
16:30 – 18:00	**S228**	**Concurrent Session III: Trauma** (Ronald Man Yeung WONG, Felix LEUNG)	
16:30 – 16:48		The role of coated nails to prevent infection in high-risk tibial fractures: the Leeds experience	Peter GIANNOUDIS
16:48 – 17:06		Customisable surgery for the future	Anna Noel MILLER
17:06 – 17:24		Current concepts in the treatment of fracture-related infections	Michael SCHUETZ
17:24 – 17:42		Failed elbow fracture dislocation	Ting LI
17:42 – 18:00		Q & A	
16:30 – 18:00	**S226**	**Concurrent Session IV: Hong Kong Science & Technology Parks** (Richard Hin Lun LEE, Jenny CHEUNG)	
16:30 – 16:43		Surgery in AI era: surgical robots or robotic surgery?	Max QH MENG
16:43 – 16:56		Bone quality: a key factor in orthopaedic surgeries and complications	William W LU
16:56 – 17:09		Advanced polyethylene: innovations shaping the future of arthroplasty	Ling DING
17:09 – 17:22		Patient-specific hologram and X-ray-based surgical navigation	Louis SZE
17:22 – 17:35		3D ultrasound imaging for scoliosis assessment: past, present and future	De YANG
17:35 – 17:48		Generative AI for spine deformity outpatient department: technologies can be transferred to other specialists	Xihe KUANG
17:48 – 18:00		Next generation of orthopaedic implants with biological property: closing the gaps between preclinical and clinical applications	Jerry Jiankun XU
18:00 – 18:30	**Corridor**	**Hong Kong Science & Technology Parks – Matching and Demonstration Session**	
18:00 – 18:30	**S221**	**The Hong Kong Orthopaedic Association – Annual General Meeting**	
18:30 – 22:00	Chancellor Room, 4/F, Old Wing	Congress Banquet	

Sunday, 2 November 2025

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S221**	**Free Paper Session VI: Basic Sciences** (Wayne Yuk Wai LEE, Sien LIN)	
6.1		Cascade targeting selenium nanoparticles-loaded hydrogel microspheres for multifaceted antioxidant defence in osteoarthritis	Yiting Lei
6.2		Sensory neuron activation by brain-derived nerve growth factor harnesses stem cells to promote bone regeneration after traumatic brain injury	Zheyu Jin
6.3		Sexual dimorphism in treatment response to low-dose semaglutide for osteoarthritis	Mingde Cao
6.4		Short-term therapeutic effects of extracellular vesicles isolated from three-dimensional culture of adipose-derived stem cells in a rat model of failed healing tendinopathy	Haining Liu
6.5		Therapeutic effect of low pH-preconditioned tendon-derived stem cells exosomes on tendinopathy	Meng Zhou
6.6		Neuroimmune modulation by TAFA4 protects against intervertebral disc degeneration	Jiaheng Han
6.7		ChitoSilkBioPatch: a bio-inspired wound dressing scaffold for antibiotic-free diabetic wound management	Cheuk-Kin Kwan
6.8		Functional study of JunB in skeletal muscle regeneration	Qin Zhou
6.9		Advanced glycation end-product breaker alleviates hyperglycaemia, muscle functional perturbation, and osteoporosis: an aged, diet-induced hyperglycaemia mouse model	Victor Yan-Zhe Lu
6.10		Calcitonin gene-related peptide alleviates bone ageing by upregulating Klotho expression	Weiyang Liu
6.11		Association of circulatory proteins with adult spinal deformity risks: a Mendelian randomisation study	Gabriel Chun Yin Sung
6.12		Precision pulsed electromagnetic field therapy for osteoarthritis	Ye Li
6.13		Low-magnitude high-frequency vibration combined with β-hydroxy-β-methylbutyrate treatment to prevents neuromuscular junction degeneration in age-related sarcopenia	Qianjin Wang
6.14		A standardised anterior cruciate ligament reconstruction model in rabbits using a transtibial guide device for injectable magnesium-based materials research and development	Xuan He
6.15		A pilot single cell RNA transcriptomic study reveals convex-concave osteogenic asymmetry via mTOR-FZD5 signalling in adolescent idiopathic scoliosis	Gen Tang
6.16		Pathogenesis of type V osteogenesis imperfecta	Zhijia Tan
6.17		SoniC/S: a rapid and efficient approach for whole-tissue optical clearing and immunofluorescent staining	Hoi Pan Harry Cheung

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S225**	**Free Paper Session VII: Rehabilitation, Orthopaedic Oncology, Hand and Microsurgery** (Wesley NG, Michelle LEE)	
7.1		Preoperative serum albumin level is a useful predictor of long-term survival in patients with necrotising fasciitis	Mancy Tsz-man Ching
7.2		Differentiating native knee septic arthritis from non-infective arthropathies a multivariable logistic regression model from 1052 knee aspirates	Emanuel Chi-hang Sung
7.3		Socioeconomic burden of osteoarthritis in Hong Kong: a descriptive and comparative study	Yuk Tung Chan
7.4		Machine learning prediction of reinjury at the 2-year follow-up in athletes with chronic ankle instability using clinical risk factors	Ui-jae Hwang
7.5		Acupuncture for rotator cuff-related shoulder pain: a systematic review and meta-analysis	Xin Fu
7.6		Motor unit potential and nerve conduction velocity as novel correlates of muscle health in sarcopenia	Can Cui
7.7		Use of anti-osteoporotic agents in fracture liaison service demonstrates efficacy in reduction of mortality and refracture rates: a single-centre retrospective cohort study	Zhipeng Yan
7.8		Effect of pulsed electromagnetic field therapy on the postural balance in patients with end-stage knee osteoarthritis: secondary analysis of a randomised clinical trial	Ioi Chit Cheung
7.9		Adherence to a digital knee rehabilitation programme in Hong Kong: a qualitative study	Naomi Cheuk Ying Chen
7.10		Six-week structured non-surgical treatment programme can have sustained improvement for 18 months in 1362 patients with end-stage knee osteoarthritis	Wing Yip Lee
7.11		Extracortical bone bridge with vascular bone graft reduces junctional resorption in megaprosthetic reconstruction in patients with orthopaedic oncology: a review of >10 years of experience	Ching Ngai Gabriel Leung
7.12		Outcomes of arthroscopic synovectomy in metacarpophalangeal joints: a retrospective analysis of patients with inflammatory arthritis	Wing Cham Yu
7.13		Multiple tendon transfers under 'wide awake local anaesthesia no tourniquet': a retrospective case series	Tsz Ching Leo Chau
7.14		Sensory outcomes of cross finger flap versus heterodigital island flap for fingertip reconstruction: an 11-year retrospective analysis	Tsang Yeung
7.15		Outcomes of reverse Sauvé-Kapandji procedure in congenital proximal radio-ulnar synostosis: a case series	Michelle Kar Lam Li
7.16		Ulnar morphology and stability of the distal radial ulnar joint	Michael Mak
7.17		Multicentre subgroup analysis of Wassel type IV thumb polydactyly: a comprehensive review of anatomical features, surgical management, and outcomes	Ka Wai Cheng
7.18		Complications of intramedullary screw in proximal phalanx fractures: a systematic review	Chi Yan Leung

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S226**	**Free Paper Session VIII: Paediatric Orthopaedics II, Foot & Ankle** (John CHAN, Lin Wing LOK)	
8.2		Prognostication of adolescent idiopathic scoliosis using unsupervised machine learning: a retrospective cohort study on 655 cases up to skeletal maturity	Cheuk Kin Kwan
8.3		Anterior head posture may be associated with curve progression to bracing threshold in patients with mild adolescent idiopathic scoliosis	Tsz Hang Ma
8.4		Observed trends of functional leg length discrepancy, pelvic obliquity, and curve progression in adolescents with idiopathic scoliosis treated with bracing	Tsz Ping Chong
8.5		Complexity in closed spina dysraphism: lessons and pitfalls learned from a multidisciplinary combined clinic	Alec Lik Hang Hung
8.6		Effect of full-time rigid bracing on pulmonary function in adolescent idiopathic scoliosis	Yuen Tong Law
8.7		A scoping review on the application of new technology in the screening and diagnosis of adolescent idiopathic scoliosis	Nandini Dulani
8.8		Acceptance and commitment therapy versus education for improving psychological well-being in parents and children with adolescent idiopathic scoliosis: a randomised controlled trial protocol	Chelsia Ka Ching Cheung
8.9		A novel bone microarchitecture phenotyping model for predicting curve progression in adolescent idiopathic scoliosis at the first clinical consultation: a prospective longitudinal study of 292 girls followed up to skeletal maturity	Kenneth Guangpu Yang
8.10		Using ultrasound to reduce unnecessary X-ray irradiation for screening scoliosis in school children: a diagnostic validation study in 892 participants	Cheuk Kin Kwan
8.11		Optimising the surgical journey in adolescent idiopathic scoliosis: starting with productive waiting time	Adam Yiu Chung Lau
8.12		The use of 3D-printed cutting guide improves the accuracy of distal chevron osteotomy for hallux valgus surgery	Ho Fung Yee
8.13		Acute effectiveness of ankle taping in dancers with chronic ankle instability	Jojo Hoi Ching Lai
8.14		Long-term effectiveness of pulsed electromagnetic field therapy on peroneal muscles and balance function in chronic ankle instability: a double-blinded randomised controlled trial	Samuel Ka-Kin Ling
8.15		Outcome of 3D-printed patient-specific-instrument-assisted lapidus fusion versus conventional lapidus fusion for surgical correction of hallux valgus deformity: a randomised control trial	Rachel Lok-ting Man
8.16		The role of tendon thickness in Achilles function	Samuel Ka Kin Ling
8.17		Application of platelet-rich plasma in different foot and ankle conditions: a single-centre retrospective review	Esther Man-wai Chow
8.18		Comparison of 1.5-cm mini-open Achilles tendon repair and the Achillon device for Achilles tendon rupture	Cheuk Yi Cherry Sham
8.19		Radiological and early clinical outcome in fibular nailing for Weber B fractures: a prospective evaluation of restoration of fibular anatomy	Lucci Lugee Liyeung

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S227**	**Free Paper Session IX: Adult Joint Reconstruction II** (Gerry HO, Matthew LEE)	
9.1		Replace the hip, balance the spine! Total hip arthroplasty improves global sagittal spinal imbalance and spinopelvic mobility: a prospective cohort of 163 patients with EOS whole body postural radiographs	Thomas Ka Chun Leung
9.2		Minimising revision: long-term outcome and survivorship of porous tantalum acetabulum components in complex primary and revision total hip arthroplasty: a 10 to 20 year study	Chun Man Lawrence Lau
9.3		Minimal risk of dislocation with robotic arm–assisted total hip arthroplasty: a review of 236 hips from a tertiary referral centre	Wing Tung Ng
9.4		Functional cup positioning in total hip arthroplasty for patients with ankylosing spondylitis: a 20-year survivorship analysis	Kai Chun Augustine Chan
9.5		Spino-pelvic profile in patients with hip osteoarthritis in Hong Kong	Chi Kin Lo
9.6		Hip-knee relationship in an Asian population	Jerone Chiu
9.7		Cementless and cemented medial congruent total knee arthroplasty: an early result	Chun Man Lawrence Lau
9.8		Clinical outcomes of posterior stabilised versus medial congruent total knee arthroplasty	Chun Man Lawrence Lau
9.9		Constrained posterior stabilised inserts yield comparable early outcomes to posterior stabilised inserts in total knee arthroplasty for severe deformities in an Asian cohort: a retrospective study	Hoi Kin Leung
9.10		Kinematic analysis of inlay versus onlay technique for patella resurfacing in primary total knee arthroplasty	Yan Zhe Victor Lu
9.11		Comparison of clinical outcomes and kinematics of cruciate-retaining and medial congruent cruciate-retaining implants	Ashley Ying-Ying Wong
9.12		Metaphyseal fixation devices in total knee arthroplasty: a retrospective review	Ho Yin Chan
9.13		Natural history of biological fixation in highly porous cementless total knee arthroplasty with minimum of 2 years of follow-up	Kai Chun Augustine Chan
9.14		Timing is everything: does discharge timing affect postoperative outcomes of arthroplasty?	Tin Oi Josephine Yu
9.15		Comparing monopolar and bipolar diathermy for haemostasis in total knee arthroplasty: a randomised controlled trial	Michelle Hilda Luk
9.16		Sonication of explanted components as a clinical adjunct for the microbiological diagnosis of periprosthetic or peri-implant infections: a diagnostic accuracy study	Ping Keung Chan
9.17		Next-generation sequencing for microbial detection in prosthetic joint infections	Rhoda Cheuk-Ying Leung
9.19		Enhanced recovery after surgery for total knee replacement in a Hong Kong public hospital	Ho Ken Fong
9.20		From traditional to virtual: enhancing access and clinic efficiency by migrating stable postoperative joint replacement cases to telehealth nurse clinic	Pok Man Fung
9.21		Spinopelvic parameters associated with prosthetic impingement in patient undergoing total hip arthroplasty *(New Zealand Orthopaedic Association Ambassador Paper)*	Woo-sung Kim

Time	Room	Topic (Moderators)	Speakers / Presenters
07:30 – 10:00	**S228**	**Free Paper Session X: Sports Medicine II** (George Ying Kan LAW, Ramon Yiu LO)	
10.1		Barriers to rehabilitation after anterior cruciate ligament reconstruction: a qualitative focus group analysis	Sik Lok To
10.2		Constructing a machine learning model to predict anterior cruciate ligament re-rupture rate: a feasibility study	Ryan Wai Chung Hui
10.3		Correlation between early postoperative clinical outcomes and bone tunnel morphological parameters on high-resolution peripheral quantitative computed tomography in anterior cruciate ligament reconstruction	Cham Kit Wong
10.4		Decade of progress: anterolateral ligament reconstruction in primary anterior cruciate ligament surgery	Kevin Chi Him Fok
10.5		Engineered hydrogels for tunable mRNA release: enhancing TGF-β3 mRNA therapy for tendon regeneration	Ruijia Huang
10.6		Biodegradable and high-oriented piezoelectric electrospun nanofibres for enhanced tendon regeneration	Zhenyu Zhong
10.7		Early reports of chondral lesion fixation using suture bridge technique in skeletally immature patients with open distal femoral physes	Janus Siu-him Wong
10.8		Associations between rotator cuff fatty infiltration, serum lipid levels, and statin use	Janus Siu-him Wong
10.9		Sport-specific versus conventional biomechanical assessments in identifying anterior cruciate ligament injury risk factors in badminton	Zuru Liang
10.10		Constructing a machine learning model to predict cuff retear rate: a feasibility study	Yee Lam Jasmine Louie
10.11		Correlations of radiological measurements and clinical outcomes in reverse shoulder arthroplasty: 10-year experience in United Christian Hospital	Kejun David Wei
10.12		Augmented reality-assisted high tibial osteotomy: surgical precision and efficiency	Jamie Chiu Tsun
10.13		Artificial intelligence– and large language model–integrated reverse shoulder arthroplasty planning improves efficiency, implant positioning, and safety: a comparative study	Li Liang Darren Wong
10.14		Single-centre 20-year review of necrotising fasciitis in limbs: the PACE score for mortality prediction	Hon Yeung Steven Tsui
10.15		Postoperative vitamin D levels predict quadriceps muscle strength recovery after anterior cruciate ligament reconstruction	Victor Yan Zhe Lu
10:00 – 10:30		**Coffee Break / Exhibition**	

Time	Room	**Topic** (Moderators)	Speakers / Presenters
10:30 – 12:00	**S221**	**Plenary Session III: Artificial Intelligence and Mixed Reality in Orthopaedics** (Michael Siu Hei TSE, Adam Yiu Chung LAU)	
10:30 – 10:50		Artificial intelligence in spine surgery	Max Meng-Huang WU
10:50 – 11:10		Advanced analytics in spinal deformity surgery: the now and the future	Michael P. KELLY
11:10 – 11:30		Technologies enabling precise bone and soft tissue tumour resection: mixed reality	Kwok Chuen WONG
11:30 – 11:50		VR+AI enabling immersive experience in training of young surgeons	Grace Teng ZHANG
11:50 – 12:00		Q & A	
10:30 – 12:00	**S227**	**Concurrent Session V: Foot and Ankle** (Esther Man Wai CHOW, Stephanie Ka Ki LIU)	
10:30 – 10:50		Achilles tendinopathy: the quest for clarity	Samuel Ka Kin LING
10:50 – 11:10		Staged approach to manage Achilles tendinopathy	Yeung YEUNG
11:10 – 11:30		Management of tendo Achillis stump after flexor hallucis longus transfer	Shun Ping WANG
11:30 – 11:40		Haglund's deformity and insertional Achilles tendinopathy	Shih-Chieh TANG
11:40 – 12:00		Case discussion and Q&A	
10:30 – 12:00	**S226**	**Concurrent Session VI: Orthopaedic Rehabilitation** (Raymond Wai Kit NG, Ophelia Yue Ting WAN)	
10:30 – 10:55		Interdisciplinary care model and long-term outcome for using epidural spinal stimulation for spinal cord injury	Hsiang-Ling HUANG Ming-Yung WU Sheng-Tzung TSAI
10:55 – 11:20		Management of spinal cord injury: surgery and beyond	Paul Aarne KOLJONEN
11:20 – 11:45		Innovations in chronic low back pain management	John YS CHOI
11:45 – 12:00		Q & A	
10:30 – 12:00	**S225**	**Concurrent Session VII: Hand** (Jeffrey Justin Siu Cheong KOO, Emily Ka Yan YIP)	
10:30 – 10:42		AI in predicting outcome of carpal tunnel syndrome cases	Oscar Su JIANG
10:45 – 10:57		Recurrent carpal tunnel syndrome	Jeffrey Justin Siu Cheong KOO
11:00 – 11:12		Ultrasound-guided carpal tunnel release	Michael Chu Kay MAK
11:15 – 11:27		Tendon transfer for severe carpal tunnel syndrome	Esther Ching San CHOW
11:30 – 11:42		Nerve conduction studies and electromyography: the differentiation between carpal tunnel syndrome and its mimickers	Alex Chi Ping CHOW
11:45 – 12:00		Case discussion	

Time	Room	**Topic** (Moderators)	Speakers / Presenters
10:30 – 12:00	**S228**	**Concurrent Session VIII: Sports Medicine** (Michael Tim Yun ONG, Andrew FAN)	
10:30 – 10:50		Sports medicine in action: on-field care and team travel in football	Keith Hay Man WAN
10:50 – 11:10		Modelling the future of reverse shoulder arthroplasty	Jonathan Patrick NG
11:10 – 11:30		Glenoid fossa fractures: management and surgical approaches	Thin HONG
11:30 – 11:40		Does scapular muscle training programme preoperatively improve the functional outcomes and decrease coracoid pain? A randomised controlled trial	Athip KONGKLAM
11:40 – 11:50		Microbiological and biomechanical effects of gentamicin concentration and soaking duration in anterior cruciate ligament reconstruction: a porcine flexor digitorum profundus tendon model	Wachirawit PENRAT
11:50 – 12:00		Q & A	
12:00 – 13:00		**Lunch Symposia**	
	S225	Lunch Symposia I (Sponsored by Kinwood HealthCare Ltd)	
		Advancing in chronic pain management: a targeted approach to lumbar and sacroiliac joint pain	Raymond Churk Lun YIP
		Coolief for spine and knee	Zhen Wei LIM
		Clinical application of endoscopic unilateral laminotomy and bilateral decompression in cervical and lumbar degenerative diseases	Xin WANG
	S227	Lunch Symposia II (Sponsored by Baxter Healthcare Ltd)	
		Use of haemostats in spinal surgery	John YS CHOI
	S228	Lunch Symposia III (Sponsored by Amgen Hong Kong Limited)	
		Restoring strength: spine surgery and anabolic treatment for recent fractures	Eric Cheung Hing LAM
		Breaking the fragility fracture cascade: imminent and high-risk fractures to long-term management	Paul Yun Tin TSE
13:00 – 14:30	**S221**	**Plenary Session IV: Precision Medicine and Big Data in Orthopaedics** (Keith Hay Man WAN, Gloria Yan Ting LAM)	
13:00 - 13:20		Machine learning in predicting the reparability of rotator cuff tears	Ekavit KEYURAPAN
13:20 - 13:40		Transforming complex spinal surgery with digital surgical planning and 3D printing	Yong HAI
13:40 - 14:00		Resurfacing the hip and knee: less is more in arthroplasty?	Justin COBB
14:00 - 14:20		The equation of kinematic dissolving: why arthroplasty shall be analytical and personalised?	Yixin ZHOU
14:20 - 14:30		Q & A	

Time	Room	**Topic** (Moderators)	Speakers / Presenters
13:00 – 14:30	**S228**	**Concurrent Session IX: Spine** (Cho Yau LO, Edwin LAM)	
13:00 – 13:15		Harnessing machine learning to prevent complications in spine surgery	Yong HAI
13:15 – 13:30		Awake endoscopic spine surgery: benefits and limitations in contemporary practice	Max Meng-Huang WU
13:30 – 13:45		Complete patient journey powered by generative AI: development of mskalign to streamline scoliosis screening, prognostication, and management	Jason Pui Yin CHEUNG
13:45 – 14:00		Application of computerised navigation and 3D-printed model in complex spine surgery	Chun Man MA
14:00 – 14:15		Traumatic cervical spinal cord injury in Hong Kong: epidemiological data and implications for AI-driven radiological screening	Graham Ka Hon SHEA
14:15 – 14:30		Q&A	
13:00 – 14:30	**S227**	**Concurrent Session X: Orthopaedic Training** (Ronald Man Yeung WONG, Kam Kwong WONG)	
13:00 – 13:25		A new era of competency-based learning and resident evaluation in the US	Anna Noel MILLER
13:25 – 13:50		Emerging technologies and AI in orthopaedic medical education: college direction	Sheung Wai LAW
13:50 – 14:15		Entrusted professional activities: what, why and how	Ping Tak CHAN
14:15 – 14:30		Q&A	
13:00 – 14:30	**S225**	**Concurrent Session XI: Orthopaedic Oncology** (Anderson Siu Ming LEUNG, Jacky Hiu Woo LAU)	
13:00 – 13:20		Liquid nitrogen recycled autograft: can we trust it?	Raymond Ching Hin YAU
13:20 – 13:30		Q&A	
13:30 – 13:50		Use of 3D printed guides in bone sarcoma surgery: a practical consideration	Kwok Chuen WONG
13:50 – 14:00		Q&A	
14:00 – 14:30		Case presentation and discussion	Jacky Hiu Woo LAU
14:30 – 15:00		**Coffee Break / Exhibition**	
15:00 – 16:30	**S221**	**Plenary Session V: Innovative Surgical and Rehabilitation Techniques** (Felix LEUNG, Lucci Lugee LIYEUNG)	
15:00 – 15:20		Innovation in deformity correction: past and present	Chris HARRIS
15:20 – 15:40		Mechanobiology is compulsory for fracture healing – the concept of the biphasic plate	Michael SCHUETZ
15:40 – 16:00		Robotic surgery for adult spinal deformity: state of the art	John YS CHOI
16:00 – 16:20		AI and translational research in the foot and ankle field	Shun-ping WANG
16:20 – 16:30		Q & A	
16:30 – 16:45	**S221**	**Closing Remarks**	Michael Siu Hei TSE Ronald Man Yeung WONG

Award Paper Session

AP01

Prevalence of meniscal tears in anterior cruciate ligament–deficient knees: a prospective epidemiological study of 731 cases

Sandra Wan, WP Yau
Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Delay in anterior cruciate ligament reconstruction (ACLR) is associated with increased risks of meniscal tears and premature osteoarthritis. However, controversy exists regarding the definition of delayed ACLR, which ranges from 3 weeks to 24 months. This study aims to determine a cut-off period for delayed ACLR that is associated with a significant increase in the risk of meniscal tears.

Methods: This prospective single-centre epidemiological study investigated the prevalence of meniscal tears at the time of primary ACLR between 2017 and 2021. Patients with multi-ligamentous injuries or those who were skeletally immature were excluded. Receiver operating characteristic curve analysis was performed to determine the cut-off period between injury and ACLR (in days) that was associated with a significant increase in the risk of meniscal tears.

Results: Among 731 patients (83% male), the mean age was 28±8 years. The mean period between injury and ACLR was 539±988 days. Meniscal tears were present in 70% of knees. Receiver operating characteristic curve analysis showed that the cut-off period of 376 days best predicted the presence of meniscal tears (odds ratio=2.51, 95% confidence interval=1.72-3.67, $p<0.001$). Medial meniscal tears were associated with surgical delay alone, whereas lateral meniscal tears were associated with male sex alone ($p=0.005$).

Conclusion: A delay of 12 months in ACLR is associated with a 2.5-fold increase in the risk of developing meniscal tears.

AP02

Predictors for graft rupture after anterior cruciate ligament reconstruction: a study of 731 cases with a mean follow-up of 5.5 years

Wai Pan Yau
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: This study aims to determine the predictors for postoperative graft rupture after primary anterior cruciate ligament reconstruction (ACLR).

Methods: Pre-, intra-, and postoperative data of patients who underwent primary ACLR between 2007 and 2021 were collected prospectively and retrospectively using a standard form. The posterior tibial slope, medial proximal tibial angle, and the position of the tibial tunnel were measured using knee radiographs. The graft bending angle (GBA) and the size of the intercondylar notch were measured using computed tomography. The primary outcome was graft rupture diagnosed by magnetic resonance imaging or repeat arthroscopy. Multiple linear regression with a stepwise algorithm was performed to identify predictors for graft rupture after ACLR.

Results: The mean age of 606 male and 125 female patients was 28±8 years. The mean follow-up duration was 66±52 months. In total, 59 (8%) graft ruptures occurred at a mean of 55±44 months. The predictors for graft rupture, in decreasing importance, were time elapsed since ACLR ($p<0.001$), femoral GBA in the sagittal plane ($p<0.001$), age ($p=0.001$), International Knee Documentation Committee activity level at final follow-up ($p=0.09$), and posterior tibial slope ($p=0.01$).

Conclusion: The only modifiable surgical factor that may help reduce graft rupture after ACLR is the femoral GBA in the sagittal plane.

AP03

Sensory neuron activation by brain-derived nerve growth factor harnesses stem cells to promote bone regeneration after traumatic brain injury

Zheyu Jin, Zhengming Shan, Zhenkang Wen, Ling Qin, Jiankun Xu
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

AP04

Factors affecting cementless femoral stem alignment in direct anterior approach hip arthroplasties: a review of 100 cases

Yan Ting Lam[1], Cham Kit Wong[1], Rex Wang Fung Mak[2], Jonathan Patrick Ng[2], Tsz Lung Choi[1], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

AP05

Using ultrasound to reduce unnecessary X-ray irradiation for screening scoliosis in school children: a diagnostic validation study in 892 participants

Cheuk Kin Kwan[1], Adam Yiu Chung Lau[1], Kenneth Guangpu Yang[1], Alec Lik Hang Hung[1], Winnie Chiu Wing Chu[2], Kelly Ka Lee Lai[3], Timothy Tin Yan Lee[3], Yong Ping Zheng[3], Jack Chun Yiu Cheng[1], Tsz Ping Lam[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Imaging and Interventional Radiology, The Chinese University of Hong Kong
[3]Department of Biomedical Engineering, The Hong Kong Polytechnic University

AP06

Triple-hit polydopamine-based dual-enzymatic implant coating with DNase I and lysostaphin for osteoporotic fracture–related infection

Ronald Man Yeung Wong, Baoqi Li, Yejin Zhang, Chaoran Liu, Ning Zhang, Wing Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

AP07

Minimising revision: long-term outcome and survivorship of porous tantalum acetabulum components in complex primary and revision total hip arthroplasty: a 10 to 20 year study

Chun Man Lawrence Lau[1], Kin Yau Alex Wong[2], Hongjian Hu[2], Ka Chun Thomas Leung[3], Michelle Hilda Luk[1], Ping Keung Chan[1], Amy Cheung[3], Henry Fu[1], Kwong Yuen Chiu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Applied Mathematics, The Hong Kong Polytechnic University
[3]Department of Orthopaedics and Traumatology, Queen Mary Hospital

AP08

Prediction of scoliosis progression using longitudinal radiographs and attention-based long short-term memory networks

Elvis Chun Sing Chui[1], Davis Kai Yue[1], Xin Ye[1], Adam Yiu Chung Lau[1], Alec Lik Hang Hung[2], Kenneth Guangpu Yang[1], Xiaoli Liu[1], Russell Lam[1], Wayne Yuk Wai Lee[1], Jack Chun Yiu Cheng[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Timely prediction of scoliosis progression is crucial for optimising follow-up schedule and guiding treatment plan. We developed a deep learning model utilising an attention-based long short-term memory (LSTM) network to forecast changes in Cobb angles using sequential standing anteroposterior (AP) spine radiographs.

Methods: Three-dimensional rectangular models for vertebrae T1 to L5 were reconstructed using 68 anatomic landmarks on paired AP and lateral radiographs that capture vertebral position, tilt, and rotation. Global spinal curvature was then reconstructed to predict overall curve progression. Vertebral tilt and orientation features across time were fed into the attention-based LSTM network to capture temporal alignment patterns and predict future Cobb angles. Two models were trained: (1) the use of baseline and 6-month radiographs to predict the 12-month Cobb angle, and (2) the use of baseline, 6-, and 12-month radiographs to predict the 18-month Cobb angle. Ground truth Cobb angles were measured by clinicians. Performance was evaluated using mean absolute error (MAE) and intraclass correlation coefficient (ICC).

Results: The use of baseline and 6-month radiographs to predict the 12-month Cobb angle yielded an MAE of 4.5° and ICC of 0.83, whereas the use of baseline, 6-, and 12-month radiographs to predict the 18-month Cobb angle yielded an improved MAE of 3.2° and ICC of 0.90.

Conclusion: The use of three serial radiographs (over 12 months) significantly improved Cobb angle prediction accuracy, compared with two radiographs. This temporal prediction framework may enable earlier identification of progressive scoliosis.

AP09

Low-magnitude high-frequency vibration combined with β-hydroxy-β-methylbutyrate treatment to prevents neuromuscular junction degeneration in age-related sarcopenia

Qianjin Wang, Wujian Lin, Can Cui, Chaoran Liu, Senlin Chai, Abudureheman Maihemuti, Xiaoxu Xu, Ronald Man Yeung Wong, Ning Zhang, Wing-Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Age-related sarcopenia, driven by neuromuscular junction (NMJ) degeneration, poses a significant health burden. We investigated whether combining low-magnitude high-frequency vibration (LMHFV) with β-hydroxy-β-methylbutyrate (HMB) may protect against sarcopenia by targeting NMJ integrity and function.

Methods: Sixty 6-month-old SAMP8 mice were randomised into four groups: control, LMHFV alone (35 Hz, 0.3 g, 20 min/day), HMB alone (500 mg/kg/day), and combination for 4 months. Assessments included muscle mass/function, body composition, fibre typing, NMJ morphology (whole-mount co-staining), and molecular analyses (qPCR/Western blot). Wnt10b's role was validated via knockdown (AAV9-siRNA) and rescue (recombinant Wnt10b).

Results: A combination of LMHFV and HMB demonstrated superior protection against sarcopenia progression versus monotherapies or control. It significantly improved muscle mass, contractile function, and body composition, while reducing intramuscular lipid accumulation. The combined treatment reversed age-related fibre-type shifts toward a youthful phenotype. It preserved NMJ structure, reducing degenerative changes and neurotransmission failure. Mechanistically, the combined treatment upregulated NMJ formation pathway components and activated Wnt10b signalling while suppressing endogenous inhibitors. Wnt10b knockdown replicated sarcopenic NMJ and functional deficits, whereas exogenous Wnt10b supplementation rescued muscle and NMJ integrity.

Conclusion: The combination of LMHFV and HMB synergistically mitigates sarcopenia by preserving NMJ architecture and function, predominantly through Wnt10b pathway activation. This signalling cascade stabilises NMJ formation components, preventing denervation. Our findings confirm the pivotal therapeutic target of Wnt10b and support the clinical translation of this non-invasive approach for combating age-related neuromuscular decline.

AP10

A novel bone microarchitecture phenotyping model for predicting curve progression in adolescent idiopathic scoliosis at the first clinical consultation: a prospective longitudinal study of 292 girls followed up to skeletal maturity

Kenneth Guangpu Yang, Eric Cheuk Kin Kwan, Adam Yiu Chung Lau, Wayne Yuk Wai Lee, Vivian Wing Yin Hung, Alec Lik Hang Hung, Tsz Ping Lam, Jack Chun Yiu Cheng
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Award Poster Session

BP01

Optimum age for surgery in patients with severe adolescent idiopathic scoliosis: an AI-driven retrospective analysis

Adam Yiu Chung Lau[1], Wai Wang Chau[1], Alec Lik Hang Hung[2]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Timing for surgery in patients with severe adolescent idiopathic scoliosis (AIS) is critical for long-term health-related quality of life (HRQOL) outcomes. This study aims to determine the optimum age for surgery to achieve satisfactory long-term HRQOL recovery based on Scoliosis Research Society-22r questionnaire (SRS-22) and Spinal Appearance Questionnaire (SAQ).

Methods: We analysed longitudinal SRS-22 and SAQ data from 388 patients with severe AIS aged 10 to 18 years. Composite scores were computed (SRS-22: mean of domains; SAQ: mean of domains/2). Good recovery was defined as a score of ≥3 at the last visit. Receiver operating characteristic analysis was used to determine optimum cut-offs that predict good recovery. T-tests and linear regression were used for secondary analyses. The optimum cut-off ages based on SRS-22 and SAQ were identified separately.

Results: The mean patient age at surgery was 15.32 years. For SRS-22, the optimum age was 14.72 years (area under the curve [AUC]=0.78, 95% confidence interval [CI]=0.73-0.83, $p<0.001$; sensitivity=0.82, specificity=0.78). For SAQ, the optimum age was 15.18 years (AUC=0.75, 95% CI=0.70-0.80, $p<0.001$; sensitivity=0.68, specificity=0.62). Scores plateaued at 4 (for SRS-22) and 6 (for SAQ) years after surgery. Ages 12 to 16 years showed faster recovery ($p=0.021$).

Conclusion: The optimum age for surgery was between 14.72 and 15.18 years, which showed the best estimate of HRQOL recovery while allowing growth. Nonetheless, caution is suggested because early data were limited and findings were based solely on HRQOL results. Further longitudinal research is needed to confirm recovery trajectories. Using AI is commendable for predictive models.

BP02

Alpha-ketoglutarate as an intermediate in tricarboxylic acid cycle attenuates muscle atrophy in sarcopenic mice

Chaoran Liu, Hei Yuet Wong, Ning Zhang, Wing-Hoi Cheung, Ronald Man Yeung Wong
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

BP03

Short-term effect of pulsed electromagnetic field therapy on hamstring muscle strength after anterior cruciate ligament reconstruction with hamstring autograft: a randomised, double-blind, placebo-controlled, clinical trial

Kenney Ki Lee Lau[1], Abbey Ssu Chi Chen[1], Christine Hoi Yan Fu, Joseph Huai Yu Li, Jonathan Patrick Ng[2], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3], Pauline Po Yee Lui[3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: This study investigated the effects of pulsed electromagnetic field (PEMF) therapy on hamstring muscle strength in patients undergoing anterior cruciate ligament reconstruction (ACLR) using hamstring tendon autografts.

Methods: A double-blind, placebo-controlled, randomised trial was conducted, involving adult patients with hamstring deficits, specifically those with <85% hamstring strength at 4 months post-ACLR. Participants were randomly assigned to receive either PEMF therapy or placebo twice weekly over 8 weeks, with each session lasting for 10 minutes. Muscle properties were assessed at baseline and mid- and post-intervention stages.

Results: In total, 27 patients were randomised to either PEMF (n=13) or placebo (n=14). The PEMF group exhibited a significantly higher injured-limb-to-uninjured-limb ratio of the biceps femoris muscle thickness (p=0.029). Similarly, the PEMF group demonstrated a significantly lower semimembranosus stiffness ratio (p=0.011).

Conclusion: PEMF promoted the growth of hamstring muscles by enhancing semimembranosus and biceps femoris development to offset semitendinosus deficiency. A larger sample size and extended follow-up may reveal improvements in hamstring strength among ACLR patients with deficits.

BP04

Association of anterior pelvic tilt with curve progression to bracing threshold in patients with mild adolescent idiopathic scoliosis

Ho Lam Vincent Wu, Tsz Hang Ma, Tin Ngo Oscar Mak, Tsun Chiu, Kenneth Guangpu Yang, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam, Adam Yiu Chung Lau, Cheuk Kin Kwan
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

BP05

Synthetic dermal substitute for treating lower limb wound infection

Man-Wai Esther Chow[1], Ka-Kin Samuel Ling[2], Lucci Lugee Liyeung[1]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Extensive skin defects can be disabling and carry the risk of wound infection. Temporary coverage by synthetic dermal substitute is a potential solution to bridge the prolonged healing process while protecting the deep structures and minimising the need for complicated reconstruction. We illustrated its application in infected wounds in a case series.

Methods: Patients with lower limb wounds treated with synthetic dermal substitute between November 2023 and June 2025 were included. Underlying pathologies, risk factors, types of bacterial infection, and wound healing progress were reviewed retrospectively.

Results: Nine patients (mean age, 64.7 years) were included. The risk factors for wound infection were diabetes (n=3), peripheral vascular disease (n=2), immunosuppressant use (n=1), and post-traumatic or postoperative complications (n=3). Muscle and/or bone were exposed in seven (77.8%) patients. Most (88.9%) cultures yielded polymicrobial, and the most common pathogens were *Staphylococcus* and *Corynebacterium*. Dermal substitutes were applied under local or regional anaesthesia in four patients. Negative pressure therapy was applied in all patients to enhance wound granulation. Infection control was achieved in six (66.7%) patients, and the mean time to negative culture was 102.2 days. Additional procedures were performed in three patients, including skin graft (n=3) and free flap reconstruction (n=1). There was no adverse reaction.

Conclusion: Synthetic dermal substitute is a safe wound coverage option for deep infected wounds in lower limbs. Its application in frail patients who cannot tolerate multiple surgeries or complicated flap reconstruction warrants further evaluation.

Free Paper Session I: Trauma

FP1.1

3D-guided navigation percutaneous screw fixation for displaced pelvi-acetabular fractures

Adrian Bing Fung Ang
Department of Orthopaedics and Traumatology, Queen Elizabeth Hospital

FP1.2

Prediction of incident fragility fracture using high-resolution peripheral quantitative computed tomography: an 8-year follow-up study in Hong Kong

Zoey Tsz Lok Tsang, Keith Yu Kin Cheng, Vivian Wing Yin Hung, Ronald Man Yeung Wong, Ning Zhang, Ling Qin, Wing Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Osteoporosis is a prevalent geriatric condition, characterised by poor bone quality and elevated fracture risk. The incidence of osteoporosis and fractures are projected to significantly increase in the ageing populations worldwide; early diagnosis is needed. Dual-energy X-ray absorptiometry (DXA), the gold standard for diagnosing osteoporosis, has limitations in predicting fracture. High-resolution peripheral quantitative computed tomography (HR-pQCT) assesses three-dimensional bone microarchitecture and may be used for fracture risk assessment.

Methods: This retrospective nested case-control study recruited older adults in Hong Kong from the previous normative reference standards cohort, with an 8-year follow-up period. Self-reported history and vertebral fracture assessment by DXA were used to determine the presence of incident fractures. HR-pQCT scans of the distal radius and tibia were used to develop a logistic regression model to predict incident major osteoporotic fractures (MOF).

Results: Among 160 older adults (median age, 74 years), 55 incident fragility fractures were identified, with 83.6% being MOF. Our model, validated using hold-out method, demonstrated high sensitivity (training cohort: 93.8%, testing cohort: 85.7%) and good diagnostic performance (Youden Index >0.5, area under the curve=0.8, $p<0.001$). Compared with true-positive cases, false-positive cases exhibited faster gait speed suggesting better baseline physical functioning, which may have reduced their likelihood of experiencing fracture-inducing incidents. This could explain the absence of MOF despite poor bone microarchitecture.

Conclusion: Our model has high sensitivity in predicting older adults with incident MOF within 8 years. HR-pQCT can serve as an alternative diagnostic tool, facilitating clinical decisions for early intervention.

FP1.3

Retrospective comparison between helical blade and screw in geriatric hip fracture fixation with cephalomedullary devices

Man Kit Ho
Department of Orthopaedics and Traumatology, Princess Margaret Hospital

Introduction: Cephalomedullary device is a sliding, fixed-angle device for fixation of trochanteric hip fractures. A retrospective review was conducted to compare clinical outcomes of helical blade fixation versus screw fixation in geriatric hip fracture fixed with cementless TFN-ADVANCED Proximal Femoral Nailing (TFNA) system.

Methods: In total, 100 cases of geriatric hip fractures fixed with TFNA between January 2024 and June 2025 were retrospectively reviewed. Primary outcome was fixation failure, which was defined as fracture non-union or implant cutout. Secondary outcomes include length of hospital stay, postoperative functional status, and time to fracture union. The Chi-squared test was used to determine statistical significance for categorical variables, and the two-tailed independent t test was used for continuous variables.

Results: In total, 52 cases of helical blade fixation and 48 cases of screw fixation were reviewed. Both groups have comparable radiological parameters, including fracture classifications, quality of fracture reduction, and tip apex distances. The helical blade fixation group had no fixation failure case, whereas the screw fixation group has one fixation failure case. There was no statistical significance between two groups in terms of length of hospital stay, postoperative functional status, and time to fracture union.

Conclusion: Both TFNA helical blade fixation and screw fixation were comparable in terms of fixation failure rate, length of hospital stay, postoperative functional status, and time to fracture union.

FP1.4

Prevalence, risk factors, prediction of robust callus formation and accelerated fracture healing in patients with traumatic brain injury: a 5-year study

Zhengming Shan[1], Zheyu Jin[1], Weiyang Liu[1], Jun Hu[2], Ling Qin[1], Jiankun Xu[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The First Affiliated Hospital of Shantou University Medical College

FP1.5

Surgeon-administered regional anaesthesia for ankle fracture fixation

Chun Lok Chow, Chun Man Ma
Department of Orthopaedics and Traumatology, North District Hospital

FP1.6

Intra-operative intra-articular cocktail injection for patella open reduction and internal fixation: a single-centre, double-blind, randomised controlled trial

Johnson Pok-Him Tam, Colin Yung, Tak-Wing Lau, Frankie Leung, Christian Fang
Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP1.7

Automated prediction of bone mineral density and T-score from radiographs via deep learning: a multi-centre study

Ronald Man Yeung Wong[1], Wing Hoi Cheung[1], Xin Ye, Xiaoli Liu[1], Hongxun Sang[2], Jing Zhang[2], Ka Kwan Mak[1], Chun Sing Chui[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics, Shenzhen Hospital Southern Medical University

FP1.8

Patients' decision-making delay prolongs surgical waiting time among older adults with hip fractures: a retrospective cohort study

Zihong Lin[1], Kendrew Yu-Hei Choi[1], Sheryl Lok-chi Man[2], Cyrus Tsun-Kit Lau[2], Esther Man-Wai Chow[1], Lucci Lugee Liyeung[1], Samuel Ka-Kin Ling[2], Michael Chu-kay Mak[1], Patrick Shu Hang Yung[2], Kin On Kwok[1]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP1.9

Territory-wide comparative analysis of all-cause mortality in geriatric patients with hip fractures, femoral shaft fractures, and distal femur fractures: a retrospective cohort study

Ho Yin Raymond Kwok[1], Shing-Yat Colin Yung[1], Tak-Wing Lau[1], Christian Xinshuo Fang[2], Frankie Ka-Li Leung[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Hip fractures, femoral shaft fractures, and distal femur fractures are common in older adults and are associated with significant morbidity and mortality. Although hip fractures are well-studied, femoral shaft and distal femur fractures in geriatric populations are less characterised in terms of mortality risk. This study aimed to compare these three fracture types in terms of 30-day, 90-day, and 1-year all-cause mortalities to identify high-risk groups and guide clinical management.

Methods: This retrospective study used territory-wide data from the Clinical Data Analysis and Reporting System. All geriatric patients aged ≥65 years who were admitted for hip, femoral shaft, and distal femur fractures in all public hospitals between 2022 and 2023 were included. Primary outcomes were 30-day, 90-day, and 1-year all-cause mortalities; secondary outcome was the length of hospital stay.

Results: In total, 13 128 fractures, including 11 874 hip fractures and 1254 femur fractures were analysed. Using the Kaplan-Meier survival analysis, all-cause survival rates were significantly lower in femur fractures than in hip fractures at 30 days (93.2% vs 95.4%), 90 days (85.6% vs 89.4%), and 1 year (72.1% vs 78.9%). Subgroup analysis also showed that regardless of surgical or conservative treatment, significantly higher all-cause mortality rates were observed in femur fractures across all three timepoints.

Conclusion: Geriatric patients with femoral shaft and distal femur fractures have a higher overall mortality rate than those with hip fractures. They may benefit from better risk stratification and personalised rehabilitation strategies.

FP1.10

Does outcomes at the first follow-up predict outcomes in subsequent follow-ups in patients with wrist fracture: prospects in reducing future outpatient visits

Ho Yin Raymond Kwok[1], Shing-Yat Colin Yung[1], Christian Xinshuo Fang[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: The Quick Disabilities of the Arm, Shoulder and Hand (qDASH) score is increasingly used in upper limb fracture clinics to monitor patient recovery and guide clinical decision-making. However, the predictive value of serial qDASH measurements for future functional outcomes remains underexplored.

Methods: We retrospectively analysed 2755 patients with upper limb fractures (9741 clinic visits) at our tertiary rehabilitation centre between 2013 and 2024, focusing on those with complete sequential qDASH data. Scatterplot analysis and Markov stochastic chain were used. Outcomes were defined into three classes: excellent recovery (qDASH 0.5 standard deviation below mean), above average recovery (in between), and below average recovery (above mean).

Results: Scatterplot analysis demonstrated that patients with lower current qDASH scores were highly likely to maintain favourable outcomes at subsequent visits. The excellent recovery threshold identified a distinct subgroup with consistently superior trajectories. The Markov flowchart revealed that 26.8% of early post-injury visits met this excellent criterion, with high stability of outcomes across subsequent visits (86.5% remains excellent). This suggested that 631 clinic visits per year were eligible for chatbot-based digital follow-up, potentially substituting in-person consultations.

Conclusion: Serial qDASH scoring reliably predicts functional outcomes following upper limb fracture. These findings support the feasibility of targeted digital follow-up for well-recovering patients, optimising resource allocation and patient-centred care in fracture rehabilitation.

FP1.11

Automated 3D bone defect reconstruction using UNet_selfNet: a multicentre AI validation study

Elvis Chun Sing Chui, Xin Ye, Ericsson Chun Hai Fung, Xiaoli Liu, Tsun Chiu, Hong Xun Sang, Jin Zhang, Patrick Shu Hang Yung, Louis Wing Hoi Cheung
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Bone defects from trauma, infections, or congenital anomalies challenge orthopaedic surgery, impacting structural integrity and quality of life. Traditional 3D reconstruction, reliant on manual segmentation, is slow and prone to error. Deep learning, particularly UNet3D, offers precise, automated solutions. This multicentre study leverages diverse patient populations and Imaging protocols to evaluate 2D/3D deep learning architectures, particularly UNet_selfNet, for bone segmentation and defect reconstruction from computed tomographic (CT) scans.

Methods: Using 25 344 CT slices from 245 3D volumes (standardised to 128×128×128×1 for 3D, 256×256×1 for 2D), with expert-annotated binary masks, we evaluated 62 architectures (U-Net, FPN, LinkNet) with ResNet, SEResNet, VGG, MobileNet, DenseNet, and InceptionResNetV2 backbones. UNet_selfNet, an encoder-decoder CNN with 3D convolutions, was optimised using PyTorch, cross-entropy/Dice Loss, and Adam (learning rate 0.001) over 100 epochs on NVIDIA A100 GPUs. A 10-volume validation set assessed performance via intersection-over-union (IoU), F1-score, volume overlap, and root mean square error.

Results: UNet_selfNet excelled, achieving IoU=0.927 and F1=0.962 (2D), as well as IoU=0.925 and F1=0.964 (3D), with root mean square error=0.82 mm and 81% volume overlap. Other models (eg, unet-resnext101, IoU=0.912) trailed, whereas FPN-based models underperformed.

Conclusion: UNet_selfNet, implemented in dedicated software, sets a benchmark for bone segmentation/reconstruction, offering transformative accuracy for orthopaedic applications. Future work should validate on diverse datasets and optimise inference times.

FP1.12

Pericapsular nerve group analgesia by indwelling catheter to facilitate rehabilitation after intertrochanteric hip fracture fixation: a pilot study

Florence Ou Suet Pang, Michael Chu-Kay Mak
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

FP1.13

Comparative evaluation of large language models for hip fracture-related patient questions: DeepSeek-V3-FW, Gemini 2.0 Flash, and ChatGPT-4.5

Yejin Zhang[1], Tao Huang[1], Chaoran Liu[1], Anna N Miller[2], Minghui Yang[3], Ian Harris[4], Takeshi Sawaguchi[5], Theodore Miclau[6], Wing Hoi Cheung[1], Ronald Man Yeung Wong[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics, Dartmouth Hitchcock Medical Centre and the Geisel School of Medicine at Dartmouth
[3]Department of Orthopaedics and Traumatology, Beijing Jishuitan Hospital
[4]Department of Medicine, UNSW Sydney
[5]Department of Orthopaedics and Traumatology, Fukushima Medical University
[6]Department of Orthopaedics, University of California

FP1.14

Implant innovation or illusion? A critical analysis of cut-out risk reduction in osteoporotic bone

Wai Kiu Thomas Liu[1], Marilyn Janice Oentaryo[2], Christian Fang[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Despite generational advancements in hip fracture implants, the optimal fixation method remains controversial. Current clinical studies present conflicting results due to methodological variations and confounding factors. This controlled biomechanical study systematically evaluates cut-out resistance across four implant generations using standardised synthetic osteoporotic bone models.

Methods: Nine representative implants were tested: first-generation (DHS, AO screws), second-generation (Gamma3, PFNA-II), third-generation (cementless TFNA), and contemporary 3.5-generation (FNS, cemented TFNA, X-Bolt). Each implant underwent axial loading (12 mm/min) in synthetic bone until 35 mm displacement, with force measurements recorded at 0.01 mm intervals (n=10 per implant).

Results: Significant differences in the force endured were demonstrated between implants ($p<0.001$). At 30 mm, cemented TFNA demonstrated superior resistance (1365±40 N), followed by X-Bolt (1286±26 N), DHS (778±64 N), FNS (710±42 N), Gamma3 (593±25 N), DHS blade (558±11 N), cementless TFNA (556±23 N), PFNA-II (516±17 N), and AO screw (292±13 N). The 3.5-generation implants demonstrated superior performance compared with 1st to 3rd generations ($p<0.001$), with greater diameter ($p<0.001$) and cross-sectional area ($p<0.001$). Bolt designs consistently outperformed screws and blades beyond 15 mm ($p<0.05$). Although screws demonstrated greater early resistance than blades, these differences became non-significant beyond 15 mm. Strong correlations existed between implant geometry and performance (cross-sectional area: $R=0.954$, diameter: $R=0.945$, $p<0.001$).

Conclusion: Bolt design and cement augmentation provided optimal cut-out resistance. Contrary to their proposed biomechanical benefits, blade-type implants showed no superiority over screws. The correlation between implant geometry and biomechanical performance supports preferential use of newer-generation implants with larger cross-sections for osteoporotic bone; however, clinical studies remain necessary to validate these biomechanical observations.

FP1.15

Performance of large language models in sarcopenia-related patient queries: a comparative study of ChatGPT4.5, Deepseek-V3, and Gemini 2.0

Huang Tao[1], Ben Kirk[2], Jacqueline Close[3], Jae-young Lim[4], Gustavo Duque[5], Peter Ebeling[6], Minghui Yang[7], Maoyi Tian[8], Wing Hoi Cheung[1], Ronald Man Yeung Wong[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Medicine, Melbourne Medical School, The University of Melbourne
[3]Department of Orthopaedics and Traumatology, Falls, Balance and Injury Research Centre, Neuroscience Research Australia
[4]Department of Medicine, Seoul National University College of Medicine
[5]Department of Medicine, Australian Institute for Musculoskeletal Science, The University of Melbourne and Western Health
[6]Department of Medicine, School of Clinical Sciences, Monash University
[7]Department of Orthopaedics and Traumatology, Beijing Jishuitan Hospital
[8]School of Public Health, Harbin Medical University

FP1.16 *British Orthopaedic Association Ambassador Paper*

Hip fracture surgery delayed by operating room capacity is an independent risk factor for 120-day mortality

Paul Lambton Rodham

Introduction: Delay in operative management for hip fracture is a modifiable risk factor for mortality. Multiple national guidelines recommend target times to the operating room (OR). However, the literature is limited by small sample sizes and/or non-discrimination between patients delayed to OR for medical optimisation and those delayed due to operative capacity. The latter is a confounding factor as medically unfit patients are likely to experience perioperative complications. Additionally, male sex, advanced age, medical comorbidity, pre-operative confusion, and residing in a care facility are non-modifiable risk factors for mortality following hip fracture. This study aims to assess the effects of delay in operative management after adjustment for non-modifiable risk factors for mortality.

Methods: Across a 4.5-year period, data were prospectively collected for all older patients who presented with a proximal femoral fracture to our level-1 trauma centre. Exclusion criteria included pathological fractures, age <65 years, periprosthetic fractures, non-operatively managed fractures, and delay >36 hours due to requirement for medical optimisation. Binary logistic regression modelling was used to analyse the effects of time to operation on 120-day mortality after adjustment for age, American Society of Anesthesiologists grade, sex, preoperative confusion, preoperative mobility, preoperative care requirements, and time to review by elderly care physician.

Results: In total, 2364 patients (73.1% female) were eligible for inclusion. Their median age was 84.6 (interquartile range, 78.2-90.0) years, and their median time from emergency room to OR was 38.6 (interquartile range, 22.8-53.9) hours. Operative procedures included cannulated screws (n=12), dynamic hip screw (n=603), intramedullary nailing (n=452), cemented hemiarthroplasty (n=1182), and total hip arthroplasty (n=115). Overall mortality at 120 days was 14.2%. Increasing time from emergency room to OR increased mortality rate (p=0.002); the time to OR of >36 hours was associated with an odds ratio of 1.495 (95% confidence interval, 1.134-1.977) for 120-day mortality.

Conclusion: In this large single-centre cohort study, delay in operative management for patients with hip fractures due to operative capacity substantially increases mortality rates. This is key evidence for prompt operative management and support for an increase in operative capacity to prepare for increased demands due to a global ageing population.

Free Paper Session II: Paediatric Orthopaedics

FP2.1

Bone healing is delayed in osteogenesis imperfecta patients with WNT1 and COL1A1 mutations

Ivan Suet-nam Cheung[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], Joanna Yuet-ling Tung[3], Joshua Chun-ki Chan[4], Tommy Zhijia Tan[5], Peikai Chen[5], Wang Chow[2], Michael Kai-tsun To[1]
[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 Paediatrics & Adolescent Medicine, Hong Kong Children's Hospital
[4]Department of Clinical Genetics, Hong Kong Children's Hospital
[5]Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital

FP2.2

Are patients with Down syndrome at risk of residual acetabular dysplasia at skeletal maturity? A multicentre radiographic study

Yuk-heng Tang[1], Janus Siu-him Wong[1], Henry Chun-him Fu[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.3

Helmet therapy for deformational plagiocephaly: a single centre's experience

Adora Sum Yuet Ching[1], Oscar Chun Yiu Wong[1], Alec Lik Hang Hung[2], Tsz Ping Lam[2], Jack Chun Yiu Cheng[2], Adam Yiu Chung Lau[2]
[1]Department of Prosthetics and Orthotics, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Deformational plagiocephaly is defined as an asymmetrical flattening of an infant's occipital skull. Helmet therapy is a conservative method that can reduce skull deformity by guiding the growing direction of the head. However, its effectiveness has not yet been validated. This study aims to evaluate the effects of helmet therapy on deformational plagiocephaly in patients at a tertiary hospital.

Methods: This is a single-centre retrospective study in a tertiary university hospital. We reviewed medical records of 30 infants (aged 7.83±2.51 months) who attended between 2022 and 2025. Infants with no early closure of cranial suture/synostosis, and with cranial vault asymmetry index (CVAI) ≥5% were prescribed a course of helmet therapy (mean duration, 3.77±2.37 months). The difference in CVAI was the primary outcome in assessing the effectiveness of helmet therapy.

Results: The mean CVAI significantly reduced from 7.57±2.45 to 6.10±2.63 (p=0.002). The effect of helmet therapy was dose-dependent; reduction in deformity was significant when compliance was ≥6 hours per day. Patients with poor compliance and used helmets in the daytime predominantly showed less reduction in deformity. Mild skin redness was reported, but most were resolved by proper donning of helmet.

Conclusion: Helmet therapy is effective for Hong Kong infants with plagiocephaly when initiated early and compliance to treatment was high. Patients with more severe deformity showed better improvements. Further multicentre study with larger sample size, standardised treatment plans, and longer follow-up are recommended.

FP2.4

Trigger thumbs in the paediatric population: changes in the last 40 years

Wen Ching Jeannette Ting[1], Chu Kay Michael Mak[2], Wing Lim Tse[2], Pak Cheong Ho[2]
[1]Department of Surgery, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

The Oberg-Manske-Tonkin (OMT) classification no longer considers trigger thumbs as a congenital condition. Nevertheless, it is the second most common presentation in congenital hand clinics. Trigger thumbs in the paediatric population were commonly treated with surgery, with good success rates. The belief was that the only way to manage it was to release the tight A1 band. Over the last 40 years, approximately 300 patients with trigger thumbs were treated at Prince of Wales Hospital, Hong Kong. The trend has moved towards conservative management with stretching and splinting. Most patients maintain a functional thumb without surgery. We present our changing experience over the last 40 years and what works for us currently.

FP2.5

Contributing factors of coxa vara development after femoral osteotomy in patients with osteogenesis imperfecta

Daniel Li-Liang Lin[1], Michael Kai-Tsun To[2]
[1]Department of Orthopaedics, The University of Hong Kong–Shenzhen Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: To determine contributing factors of coxa vara development after femoral osteotomy in patients with osteogenesis imperfecta (OI).

Methods: We retrospectively analysed 141 patients with OI who underwent femoral osteotomy and internal fixation between 2012 and June 2023. Among them, 77 underwent unilateral surgeries and 64 underwent bilateral surgeries, with a total of 205 surgeries. Based on the measurement of neck-shaft angle, <110° was considered coxa vara. Statistical analyses were performed for the following factors: age at the time of operation, bone mineral density, OI phenotypes, OI genotypes, fracture sites on femur, proximal femoral placement of intramedullary nail, postoperative hip-extraarticular (HE) angles, and hip spica duration. Logistic multifactorial regression was used to analyse the independent risk factors of coxa vara.

Results: Among the 205 cases, 48 were considered coxa vara and assigned as the observation group, and the rest were assigned as the control group. After univariate analysis, OI genotypes, fracture sites on femur, lateral placement of intramedullary nail at proximal femur, insufficient HE angle correction, and short duration of hip spica cast were considered risk factors associated with coxa vara.

Conclusion: Femoral neck fracture, lateral placement of intramedullary nail at proximal femur, insufficient HE angle correction, and short hip spica duration were independent risk factors for developing coxa vara after femoral osteotomy in patients with OI. Patients carrying autosomal recessive pathogenic OI genes (WNT1, FKBP10) may be partially associated with coxa vara.

FP2.6

Comparison of skeletal age and chronological age in Hong Kong Chinese population using the Greulich and Pyle method and the Tanner and Whitehouse 3 method

Ka Man Sally Lau, Ching Man Yeung, Arthur King Hay Ma
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Skeletal age, a measure of maturity based on endochondral ossification, differs from chronological age and is influenced by genetic, hormonal, nutritional, and environmental factors. Accurate assessment is crucial for guiding orthopaedic interventions, including limb-length discrepancy prediction, fracture management, and scoliosis treatment. The Greulich and Pyle (GP) and Tanner-Whitehouse 3 (TW3) methods—derived from North European populations—are widely used but require validation in Hong Kong Chinese children. This study evaluates the correlation between skeletal age (GP and TW3) and chronological age in a Hong Kong Chinese paediatric population, assessing sex-based differences and pubertal variations.

Methods: A retrospective analysis of skeletal age based on plain radiographs of the hand and wrist was conducted. Skeletal age was determined independently using GP and TW3 methods and compared with chronological age. Statistical analyses assessed agreement, discrepancies, and sex-specific trends.

Results: Comparative analysis of the GP method and TW3 method revealed general concordance between skeletal age and chronological age across the cohort, although some variations were observed. Certain developmental periods appeared to demonstrate more pronounced differences between skeletal age and chronological age.

Conclusion: Although GP and TW3 methods remain useful for skeletal age assessment in Hong Kong Chinese children, population-specific variations highlight the need for cautious interpretation. Future studies may evaluate novel techniques or adjustments to improve accuracy in determining skeletal age in Hong Kong children.

FP2.7

Prevalence of coxa vara among patients with osteogenesis imperfecta

Brian Xiongyuan Xie[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], Joanna Yuet-ling Tung[3], Joshua Chun-ki Chan[4], Tommy Zhijia Tan[5], Peikai Chen[5], Wang Chow[2], Michael Kai-tsun To[1]
[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 Paediatric & Adolescent Medicine, Hong Kong Children's Hospital
[4]Department of Clinical Genetics, Hong Kong Children's Hospital
[5]Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital

FP2.8

Outcomes of children treated for non-traumatic avascular necrosis of the femoral head

Merilyn Sik-yu Wong[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.9

Is leg length discrepancy in childhood associated with long leg acetabular dysplasia at skeletal maturity? A follow-up study up to skeletal maturity

Satoshi Yoshida[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.10

Femoral head avascular necrosis risk is low among osteogenesis imperfecta patients undergoing orthopaedic surgery involving anterograde femoral intramedullary fixation: a multicentre cohort

Patrick Pak-ching Chu[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], Joanna Yuet-ling Tung[3], Joshua Chun-ki Chan[4], Tommy Zhijia Tan[5], Peikai Chen[5], Wang Chow[2], Michael Kai-tsun To[1]
[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 Paediatrics & Adolescent Medicine, Hong Kong Children's Hospital
[4]Department of Clinical Genetics, Hong Kong Children's Hospital
[5]Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital

FP2.11

Epidemiology and mid-term follow-up of slipped capital femoral epiphysis in Hong Kong

Yau Mei Cheung[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.12

Long term outcomes of hip salvage procedures at a mean of 16-year follow-up

Yeh Joon Park[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.13

Radiographic acetabular development in patients with FGFR3 disorders

Bernard Mong-hei Chan[1], Janus Siu-him Wong[2], Joshua Chun-ki Chan[3], Noah Lok-wah So[4], Joanna Yuet-ling Tung[5], Evelyn Eugenie Kuong[4], Michael Kai-tsun To[2], Wang Chow[4]
[1]School of Biomedical Sciences, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Department of Clinical Genetics, Hong Kong Children's Hospital
[4]Department of Orthopaedics and Traumatology, Hong Kong Children's Hospital
[5]Department of Paediatrics & Adolescent Medicine, Hong Kong Children's Hospital

FP2.14

'Rule of thumb' arithmetic method with bone age is most accurate in predicting limb length discrepancy at skeletal maturity after epiphysiodesis

Denise Danyi Huang[1], Janus Siu-him Wong[1], Noah Lok-wah So[2], Evelyn Eugenie Kuong[2], 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

FP2.15

Significant discrepancies between bone age and chronological age among Hong Kong children undergoing growth modulation surgeries

Chak-bong Hui[1], Janus Siu-him Wong[1], Thomas Wai-kiu Liu[2], Noah Lok-wah So[3], Evelyn Eugenie Kuong[3], Michael Kai-tsun To[1], Wang Chow[3]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[3]Department of Orthopaedics and Traumatology, Hong Kong Children's Hospital

FP2.16

Assessing the effects of upper limb casting on Chinese handwriting in primary students in Hong Kong

Chi Lap Yam, Esther Ching San Chow, Wan Yee Paulina Lui
Department of Orthopaedics and Traumatology, United Christian Hospital

FP2.17

Dangling extra thumbs: is excellent outcome guaranteed after simple excision?

Man Chun Tsang, Ching Man Yeung, Kai Yiu Alexander Choi
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Dangling extra thumbs is a type of congenital preaxial polydactyly. Surgical outcomes of dangling- and structural-type polydactyly are not fully studied.

Methods: In total, 48 patients with polydactyly, including 13 dangling types and 35 structural types, who underwent surgical treatment before 3 years of age and were followed up for a mean of 11.7 years were assessed. Correlations between surgeon-rated outcome and activity-based patient- and parent-rated outcome were investigated, as were outcomes between dangling and structural polydactyly. Japanese Society for Surgery of the Hand score, Cheng score, and Tada score were used to determine surgical outcome. The paediatric quality of life assessment questionnaire was given to patients and parents as a measure of the subjective outcome of the operation.

Results: Compared with the structural group, the dangling thumb group had significantly better outcomes in terms of Japanese Society for Surgery of the Hand score, Cheng score, and Tada score, as well as significantly lower parent-rated scores from the questionnaire. There was no significant difference in the patient-rated outcome between groups. In the dangling group, there was no significant correlation between parameters and the patient and parent scores, except that the parent score was negatively correlated to patient-reported outcome measures. In the dangling group, there was significantly larger range of patient-reported outcome measures for the operative side, compared with the non-operative side.

Conclusion: Dangling extra thumbs are considered a benign condition with excellent outcomes. Surgical outcome of dangling-type polydactyly is better than that of the structural type, although excellent result is not guaranteed.

FP2.19 *Malaysian Orthopaedic Association Ambassador Paper*

Congenital knee dislocation: a series of successful conservative treatment

Syed Mohd Esmat Hussaini B Syed Mohd Ridzuan

Congenital knee dislocation (CKD) is characterised by knee hyperextension with anterior displacement of tibia. This is a rare condition, with an incidence of 1 in 100 000 livebirths. It may occur in isolation but more commonly associated with conditions like myelomeningocele, Marfan, and Larsen syndromes. We report three cases of CKD successfully treated non-operatively. Case A is a premature female newborn with bilateral CKD. General examination showed multiple anomalies including low set of ears, flat nasal bridge, left hip subluxation, clinodactyly of bilateral ring and little fingers. Both knees were reducible but unstable. Serial casting was performed for 3 months in progressive knee flexion position. Passive knee flexion of 120° with active flexion of 90° on both knees was achieved upon completion of serial casting. The left hip instability resolved spontaneously after 8 weeks. Case B and Case C are both term female newborns diagnosed with unilateral CKD of the left knee. General examinations demonstrated no other anomalies. In both cases, the knee was hyperextended but stable. Passive stretching with close follow-up resulted in excellent outcome. Excellent outcomes can be achieved in CKD, especially when gradual reduction and serial casting are initiated early, as demonstrated in our cases. In recalcitrant cases, prolonged serial casting or surgical intervention may be necessary to restore knee alignment and achieve a stable joint with functional range of motion. Early recognition, appropriate patient selection, and close follow-up are key to optimising outcomes.

Free Paper Session III: Spine

FP3.1

Comparison of effectiveness of pedicle screw with polyaxial/monoaxial conversion capabilities with conventional pedicle screws in the reduction of focal kyphosis of burst fracture

Yu Chung Wong[1], Wai Wang Chau[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Posterior spinal fusion with pedicle screws and rods construct is an established method for the treatment of burst fracture at the thoracolumbar spine. Prior laboratory study suggested restoration of spina lordosis followed by distraction across the fractured spine segment could give a better decompression effect at the spinal canal. Another clinical study suggested the use of monoaxial pedicle screw could achieve a better reduction in the angulation of the fractured spine. Recent advances in pedicle screw design allow the option of conversion from polyaxial to moaxial mode after insertion. This flexibility allows spine surgeon to restore a better spine lordosis when the pedicle screw is in a polyaxial mode, and apply distraction when the pedicle screw is locked in monoaxial mode to maximize distraction force.

Methods: Records of patients admitted to the orthopaedics unit at Prince of Wales Hospital, Hong Kong, between July 2005 and December 2024 who underwent fixation for thoracolumbar burst fractures were retrospectively reviewed. Pre- and postoperative wedge angle of fractured vertebra was compared between conventional pedicle screw construct and new pedicels screw with polyaxial/monoaxial conversion capability.

Results: There was no significant difference in the improvement of wedge angle of thoracolumbar burst fracture fixed with new pedicle screw system with polyaxial/monoaxial conversion capability, compared with traditional pedicle screw.

Conclusion: Use of new pedicle screw design with polyaxial/monoaxial conversion capability cannot improve the sagittal spinal alignment in patient with burst fracture who underwent posterior spinal fusion.

FP3.2

Efficacy and complications of unilateral biportal endoscopic lumbar spine surgery: clinical results for 293 patients

Wing Ngai Yim
Private practice

Introduction: Unilateral biportal endoscopic (UBE) spine surgery is gaining popularity as a minimally invasive spine surgery technique worldwide. It provides excellent magnification and clear visualisation of neural structures while minimising soft tissue damage, muscle destruction, and facet joint disruption. Compared to single-portal endoscopic surgery, UBE allows greater mobility and flexibility for surgeons. Additionally, the procedure can be performed using conventional spinal instruments, reducing the learning curve. This study evaluates the clinical outcomes and potential complications of UBE in lumbar spinal surgery.

Methods: This retrospective study included 293 patients treated between January 2020 and July 2025. The primary pathologies were disc herniation and central or lateral recess spinal stenosis. Fusion surgeries and revision cases were excluded. All patients underwent UBE discectomy or laminotomy with unilateral approach for bilateral decompression. We evaluated epidemiological and clinical data, including operation time, surgical level, visual analogue scale pain scores, patient satisfaction, and complications (eg, dural tear, revision surgery, and blood transfusion requirements).

Results: The outcomes for pain relief and patient satisfaction were favourable. Complication rates were very low, with only one case of dural tear, two cases of early disc reherniation, and one rare case of neurogenic pulmonary oedema. No patients required blood transfusion.

Conclusion: UBE is a safe and effective procedure with excellent clinical outcomes.

FP3.3

Cervical vertebral maturation method for staging skeletal growth and curve progression in patients with adolescent idiopathic scoliosis

Samuel Tin Yan Cheung, Garvin Chi Chun Cheung, Jason Pui Yin Cheung, Prudence Wing Hang Cheung
Department of Orthopaedics and Traumatology, The University of Hong Kong

FP3.4

Unilateral biportal endoscopy versus open microscopic approach for lumbar spinal stenosis: a comparative case series

Timothy Aaron Kuan, Chong Chung Chan
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Lumbar spinal stenosis is a prevalent degenerative condition causing significant morbidity. Open microscopic decompression is the traditional approach, and unilateral biportal endoscopy (UBE) has emerged as a minimally invasive alternative. This study compares perioperative and clinical outcomes between the two approaches in a single-surgeon series.

Methods: A retrospective analysis was conducted among consecutive patients with lumbar spinal stenosis treated with posterior decompression between January 2020 to February 2025. The UBE group (n=52) underwent biportal endoscopic decompression, whereas the open microscopic decompression group (n=47) received conventional open surgery. Demographic data, operative time per level, estimated blood loss per level, length of hospital stay, and complications were recorded. Clinical outcomes were assessed preoperatively and at 3-month follow-up using the numeric rating scale (NRS), Japanese Orthopaedic Association score (JOA), Oswestry Disability Index (ODI), and Roland Morris Disability Questionnaire (RMDQ).

Results: The UBE group demonstrated significantly lower estimated blood loss per level (45.9±18.3 mL vs 120±25.1 mL, $p<0.001$). Length of hospital stay ($p=0.375$) and operative time ($p=0.079$) was comparable. Early postoperative NRS, JOA, ODI, RMDQ scores showed no significance difference. Complication rates were low and comparable (15% vs 23%).

Conclusions: UBE offers comparable efficacy to open microscopic approach but with significantly lower estimated blood loss per level. Although UBE is associated with a learning curve, it is a safe and effective minimally invasive alternative for lumbar spinal stenosis, particularly in patients requiring multilevel decompression.

FP3.5

A bedside comprehensive assessment tool for assessing degenerative cervical myelopathy

Karlen Ka Pui Law, Kenney Ki Lee Lau, Graham Ka Hon Shea, Kenneth Man Chee Cheung
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Physical performance tests (PPTs) provide objective measures in degenerative cervical myelopathy (DCM), but their associations remain underexplored. This study aimed to develop a novel PPT-based scoring system by examining the associations between PPTs and DCM severity.

Methods: The severity of spinal cord compression in patients with DCM was measured based on the cross-sectional area (CSA) at the stenosis, whereas modified Japanese Orthopaedic Association (mJOA) scores and PPTs were used as functional performance metrics. Correlations with CSA, evaluated by Pearson's correlation and linear regression, defined the validity. The Hong Kong Myelopathy Criteria (HKMC) were developed based on principal component analysis (PCA) and K-means clustering results; their validity with CSA was subsequently evaluated.

Results: In total, 269 participants with DCM (57% female; mean age, 63±9 years; symptomatic duration, 12±9 months) had a mean CSA of 65.53±12.41 mm^2 and mJOA score of 14.4±1.8. The performance of PPTs showed a significant correlation with CSA (r= -0.478 to 0.837, $p<0.001$; R^2=0.828 to 0.867). The novel HKMC was then derived by combining results from the 10-second Grip-and-Release Test, Simple-Foot-Tapping Test, and the 10-second Step Test (PCA factor-loadings=0.87-0.89) with a four-tier scoring system (scores 0-3) based on K-means clustering. The correlations between CSA and HKMC were high (r=0.896, $p<0.001$; R^2=0.814).

Conclusion: This study demonstrates a correlation between spinal cord compression and functional abilities in DCM. The novel DCM-specific assessment tool, the HKMC, demonstrates superior validity compared to individual PPTs and the mJOA score.

FP3.6

Efficacy of erector spinae block in wound pain control following unilateral bi-portal endoscopic surgery for lumbar spinal stenosis: a prospective cohort study

Cheuk Yin Tam[1], Hon Chun Chong[2], Wai Him Lam[1], Suk Ying Jodhy Mak[1], Kit Yan Jimmy Lau[1], Ho Lam Chai[2], Yuk Chuen Siu[2], Cho Yau Lo[2], Siu Man Leung[3], Chun Man Ma[2]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, North District Hospital
[3]Department of Orthopaedics and Traumatology, Tai Po Hospital

FP3.7

Efficacy analysis of separation surgery combined with stereotactic body radiotherapy in spinal metastasis: a two-centre study

Wai Him Lam[1], Cheuk Yin Tam[1], Suk Ying Mak[1], Kit Yan Jimmy Lau[1], Ho Lam Chai[2], Yuk Chuen Siu[2], Siu Man Leung[1], Cho Yau Lo[2], Chun Man Ma[2]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, North District Hospital

Introduction: This study evaluated the therapeutic efficacy of separation surgery with stereotactic body radiotherapy (SBRT) on clinical outcomes in spinal metastasis patients.

Methods: This retrospective dual-centre study analysed 27 patients (18 male, 9 female; mean age, 64.5±6.7 years) with spinal metastasis treated with separation surgery and SBRT between January 2020 and December 2024. Clinical outcomes, including American Spinal Injury Association (ASIA) scale, Frankel grades, Karnofsky Performance Status (KPS) score, visual analogue scale (VAS), Eastern Cooperative Oncology Group (ECOG) score, and muscle strength, were assessed. Survival and ambulatory maintenance were evaluated using Kaplan-Meier analysis, log-rank test, and multivariate Cox regression.

Results: The mean follow-up duration was 453±430 days. For patients with neurological deficit, the median time from magnetic resonance Imaging to surgery was 10.7 hour. The mean operative time was 342±84 minutes. The mean blood loss was 1205±910 mL. Complications included three (11.1%) dura tear, one (3.7%) rod breakage, three (11.1%) tumour progression. The median survival was 12 (range, 2-52) months. Tomita 8-10 had 6.96-fold higher mortality risk, compared with Tomita 2-5 (adjusted hazard ratio=6.96, 95% confidence interval=1.44-33.64, p=0.016). The mean ambulatory maintenance was 12.6 (range, 0-51) months. All clinical outcomes improved significantly postoperatively ($p<0.003$): the median VAS decreased from 8 to 2, KPS score increased from 30 to 60, and ECOG score decreased from 3 to 2. Frankel grades improved from a median of C to D; ten (37%) of 27 patients achieved 1-grade improvement in ASIA scale. The median muscle strength increased by one grade.

Conclusion: Timely intervention with separation surgery and SBRT provides effective spinal metastasis management, minimising surgical trauma while significantly improving pain control, neurological function, ambulation status, and quality of life.

FP3.8

Early experience with a fully automated robotic arm navigation system in the first 20 cases of lumbar spinal fusion

Cheung Hing Eric Lam
Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital

We report our initial experience with a fully automated robotic arm navigation system in 20 surgical cases conducted between November 2024 and June 2025. This study evaluates the system's feasibility, safety, and clinical outcomes in various lumbar spinal fusion procedures. The system integrates advanced Imaging, real-time tracking, and autonomous trajectory planning for enhanced precision. Metrics included setup time, navigational accuracy, operative time, complications, and postoperative outcomes. All 20 cases were completed without technical failures. The mean setup time was 26.8 minutes. Operative time decreased by 15% compared to conventional methods. No intraoperative complications occurred, and postoperative outcomes showed 98.3% optimal implant placement with no revision. Surgeon feedback noted improved ergonomics and reduced fatigue. These findings suggest the system's potential to enhance surgical precision and efficiency, warranting further evaluation in larger cohorts.

FP3.9

Accuracy of pedicle screw insertion in initial 20 lumbar spine fusion cases using a fully automated robotic arm navigation system

Cheung Hing Eric Lam
Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital

This study evaluates the accuracy of pedicle screw insertion in the first 20 cases of lumbar spine fusion surgery at our institution using a fully automated robotic arm navigation system. We retrospectively analysed 20 consecutive patients who underwent lumbar fusion between November 2024 and June 2025. A total of 118 pedicle screws were placed using the robotic system. Accuracy was assessed via postoperative computed tomographic scans, graded using the Gertzbein-Robbins classification. Of the screws placed, 95.8% (113/118) were classified as grade A (perfect placement), 3.4% (4/120) as grade B (minor breach <2 mm), and 0.8% (1/118) as grade C (breach ≥2 mm). No screws required revision and no significant complication was related to screw placement. These results demonstrate high accuracy and safety of the robotic navigation system in early adoption, suggesting its potential to enhance precision in lumbar spine fusion surgery. Further studies with larger cohorts are warranted.

FP3.10

Clinical significance of Schroth scoliosis-specific exercises during bracing in adolescent idiopathic scoliosis: a prospective, randomised clinical trial

Yat Hong Kenny Kwan[1], Lee Yin Goh[1], Anjaly Saseendran[1], Aldous Cheng[2]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Physiotherapy, The Duchess of Kent Children's Hospital at Sandy Bay

FP3.11

Curve undercorrection is predictive of postoperative distal adding-on in flexible Lenke 1AR curves

Victoria Yuk Ting Hui, Prudence Wing Hang Cheung, Jason Pui Yin Cheung
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Lenke 1AR curves (L4 tilt to the right) have a higher risk of distal adding-on after selective fusion in adolescent idiopathic scoliosis (AIS). However, indications of shorter fusions by considering curve flexibility rather than the last substantially touched vertebra remains unclear. This study aims to identify risk factors of distal adding-on and denote when fusion proximal to the last substantially touched vertebra (LSTV) is appropriate.

Methods: This retrospective study reviewed Lenke 1AR patients with AIS who underwent selective thoracic posterior spinal fusion between 2003 and 2021 with a minimum of 2-year follow-up. Lowest instrumented vertebra (LIV) was selected such that fusion mass Cobb angle <20° and fusion mass shift <20 mm on fulcrum-bending radiographs. The primary outcome was distal adding-on at 2-year follow-up: an increase in the number of distally included vertebrae in the curve with an increase in >5° in LIV/LIV+1 disc angle or >5 mm in LIV+1-central sacral vertical line distance postoperatively. Assessments were performed using preoperative, immediate, and 2-year postoperative standing radiographs. Skeletal maturity was assessed on hand-wrist films. Risk factors of distal adding-on were identified with point biserial and multivariate logistic regression; cutoffs were denoted with receiver operating characteristics analyses.

Results: In total, 112 patients were included. Patients who were skeletally immature (odds ratio [OR]=0.41, 95% confidence interval [CI]=0.22-0.78, p=0.006), more flexible (OR=1.07, 95% CI=1.02-1.12, p=0.009), and had LIV more levels proximal to the last substantially touched vertebra (OR=2.97, 95% CI=1.36-6.46, p=0.006) had higher risk of distal adding-on. Postoperatively, the distal adding-on group tended to be under-corrected and the cutoff for adding-on was fulcrum bending correction index (FBCI) <1.05 (area under the curve=0.71, 95% confidence interval=0.60-0.82).

Conclusion: In flexible 1AR curves, more aggressive intraoperative correction should be performed to avoid undercorrection (keeping FBCI ≥1.05) and prevent distal adding-on at 2-year follow-up.

FP3.12

Morphological analysis of upper lumbar pedicles in a southern Chinese population using computed tomography

Kam Lung Tung, Siu Hei Michael Tse, Ho Ming Li, Pui Kit Tang, Ka Yin Matthew Yan, Sammi Wai Sum Wong, Lewis Ng, Tik Koon Kwok, Kam Kwong Wong
Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Introduction: Pedicle morphology—particularly pedicle width—plays a critical role in determining appropriate pedicle screw size and ensuring safe transpedicular screw insertion. Ethnic variation in pedicle dimensions has been previously reported, with a general trend toward narrower pedicles in the upper lumbar spine, especially among female patients. Beyond mean measurements, the proportion of pedicles too small to accommodate the smallest standard pedicle screws (4.5 mm) may hold greater clinical relevance. This aspect remains underexplored in the local Southern Chinese population.

Methods: Lumbar spine computed tomographic (CT) scans of 100 local Chinese patients were analysed to assess pedicle width at L1-L3 levels. Pedicle width was measured as the outer diameter at the isthmus on axial images. Pedicles narrower than 5.5 mm were considered insufficient for the safe insertion of 4.5 mm screws, based on current thoracolumbar fixation systems.

Results: Among female patients, 30% of L1 pedicles and 10% of L2 pedicles measured less than 5.5 mm. In male patients, 10% of L1 and 10% of L2 pedicles fell below this threshold.

Conclusion: A substantial proportion of small pedicles in the upper lumbar spine was observed in female Chinese patients. These findings underscore the importance of individualised preoperative CT assessment for transpedicular screw placement in Chinese women, to avoid complications associated with oversized screws.

FP3.13

Efficacy of preoperative morphological measurement of contralateral facets, lamina, and spinous process in reducing the incidence of excessive bone resection in unilateral biportal endoscopy for lumbar spinal stenosis

Hon Chun Chong[1], Cho Yau Lo[1], Siu Man Leung[2], Ho Lam Chai[1], Kit Yan Lau[3], Suk Ying Mak[3], Chun Man Ma[1]
[1]Department of Orthopaedics and Traumatology, North District Hospital
[2]Department of Orthopaedics and Traumatology, Tai Po Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Unilateral biportal endoscopy (UBE) is a novel minimally invasive technique for lumbar spinal stenosis, minimising muscle injury and yielding good outcomes. Limited exposure complicates posterior spinal anatomy identification compared to open surgery. Excessive facet resection risks back pain, instability, or revision surgery. Limited standardised method currently guides intraoperative bony resection.

Methods: This retrospective study compared patients underwent UBE in North District Hospital and Alice Ho Miu Ling Nethersole Hospital, who are over 50 with single-level symptomatic lumbar spinal stenosis, failed conservative care, and no instability, excluding prior spinal surgery or infection cases. Demographics and clinical outcomes (claudication distance, back pain and leg pain) were measured preoperatively, at 4 weeks, and 3 months postoperatively. Preoperative magnetic resonance Imaging (MRI) and computed tomography (CT) and postoperative CT were performed. Group 1 relied on surgeon's intraoperative judgment, while Group 2 incorporated preoperative CT measurements of contralateral resection line (C), lamina line (L), and spinous process line (S). UBE was performed under general anaesthesia. Postoperative CT is done for both groups. Groups were compared for outcomes, resection accuracy, and complications.

Results: Preoperative morphological measurement of contralateral facets, lamina, and spinous process reduces the incidence of over- or under- resection of bone in unilateral biportal endoscopy for lumbar spinal stenosis. Reasonable adherence was shown to the preoperative plan.

Conclusion: Preoperative CT measurements of contralateral facets, lamina, and spinous process during UBE reduce resection errors. Standardised planning enhances precision, potentially lowering instability risks, and provides a reproducible approach, warranting further prospective study validation.

FP3.14

Low-dose chest computed tomography for bone mineral density screening: a study based on European Spine Phantom models

Mian Huang[1], Miao Wei[2], Zhao Zhenhui[3], Fajin Lv[2], William Weijia Lu[4]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Radiology, The First Affiliated Hospital of Chongqing Medical University
[3]Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences
[4]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP3.15

Prediction of osteoporotic vertebral compression fracture using phantom-less quantitative abdominal computed tomography

Mian Huang[1], Xiaofeng Hong[2], Chen Zheng[3], Jianjun Wu[1], Yi Jiang[2], William Weijia Lu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Radiology, The Second Affiliated Hospital of The Chinese University of Hong Kong (Shenzhen)
[3]Bone's Technology Ltd

FP3.16

Fully automatic regional bone mineral density measurement of lumbar endplates and adjacent vertebral bone by phantom-less quantitative computed tomography

Mian Huang[1], Zhaoyang Li[2], William Weijia Lu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Tianjin University

FP3.17

Femoral and tibial length growths were not predictive of curve progression in adolescent idiopathic scoliosis

Kee Lok Fong, Janus Siu Him Wong, Anjaly Saseendran, Kenny Yat Hong Hong
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: We hypothesised that curve progression in adolescent idiopathic scoliosis (AIS) patients was predicted by lower limb long bone growth.

Methods: Consecutive patients with AIS treated at a tertiary referral centre with at least 2 concurrent x-ray films of the spine and lower limbs were screened for inclusion. Serial concurrent radiographic measurements on EOS whole spine and lower limb films were compared until patient received braces or surgery. Patient sex, chronological age, menarche, body height, Cobb angle, Risser stage, femur and tibial length, and time elapsed between serial measurements were collected. Patients with congenital scoliosis, lower limb pathologies, syndromal associations were excluded. Spearman correlation was used to investigate potential associations between rates of progression Cobb angle, and femoral and tibial lengths. Statistical significance was set at $p<0.05$.

Results: 128 pairs of concurrent radiographic measurements of patient's spine and lower limbs at mean chronological age of 15±2 years were analysed. The mean annual rate of curve progression was 3±7 degrees, while the annual growth rate femur and tibia length were 11±8 cm and 8±6 cm, respectively. The rate of curve progression was not associated with femoral length growth (Spearman rho=0.27, p=0.763) or tibial length growth (Spearman rho= -0.022, p=0.808).

Conclusion: Growth of femur and tibia lengths were not statistically associated with rate of curve progression in scoliosis. The findings suggest that limb length growth may not be an accurate marker of spine growth nor predictor of curve progression in AIS.

FP3.18

Prediction of scoliosis progression using longitudinal radiographs and attention-based long short-term memory networks

Elvis Chun Sing Chui[1], Davis Kai Yue[1], Xin Ye[1], Adam Yiu Chung Lau[1], Alec Lik Hang Hung[2], Kenneth Guangpu Yang[1], Xiaoli Liu[1], Russell Lam[1], Wayne Yuk Wai Lee[1], Jack Chun Yiu Cheng[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Timely prediction of scoliosis progression is crucial for optimising follow-up schedule and guiding treatment plan. We developed a deep learning model utilising an attention-based long short-term memory (LSTM) network to forecast changes in Cobb angles using sequential standing anteroposterior (AP) spine radiographs.

Methods: Three-dimensional rectangular models for vertebrae T1 to L5 were reconstructed using 68 anatomic landmarks on paired AP and lateral radiographs that capture vertebral position, tilt, and rotation. Global spinal curvature was then reconstructed to predict overall curve progression. Vertebral tilt and orientation features across time were fed into the attention-based LSTM network to capture temporal alignment patterns and predict future Cobb angles. Two models were trained: (1) the use of baseline and 6-month radiographs to predict the 12-month Cobb angle, and (2) the use of baseline, 6-, and 12-month radiographs to predict the 18-month Cobb angle. Ground truth Cobb angles were measured by clinicians. Performance was evaluated using mean absolute error (MAE) and intraclass correlation coefficient (ICC).

Results: The use of baseline and 6-month radiographs to predict the 12-month Cobb angle yielded an MAE of 4.5° and ICC of 0.83, whereas the use of baseline, 6-, and 12-month radiographs to predict the 18-month Cobb angle yielded an improved MAE of 3.2° and ICC of 0.90.

Conclusion: The use of three serial radiographs (over 12 months) significantly improved Cobb angle prediction accuracy, compared with two radiographs. This temporal prediction framework may enable earlier identification of progressive scoliosis.

FP3.19

T4-L1-hip axis is not correlated with long term health related outcomes after fusion for adolescent idiopathic scoliosis

Fai Suen Bernice Chan, Chung Yin Isaac Tai, Anjaly Saseendran, Yat Hong Kenny Kwan
Department of Orthopaedics and Traumatology, The University of Hong Kong

FP3.20

Caregiver burden in adolescent idiopathic scoliosis: a prospective study of rising stress and falling overprotection

Chak Yan Calvin Cheng, Chung Yin Isaac Tai, Anjaly Saseendran, Yat Hong Kenny Kwan, Meanne Ching Man Chan
Department of Orthopaedics and Traumatology, The University of Hong Kong

FP3.21 ***(Japanese Orthopaedic Association)***

Racial differences in whole-body sagittal alignment between Asians and Caucasians based on international multicentre data

Jun Ouchida[1], Hiroaki Nakashima[1], Tokumi Kanemura[2], Masashi Okamoto[3], Shun Hatsushikano[3], Shiro Imagama[1], Jean Charles Le Huec[4], Kazuhiro Hasegawa[3]
[1]Department of Orthopaedics, Nagoya University Graduate School of Medicine
[2]Department of Orthopedic Surgery, Konan Kosei Hospital
[3]Niigata Spine Surgery Center
[4]Polyclinique Bordeaux Nord Aquitaine

Introduction: To investigate racial differences in whole-body sagittal (WBS) alignment between Asians and Caucasians adjusted for age and clinical score, and to clarify the relationship between age and WBS parameters by race and sex.

Methods: In total, 317 individuals (206 Asians and 111 Caucasians) were evaluated for WBS parameters radiologically. Propensity score-matching for age and Oswestry Disability Index scores was used for comparative analysis between races. Correlation analysis between age and WBS parameters was conducted by race and sex.

Results: The comparative analysis included 136 individuals. Racial differences between Asians and Caucasians were observed in the C2-7 lordotic angle (-1.8°±12.3° vs 6.3°±12.2°, $p = 0.001$) and lower lumbar lordosis (34.0°±6.6° vs 38.0°±6.1°, $p<0.001$). In correlation analysis with age, moderate or stronger correlations were found in knee flexion for all groups, and in sacral vertical axis and T1-pelvic angle for females of both racial groups. Age-related changes in pelvic incidence and pelvic thickness were more significant in Caucasian females.

Conclusion: Analysis of the correlation between age and WBS parameters suggests that age-related WBS changes vary between races and should be considered during corrective spinal surgery.

Free Paper Session IV: Adult Joint Reconstruction I

FP4.1

Factors affecting cementless femoral stem alignment in direct anterior approach hip arthroplasties: a review of 100 cases

Yan Ting Lam[1], Cham Kit Wong[1], Rex Wang Fung Mak[2], Jonathan Patrick Ng[2], Tsz Lung Choi[1], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.2

Surgical accuracy of implant positioning in robotic-assisted versus conventional total hip arthroplasty: experience of a joint replacement centre in Hong Kong

Chun Lai Wong[1], Wai Wang Chau[2], Kar Ching Raymond Hui[1], Chak Yam To[1], Siu Hung Kenneth Hui[1], Man Kwan Wong[1]
[1]Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.3

Computer-assisted total hip arthroplasty improves acetabular prosthesis placement accuracy: a multicentre, randomised controlled clinical study in China

Xiao Geng[1], Hua Tian[1], Feng Li[1], Ming Zhang[2], Zhiwen Sun[3], Ge Zhou[1]
[1] Department of Orthopaedics, Peking University Third Hospital
[2]Department of Orthopaedics, The First Affiliated Hospital of Shandong First Medical University, Shandong Provincial Qianfoshan Hospital
[3]Department of Orthopaedics, Chifeng Municipal Hospital

Introduction: To improve the accuracy of acetabular prosthesis placement, we utilised a new surgical navigation system: visual treatment solution (VTS). The purpose of this study was to verify the efficacy and safety of this system in assisting total hip arthroplasty (THA).

Methods: This was a prospective, multicentre, randomised controlled trial; 124 patients who underwent primary THAs were included. The experimental group underwent VTS-assisted THA, and the control group underwent traditional THA. The primary efficacy outcomes were the proportion of anteversion and inclination angles in the Lewinnek safe zone, and secondary outcomes included operation time, The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score, Harris score, Short Form-36 Health Survey score, and hip dislocation rate.

Results: The proportion of both anteversion and inclination angles in the safe zone was higher in the experimental group than in the control group (93.1% vs 50.9%, $p<0.01$). The mean operation time was longer in the experimental group than in the control group (112.5 vs 92.6 minutes, $p<0.01$). There were no significant differences in WOMAC score, Harris score or Short Form-36 Health Survey score between the two groups at 3 months. The dislocation rate was 0% and 1.6% in the respective group ($p>0.05$).

Conclusion: VTS-assisted THA can significantly improve the accuracy of acetabular prosthesis placement. However, there were no significant differences in short-term clinical outcomes or dislocation rates between the two groups.

FP4.4

Comparison of the outcomes of high tibial osteotomy and unicompartmental knee arthroplasty in patients with bone-on-bone medial tibiofemoral joint osteoarthritis

Cheryl Cheuk Wing Kong[1], Cham Kit Wong[2], Gloria Yan Ting Lam[1], Tsz Lung Choi[1], Rex Wang Fung Mak[1], Jonathan Patrick Ng[2], Kevin Ki Wai Ho[3], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.5

Functional outcomes comparison: bicruciate-retaining total knee arthroplasty versus fixed- and mobile-bearing unicompartmental knee arthroplasty

Hiu Hong Wong[1], Rex Wang Fung Mak[1], Cham Kit Wong[2], Jonathan Patrick Ng[2], Gloria Yan Ting Lam[1], Tsz Lung Choi[1], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.6

Unicompartmental knee arthroplasty: an analysis of postoperative alignment and outcome

Chun Man Lawrence Lau[1], Siu Nam Jimmy Wong[1], Chun Kiu Jeff Leung[1], Tsz Lung Juno Hung[1], Ka Chun Thomas Leung[2], Michelle Hilda Luk[2], Ping Keung Chan[1], Amy Cheung[2], Kwong Yuen Chiu[1], Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP4.7

Postoperative joint line convergence angle but not coronal plane alignment of knee phenotype affects the high tibial osteotomy midterm outcomes at 5.5-year follow-up

Cham Kit Wong[1], Rex Wang Fung Mak[2], Jonathan Patrick Ng[1], Gloria Yan Ting Lam[2], Tsz Lung Choi[2], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Medial opening wedge high tibial osteotomy (MOWHTO) corrects varus malalignment in medial compartment osteoarthritis (OA) to redistribute weight-bearing forces and delay knee replacement. Coronal alignment parameters, including the coronal plane alignment of the knee (CPAK) classification, lateral distal femoral angle (LDFA), medial proximal tibial angle (MPTA), and joint line convergence angle (JLCA), are critical for surgical planning and outcomes. This study evaluates their impact on MOWHTO results.

Methods: A retrospective analysis of 143 knees treated with MOWHTO between 2014 and 2022 was conducted; the mean follow-up duration was 5.5 years. Clinical outcomes included Oxford Knee Score (OKS), Knee Society Score (KSS), range of motion (ROM), and return to work/sports rates. Radiological outcomes comprised hip-knee-ankle angle, LDFA, MPTA, JLCA, and OA progression. Pre- and postoperative CPAK phenotypes were classified using arithmetic hip-knee-ankle angle and joint line obliquity.

Results: Preoperatively, CPAK1 (varus, distal apex) predominated (72%); postoperatively, CPAK9 (valgus, proximal apex) was most common (67%). CPAK phenotypes showed no significant impact on clinical outcomes. However, LDFA <90° correlated with lower return to sports rates (p=0.029), MPTA ≤95° with better ROM (p<0.05), and JLCA >2° with worse OKS, KSS, ROM, and increased OA progression (p<0.001).

Conclusions: Achieving a postoperative JLCA ≤2° is crucial for optimising clinical outcomes and minimising OA progression in MOWHTO. Although CPAK classification aids surgical planning, it did not directly influence outcomes; precise JLCA correction is important.

FP4.8

Coronal plane alignment of the knee changes in functionally aligned versus mechanically aligned total knee arthroplasty

Chun Ho Lau, Jerone Chiu, Michelle Hilda Luk, Ka Chun Leung, Ping Keung Chan, Chun Man Lawrence Lau, Henry Fu
Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP4.9

Functional versus mechanical alignment in total knee arthroplasty: a prospective double-blinded superiority randomised controlled trial

Thomas Ka Chun Leung[1], Wing Ki Cheung[2], Lawrence Chun Man Lau[2] Michelle Hilda Luk[1], Amy Cheung[1], Ping Keung Chan[2], Kwong Yuen Chiu[2], Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP4.10

Coronal plane alignment changes do not affect in vivo kinematics for robotically performed total knee arthroplasty

Cham Kit Wong[1], Michael LaCour[2], Richard Komistek[2], Rex Wang Fung Mak[3], Jonathan Patrick Ng[1], Gloria Yan Ting Lam[3], Tsz Lung Choi[3], Michael Tim Yun Ong[4], Patrick Shu Hang Yung[4]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Mechanical, Aerospace, and Biomedical Engineering, Centre for Musculoskeletal Research, University of Tennessee
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[4]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.11

Applicability of coronal plane alignment of the knee classification in total knee arthroplasty

Chi Kin Lo
Department of Orthopaedics and Traumatology, Yan Chai Hospital

Introduction: The coronal plane alignment of the knee (CPAK) classification provides a simple quantification of the coronal lower limb alignment to guide bone cut in total knee replacement. The classification is based on simple measure obtained from standing X-ray of the lower limbs. The aim of the study is to assess the applicability of CPAK in patients with arthritis requiring total knee replacement in Hong Kong.

Methods: In total, 50 consecutive patients requiring total knee replacement in Yan Chai Hospital Joint replacement Centre were recruited. All patients had standing X-ray of the lower limbs taken before total knee replacement, and their CPAK type determined.

Results: Up to 10% of the patient could not have their CPAK type accurately determined based on the standing X-ray of the lower limbs due to the presence of bone loss and problem of X-ray projection.

Conclusion: CPAK classification might not be easily obtained in patient with advanced osteoarthritis of the knee in the Hong Kong population.

FP4.12

Effect of coronal plane alignment phenotypes on postoperative outcomes following total knee arthroplasty: Hong Kong experience

Alex Yuning Zhang[1], Eun Been Chong[2], Wei Wang[3], Union Heyi Hsieh[1], Kwong Yuen Chiu[2], Chun Man Lawrence Lau[2], Amy Cheung[4], Henry Fu[2], Ping Keung Chan[2], Chunyi Wen[1]
[1]Department of Biomedical Engineering, The Hong Kong Polytechnic University
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Department of Biomedical Engineering, The University of Hong Kong
[4]Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: This study aimed to evaluate the impact of coronal plane alignment of the knee (CPAK) classifications on patient-reported outcome measures (PROMs) following total knee arthroplasty (TKA). Although CPAK has been studied in Asian populations, its influence on PROMs using functional alignment remains underexplored.

Methods: A retrospective study was performed on 138 knees in 122 patients who underwent robotic-assisted TKA with functional alignment between January 2019 and June 2024. Radiological assessments included the arithmetic hip-knee-ankle angle and joint line obliquity (JLO), categorised into nine CPAK phenotypes. The two components of Knee Society Score 2011 were obtained and the Knee Society Functional Assessment (KSFA) constitutes as a PROMs. Multivariable regression identified factors influencing outcomes, with significance set at $p<0.05$.

Results: Multivariable regression analysis identified higher body mass index (odds ratio [OR]=1.545, p=0.050) and apex proximal JLO (OR=3.972, p=0.049) as factors associated with lower postoperative KSFA scores. Preoperatively, CPAK type I was the most common phenotype (54.4%), whereas postoperatively, CPAK type V (neutral alignment) predominated (33.7%), indicating a significant shift toward neutral alignment. Patients achieving CPAK type V demonstrated greater improvements in KSFA scores (mean difference=29.8±20.1, p=0.0246).

Conclusion: This study suggests that achieving post-op CPAK type V alignment may be associated with improved functional outcomes. Avoiding high postoperative JLO is critical in optimising PROMs. Although alignment improvements post-TKA are evident, further investigation into the intraoperative phase is recommended to refine these findings.

FP4.13

Outcome of restricted kinematic alignment technique versus mechanical alignment technique using computer navigation in total knee replacement: a retrospective cohort study

Ghi Ying Jaimie Chan, Chun Wai Cheng, Wan Yan Warren Cheung, Tsang Tung Chan, Kenneth Cheuk Kee Ng, Kam Keung Lai, Chun Yiu Leung, Justin Hoi Lui Wong
Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital

FP4.14

Preliminary results of an image-free saw-based robotic knee replacement platform

Amy Cheung[1], Ka Chun Thomas Leung[1], Chun Man Lawerence Lau[2], Michelle Hilda Luk[1], Ping Keung Chan[2], Henry Fu[2], Kwong Yuen Chiu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Robotic assisted total knee replacement has become part of the day-to-day armamentarium of the modern arthroplasty surgeon. Robotic platforms vary in terms of whether preoperative Imaging such as computed tomography are required and also varies in terms of the type of effector utilised (eg, saw or burr). This study examined the single largest cohort in Hong Kong of robotic-assisted TKRs using an image-free system utilising a semi-active saw.

Methods: This is a retrospective study examining the clinical and radiological outcomes of 139 TKRs that were performed using the VELYS™ Robotic-Assisted Solution (DePuy Synthes) platform and Attune TKR system with a minimum of 6 months of follow-up (mean, 12.9 months; range, 6-18.9 months).

Results: In total, 35 TKRs used cementless and 104 used cemented components. The mean patient age at operation was 73.2 years. Statistically significant improvements in Knee Society Knee and Functional Assessment Scores were noted at 6 weeks, 3 months, and 6 months post-operation. There was one re-operation for peri-prosthetic fracture of the femur at the level of femoral pin sites requiring open reduction and internal fixation. 92% of knees achieved hip-knee-ankle angle alignment within 3°of the target intra-operative alignment target. No evidence of loosening or wear was noted at latest follow-up.

Conclusion: Excellent short-term clinical and radiological results were achieved for TKRs performed using an image-free, saw-based robotic-assisted arthroplasty platform. This is the first study based in Hong Kong examining the results of this robotic system.

FP4.15

Inter- and intra-rater reliability of pre-resection ligament tension assessment using a digital tensioner in imageless robotic–assisted total knee replacement

Joshua Sze Jun Chung[1], Xin Yang[1], Lingqing Xiao[1], Rex Wang Fung Mak[2], Jonathan Patrick Ng[2], Cham Kit Wong[2], Gloria Yan Ting Lam[3], Tsz Lung Choi[3], Michael Tim Yun Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Ligament tension balance is essential for successful total knee arthroplasty (TKA) and long-term implant survival. Conventional manual tensioning methods are subjective and vary with surgeon experience. This study evaluated the inter- and intra-rater reliability of pre-resection ligament tension assessments using an imageless robotic-assisted TKA system.

Methods: In this prospective study, 24 patients (30 knees) with end-stage knee osteoarthritis underwent robotic-assisted TKA. Three specialist and three trainee surgeons each performed three repeated varus and valgus stress assessments across flexion and extension. Each medial and lateral gap measurements were recorded. Intraclass correlation coefficients (ICCs) were calculated with a two-way mixed-effects and two-way random-effects model.

Results: Both specialists and trainees demonstrated excellent intra- and inter-rater reliability (ICC >0.90) for medial and lateral gaps in extension and medial gap in flexion. Flexion lateral reliability was good-to-excellent for trainees (ICC=0.873, 95% confidence interval [CI]=0.784-0.933) and moderate-to-excellent for specialists (ICC=0.838, 95% CI=0.729-0.913).

Conclusion: Pre-resection ligament tension assessment with an imageless robotic system yields high inter- and intra-rater reliability, reducing variability linked to surgeon experience. Although reliability was slightly lower in the flexion lateral compartment, likely due to biomechanical complexity, these findings suggest that the system significantly improves the predictability and consistency of soft tissue balancing in TKA. Digital tensioners may standardise soft-tissue balancing in TKA, potentially improving surgical outcomes and reproducibility.

FP4.16

Management for peri-prosthetic hip infections: survivorship and infection recurrence after debridement, antibiotics, and implant retention 1-stage, 1.5-stage, and 2-stage revisions

Michelle Hilda Luk[1], Ka Chun Thomas Leung[1], Chun Man Lawrence Lau[2], Amy Cheung[1], Ping Keung Chan[2], Kwong Yuen Chiu[2], Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP4.17

The ENDOspacer technique in 1.5-stage and 2-stage revisions for peri-prosthetic hip infections

Michelle Hilda Luk[1], Ka Chun Thomas Leung[1], Chun Man Lawrence Lau[2], Amy Cheung[1], Ping Keung Chan[2], Kwong Yuen Chiu[2], Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP4.18

Whole body vibration therapy in prehabilitation to enhance physical performance and subjective outcome during total knee replacement journey: a randomised controlled trial

Agnes King Yan Lam[1], Raymond Tsen Koo Cheung[1], Connie Yuk Ling To[1], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2]
[1]Department of Physiotherapy, North District Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP4.19

Enhanced thermal safety in arthroplasty: quantitative assessment of WEREWOLF FASTSEAL 6.0 for total joint replacement procedures

Joshua Sze Jun Chung[1], Mingde Cao[1], Rex Wang Fung Mak[2], Cham Kit Wong[2], Jonathan Patrick Ng[2], Gloria Yan Ting Lam[3], Tsz Lung Choi[3], Michael Tim Yun Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Achieving effective haemostasis in total joint replacement (TJR) without tourniquets is challenging, as conventional electrocautery devices risk thermal injury to critical periarticular structures. The WEREWOLF FASTSEAL 6.0 Hemostasis Wand combines radiofrequency energy with continuous saline irrigation. This study quantitatively compared thermal spread and tissue injury of WEREWOLF FASTSEAL 6.0 with conventional monopolar and bipolar diathermy.

Methods: A prospective ex vivo study was conducted using standardised porcine muscle blocks. Four groups were tested: WEREWOLF FASTSEAL 6.0 with and without 4°C saline (power 170, Flow 3), monopolar diathermy (40 W), and bipolar diathermy (40 W). Applications were performed for 1 and 3 seconds. Real-time temperature monitoring, gross tissue assessment, and histological analysis with haematoxylin and eosin staining were performed. Thermal damage depth was measured by a blinded assessor, each condition repeated three times.

Results: WEREWOLF FASTSEAL 6.0 achieved similar coagulation in 1 second to monopolar diathermy in 3 seconds, with no significant carbonisation. Using 4°C saline irrigation, WEREWOLF FASTSEAL 6.0 produced peak surface temperature of 53.3±1.7°C, which returned to below 42°C within 4 seconds. Temperature profiles were comparable across devices (area under the curve, $p>0.05$). Histological analysis revealed significantly shallower thermal injury with WEREWOLF FASTSEAL 6.0 with saline (3.4±0.6 mm) compared to bipolar diathermy (10.3±2.1 mm, $p=0.02$) and monopolar diathermy (11.0±3.6 mm, $p=0.01$).

Conclusion: WEREWOLF FASTSEAL 6.0 demonstrated superior thermal safety compared to conventional diathermy methods. Its use during TJR may minimise thermal damage to deep soft tissues before prosthesis implantation and tourniquet release.

FP4.20

A pragmatic and economical approach to achieving 'greener' knee arthroplasty

Amy Cheung[1], Wing Hang Prudence Cheung[2], Chun Man Lawrence Lau[2], Ka Chun Thomas Leung[1], Michelle Hilda Luk[1], Ping Keung Chan[2], Kwong Yuen Chiu[2], Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP4.21

Open platform image-based robotic system in total hip and total knee arthroplasties

Wang Fung Rex Mak[1], Michael Tim Yun Ong[2], Gloria Yan Ting Lam[3], Tsz Lung Choi[3], Chuan He[4], Wei Chai[5], Zongke Zhou[6], Yuan Zhang[7], Jiying Chen[8], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[4]Ruijin Hospital, Shanghai Jiao Tong University School of Medicine
[5]Fourth Medical Centre of PLA General Hospital
[6]West China Hospital, Orthopedic Research Institute, Sichuan University
[7]Xinqiao Hospital, Army Medical University
[8]The First Medical Centre, Chinese PLA General Hospital

Introduction: Robotic-assisted total hip and knee arthroplasties improve radiological accuracy and facilitate earlier recovery. We evaluate the surgical accuracy of an open-platform CT-based robotic system in total hip and total knee arthroplasties.

Methods: Patients who underwent open-platform robotic total hip or knee arthroplasties were retrospectively examined. Pre- and post-operative radiographical measurements were compared. Interobserver reliability between measurements by two independent investigators was determined. For the hip, radiological outliers were defined as those outside of the 'safe zones' of Callanan and Lewinnek, whereas for the knee, outliers were defined as >3° from planning.

Results: A total of 15 robotic-assisted THAs and 114 robotic-assisted TKAs (using four different implants) were included in the analysis. For THAs, intra-operative cup position showed significant difference in anteversion (1.82°±2.65°, p=0.029), leg length discrepancy (4.31±4.38 mm, p=0.004), and global offset (-4.84±5.15 mm, p=0.005), but not acetabular inclination. Postoperative computed tomography showed significant difference in acetabular inclination (2.33°±4.13°, p=0.05) only, but not the other three parameters (p>0.05). The percentage of cups within both Callanan and Lewinnek safe zones were 84.62% (11/13). Interobserver reliability analysis was good to excellent for all parameters. For TKAs, there were significant differences between planned and postoperative measurements for hip-knee-ankle angle (1.32°, p<0.001), femoral component coronal angle (-0.55°, p<0.001), and posterior tibial slope (-0.42°, p=0.018). Tibial component coronal angle showed no significant change (+0.19°, p=0.097), which were all below the threshold of 3°. Interobserver reliability demonstrated good to excellent agreement.

Conclusion: Open-platform image-based robotic system showed excellent radiological alignment in total hip and total knee arthroplasties.

Free Paper Session V: Sports Medicine I

FP5.1

Margin convergence is effective in improving symptoms in patients with large-to-massive rotator cuff tear, despite a high chance of full-thickness retear

Wai Pan Yau
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: The aim is to report the 5-year outcomes of patients who underwent repair for large-to-massive rotator cuff tears.

Methods: A retrospective study was conducted for patients who received primary rotator cuff repair with a minimum follow-up of 5 years. Postoperative magnetic resonance Imaging (MRI) was performed at the 2nd year post-operation. Clinical outcomes, including visual analogue scale (VAS), American Shoulder and Elbow Surgeons score (ASES), and shoulder forward flexion (FF) were compared between patients who received a direct complete repair (DCR) and those treated by a margin convergence (MC).

Results: Fifty-three patients, including 33 in the DCR group and 20 in the MC group, were included. Despite a higher chance of full-thickness retears in the MC (82%), compared to DCR (23%), there were no significant differences between the two repair techniques in terms of mean VAS, ASES, and FF at both 2-year and 5-year follow-ups. Patients who received DCR showed improvement in VAS ($p<0.001$), ASES ($p=0.002$), and FF ($p=0.049$) between the 2-year and 5-year follow-ups, which was not observed in the MC group. A higher proportion of patients in the DCR group (90%), compared to the MC group (59%), achieved the minimum clinically important difference in VAS at the 5-year follow-up ($p=0.01$).

Conclusion: MC is an effective technique for improving clinical outcomes in patients with large-to-massive rotator cuff tears, despite a high full-thickness retear rate on postoperative MRI. However, unlike those treated with DCR, further improvement in clinical outcomes between the 2-year and 5-year follow-ups was not observed in the MC group.

FP5.2

Prevalence of meniscal tears in anterior cruciate ligament–deficient knees: a prospective epidemiological study of 731 cases

Sandra Wan, WP Yau
Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Delay in anterior cruciate ligament reconstruction (ACLR) is associated with increased risks of meniscal tears and premature osteoarthritis. However, controversy exists regarding the definition of delayed ACLR, which ranges from 3 weeks to 24 months. This study aims to determine a cut-off period for delayed ACLR that is associated with a significant increase in the risk of meniscal tears.

Methods: This prospective single-centre epidemiological study investigated the prevalence of meniscal tears at the time of primary ACLR between 2017 and 2021. Patients with multi-ligamentous injuries or those who were skeletally immature were excluded. Receiver operating characteristic curve analysis was performed to determine the cut-off period between injury and ACLR (in days) that was associated with a significant increase in the risk of meniscal tears.

Results: Among 731 patients (83% male), the mean age was 28±8 years. The mean period between injury and ACLR was 539±988 days. Meniscal tears were present in 70% of knees. Receiver operating characteristic curve analysis showed that the cut-off period of 376 days best predicted the presence of meniscal tears (odds ratio=2.51, 95% confidence interval=1.72-3.67, $p<0.001$). Medial meniscal tears were associated with surgical delay alone, whereas lateral meniscal tears were associated with male sex alone ($p=0.005$).

Conclusion: A delay of 12 months in ACLR is associated with a 2.5-fold increase in the risk of developing meniscal tears.

FP5.3

Timing of anterior cruciate ligament reconstruction to prevent meniscal tears: a systematic review and meta-analysis

Sandra Wan, Rufina Ali, W P Yau
Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Considerable variability exists for the definitions of both early and delayed primary anterior cruciate ligament reconstruction (ACLR), with no consensus on when to perform ACLR to minimise meniscal tears. This systematic review aims to identify the optimal timepoint that is associated with a significant increase in meniscal tears found at the time of ACLR.

Methods: Two independent researchers searched Embase, Cochrane Library, MEDLINE, PubMed, and Web of Science for clinical studies reporting the rates of meniscal tears found at the time of primary ACLR. Studies on revision ACLR and multi-ligamentous injury were excluded. Meta-regression was performed to identify the optimal timepoint, and meta-analysis was performed to compare the rates of meniscal tears with respect to the timepoint. Risk of bias was assessed using ROBINS-I.

Results: Forty studies with 104425 knees were included. Twenty-two studies including 16768 knees showed that ACLR performed >12 months was the best predictor of medial and lateral meniscal tears ($p<0.001$). After 12 months, the rates of medial meniscal tears increased significantly (odds ratio=3.09, 95% confidence interval=2.36-4.05, $I^2=91\%$). Overall risk of bias was low.

Conclusion: To prevent meniscal tears, ACLR should be performed <12 months after injury. A limitation of this systematic review was the high heterogeneity of patient characteristics and outcomes. Future studies should assess meniscal tear patterns that contribute to the increase in meniscal tears over time.

FP5.4

Predictors for graft rupture after anterior cruciate ligament reconstruction: a study of 731 cases with a mean follow-up of 5.5 years

Wai Pan Yau
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: This study aims to determine the predictors for postoperative graft rupture after primary anterior cruciate ligament reconstruction (ACLR).

Methods: Pre-, intra-, and postoperative data of patients who underwent primary ACLR between 2007 and 2021 were collected prospectively and retrospectively using a standard form. The posterior tibial slope, medial proximal tibial angle, and the position of the tibial tunnel were measured using knee radiographs. The graft bending angle (GBA) and the size of the intercondylar notch were measured using computed tomography. The primary outcome was graft rupture diagnosed by magnetic resonance imaging or repeat arthroscopy. Multiple linear regression with a stepwise algorithm was performed to identify predictors for graft rupture after ACLR.

Results: The mean age of 606 male and 125 female patients was 28±8 years. The mean follow-up duration was 66±52 months. In total, 59 (8%) graft ruptures occurred at a mean of 55±44 months. The predictors for graft rupture, in decreasing importance, were time elapsed since ACLR ($p<0.001$), femoral GBA in the sagittal plane ($p<0.001$), age ($p=0.001$), International Knee Documentation Committee activity level at final follow-up ($p=0.09$), and posterior tibial slope ($p=0.01$).

Conclusion: The only modifiable surgical factor that may help reduce graft rupture after ACLR is the femoral GBA in the sagittal plane.

FP5.5

Epidemiology of tendinopathy and non-traumatic tendon rupture in Hong Kong: a comprehensive population-based analysis of incidence rates

Kenney Ki Lee Lau[1], Jonathan Patrick Ng[2], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3], Pauline Po Yee Lui[3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
Samuel Ka Kin Ling3,
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: This study sought to determine the incidence rates of tendinopathies and non-traumatic tendon ruptures in Hong Kong.

Methods: We used a retrospective cohort analysis based on population data collected from the Clinical Data Analysis and Reporting System. Patients admitted between 2000 and 2024 were identified through the International Classification of Diseases, Ninth Revision, Clinical Modification. The results include age-and sex-standardised incidence rates and odds ratios (OR) for tendon ruptures, both with and without a history of tendinopathy.

Results: Our research included 36 970 patients from 43 public hospitals. We found that tendinopathy had the highest incidence in the elbow (8.84±3.31 per 100 000 individuals), whereas non-traumatic tendon ruptures were most reported in the shoulder (1.90±0.87 per 100 000 individuals). Older adults demonstrated elevated rates for most tendinopathies and tendon ruptures, except for patellar tendinopathy, which was more prevalent among younger individuals. Females showed higher rates for rotator cuff, biceps, lateral epicondylitis, as well as tibialis and peroneal tendinopathies, whereas males had increased rates of patellar tendinopathy and various tendon ruptures. Furthermore, individuals without previous tendinopathy had a higher risk of rupture at shoulder (OR=1.484), hand and wrist (OR=27.154), knee (OR=17.742), and foot and ankle (OR=25.562) [all $p<0.001$].

Conclusion: We presented the total age- and sex-adjusted incidence of tendinopathies and non-traumatic tendon ruptures, along with the increased risk of tendon rupture in individuals without prior tendinopathy.

FP5.6

Pulsed electromagnetic field therapy for patients with mild to moderate knee osteoarthritis: a double-blind, randomised, placebo-controlled trial

Joseph Huai Yu Li[1], Kenney Ki Lee Lau[1], Abbey Ssu Chi Chen[1], Christine Hoi Yan Fu[1], Jonathan Patrick Ng[2], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3], Pauline Po Yee Lui[3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Current treatments for knee osteoarthritis (OA) offer limited benefits. Patients often experience muscle weakness, which affects their ability to exercise and disease progression. Pulsed electromagnetic field (PEMF) therapy may enhance muscle and cartilage growth, but its effects on strength, cartilage, and overall function remain unclear. This randomised controlled trial evaluated the impacts of PEMF therapy on muscle power, mass, cartilage thickness, physical function, and patient outcomes in mild to moderate knee OA.

Methods: Sixty patients aged ≥50 years with refractory knee OA were randomised to receive PEMF or sham treatment (30 minutes, 3 times/week for 8 weeks). Outcome measures, comprising muscle strength, lean muscle mass, cartilage thickness, mobility, and patient-reported outcomes, were evaluated at baseline, immediately after the intervention, and at 6- and 12-month post-intervention.

Results: PEMF therapy significantly increased knee extension strength at 6 months post-intervention (p=0.042), with a 72% increase, compared to 25% in the sham group (p=0.003). Knee flexor strength also increased by 72% for PEMF, compared with 24% for sham treatment (p=0.022). No differences were found between groups in terms of muscle mass, cartilage thickness, walking ability, chair stand repetitions, or Western Ontario and McMaster Universities Arthritis Index scores.

Conclusion: PEMF therapy significantly enhanced knee extensor strength at 6 months in patients with refractory OA, potentially improving muscle weakness. However, no improvements were observed in other structural or functional outcomes.

FP5.7

Comparative efficacy of surgical interventions for irreparable massive rotator cuff tears in the elderly: a systematic review

Chak Yan Calvin Cheng, Yui Hei Travis Chan, Timothy Keith Hung, Tak Man Wong
Department of Orthopaedics and Traumatology, The University of Hong Kong

FP5.8

Comparative outcomes of all-inside versus traditional anterior cruciate ligament reconstruction: a minimum 4-year matched cohort review

Sammi Wai Sum Wong, Keith Hay-Man Wan, Eugene Pak-Lin Ng, Christine Yuen-Shan Lai, Richard Hin-Lun Lee, Kevin Kwun-Hung Wong
Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Introduction: Anterior cruciate ligament reconstruction (ACLR) is a widely performed procedure for restoring knee stability following ACL injury. The all-inside technique has gained popularity due to its minimally invasive approach, bone-preserving nature and potential for reduced postoperative morbidity. This study aims to compare the long-term clinical outcomes of all-inside ACLR with the traditional full tibial tunnel technique.

Methods: A retrospective review was conducted on 48 patients who underwent ACLR between January 2019 and June 2021, with a minimum follow-up of 4 years. Patients were divided into two groups: all-inside ACLR (n=24) and traditional ACLR (n=24), matched for age, sex, and activity level. Clinical outcomes were assessed using the Knee injury and Osteoarthritis Outcome Score (KOOS) and Lysholm score. Complications, including graft rupture and infection, were also recorded. Statistical analysis was performed using independent t tests, with significance set at $p<0.05$.

Results: KOOS scores between groups were comparable across all domains: symptoms, pain, activities of daily living, sports, and quality of life. The Lysholm score was significantly higher in the all-inside group ($p<0.05$). One graft rupture occurred in each group, with no reported infections.

Conclusion: All-inside ACL reconstruction provides comparable long-term outcomes to the traditional technique, with a statistically significant advantage in Lysholm scores. The complication rates were low and similar between groups. These findings support the all-inside technique as a safe and effective alternative for ACL reconstruction.

FP5.9

Is patient-specific instrumentation worth the effort in reverse shoulder arthroplasty?

Huk Yin Edwin Cheng[1], Ka Ho Jerrick Lee[1], Geoffrey Tao Ho[1], Wai Wang Chau[1], Cham Kit Wong[2], Wang Fung Mak[3], Michael Tim Yun Ong[1], Jonathan Patrick Ng[2], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Purpose: Technological advancements in orthopaedics surgery, including patient-specific surgical instrumentations (PSI), has enabled accurate and precise surgery. This is especially true for cases with difficult anatomy. However, this comes at the expense of increased cost and reduced efficiency. This study aims to compare the clinical and radiological outcomes of utilising PSI versus standard surgical instruments in reverse shoulder arthroplasty (RSA).

Method: A single-centre, retrospective review of patients who underwent RSA between 2022 and 2025 was conducted. Among 42 patients reviewed, PSI was used in 29 patients and not used in 13 patients. Duration of operation, RSA angle, preoperative and postoperative pain, and functional outcomes, including visual analogue scale (VAS), Constant and ASES scores, and subjective shoulder value were recorded. Analysis of outcomes between RSA with and without PSI utilisation was performed.

Results: The RSA angle was -0.66°±6.15° for PSI group and 7.75°±13.03° for standard group ($p=0.042$). Positive RSA angle indicates superior tilt, whereas negative denotes inferior tilt. PSI significantly reduced the amount of RSA angle outliers compared with standard instrumentation (24.14% vs 69.23%, $p<0.05$). PSI also improve surgical efficiency with significantly shorter operation duration (134.34±36.47 vs 236.08±56.76 minutes, $p<0.001$). Postoperative outcome scores with and without PSI both showed significant improvement ($p<0.001$).

Conclusion: PSI in RSA results in more consistent RSA angle, less superior tilted glenospheres, and comparable outcome scores postoperatively. It also improves surgical efficiency compared with standard instrumentation. Therefore, PSI in RSA offers improved accuracy without compromising surgical efficiency.

FP5.10

Outcome of arthroscopic rotator cuff repair in patients with massive rotator cuff tears complicated with pseudoparalysis

Brian Siu[1], Tak Man Wong[2], Kevin Fok[1]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Pseudoparalysis is a condition that results from massive rotator cuff tears (RCT). It is defined by an inability to actively forward flex or abduct shoulder greater than 90°, while having a relatively preserved passive range of movement. Massive rotator cuff tear is defined as >5 cm cuff tear or >2 tendons involvement. Treatment options for massive RCT with pseudoparalysis include arthroscopic rotator cuff repair (ARCR), reverse total shoulder arthroplasty (RSA), superior capsule reconstruction, tendon transfer, and non-operative treatment. Pseudoparalysis is an important determining factor about the repairability of massive RCTs. Other time-dependent considerations concerning the repairability include fatty atrophy of tendon, significant tendon retraction, and muscle atrophy. Timely arthroscopic rotator cuff repair can effectively reverse pseudoparalysis in most cases of massive RCTs.

Methods: This retrospective study evaluated 192 patients with cuff injuries treated in Queen Mary Hospital between 2016 and 2021. Pseudoparalysis is defined by active forward flexion <90° or active abduction <90°. Their clinical notes, magnetic resonance Imaging, and operative records were reviewed.

Results: In total, 17 patients had reversal of pseudoparalysis following surgery. The mean time to operation was 23 weeks. The mean forward flexion improved from 55.5°to 119.0° postoperatively; 57% of all full thickness tears had significant retraction (Patte II or III).

Conclusion: Timely arthroscopic rotator cuff repair can be an effective treatment option in reversing pseudoparalysis in patients with repairable massive rotator cuff tears.

FP5.11

Comparative effectiveness of surgical versus conservative treatments for rotator cuff tears: a meta-analysis of pain and functional outcomes

Zihong Lin[1], Dennis Cham Kit Wong[1], Rex Wang Fung Mak[1], Jonathan Patrick Ng[1], Michael Tim Yun Ong[2], Kin On Kwok[1], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP5.13

How accurate is Blueprint software in predicting range of motion after reverse shoulder arthroplasty?

Geoffrey Tao Ho[1], Huk Yin Edwin Cheng[1], Ka Ho Jerrick Lee[1], Wai Wang Chau[1], Cham Kit Wong[2], Wang Fung Mak[3], Michael Tim Yun Ong[1], Jonathan Patrick Ng[2], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Obtaining functional range of motion (ROM) correlates with better patient satisfaction in reverse shoulder arthroplasty (RSA). Therefore, the ability to preoperatively adjust implant position and configuration to maximise the impingement-free ROM is a revolutionising technology. Blueprint software is an example of such technology that is widely available. However, accuracy of the software in predicting postoperative ROM is poorly documented. This study aims to assess the ability of the Blueprint software to predict postoperative ROM. We hypothesised that Blueprint will not accurately predict the actual ROM, but may show correlations with postoperative ROM.

Methods: 24 patients who underwent preoperative planning with Blueprint prior to RSA from February 2024 to December 2025 were recruited. The predicted ROM for forward flexion, abduction, and external rotation were recorded using Blueprint. Postoperative ROM was measured at 6 weeks, 3 months, 6 months, 1 year, and 1.5 years. Blueprint-predicted and actual ROM were compared. Age, initial diagnosis, scapulothoracic orientation, and presence of intraoperative subscapularis repair were also analysed.

Results: Postoperative forward flexion, abduction, and external rotation ROM were found to be statistically significant different compared with Blueprint predicted values ($p<0.001$). Weak correlation was found between predicted and final ROM for forward flexion. Weak correlation was found between scapulothoracic orientation and Blueprint-predicted ROM for forward flexion ($r= -0.59$) and abduction ($r= -0.50$), which was not found in patient diagnosis or presence of subscapularis repair ($p>0.2$).

Conclusion: Currently, preoperative planning using Blueprint 3D computed tomographic software is unable to accurately predict ROM up to 1.5 years post-RSA.

FP5.14

Fluoroscopic analysis of scapulothoracic motion after reverse shoulder arthroplasty

Jonathan Patrick Ng[1], Ka Ho Jerrick Lee[2], Huk Yin Edwin Cheng[2], Geoffrey Tao Ho[2], Wai Wang Chau[2], Cham Kit Wong[1], Wang Fung Mak[3], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Modern planning software have a functionality to predict impingement-free range of motion (ROM). This has allowed for personalised surgery to optimise the postoperative ROM based on the pre-planned combination of implant position and configuration. However, these software have been showed to be inaccurate as they do not take into account scapulothoracic (ST) motion. The objective of the study is to investigate the contribution of ST motion to the overall ROM following reverse shoulder arthroplasty (RSA).

Methods: Patient with more than 1 year post RSA were recruited for fluoroscopic analysis. Active and passive abduction in scapular plane were performed. They were categorised into high (abduction ≥100°) and low (<100°) performers. Demographics, American Shoulder and Elbow Surgeons (ASES) score, and subjective should value were recorded. Active and passive abduction in scapular plane were performed. The angle at which the glenohumeral joint motion has maximised, and the scapula started rotating was recorded. This was subtracted from the total abduction achieved to determine the contribution of ST motion in the overall ROM after RSA.

Results: Of 32 patients recruited, 25 were high performers and seven were low performers. There were no significant differences in the baseline demographics. ST motion began at lower ROM 45°±3.7° vs 80°±5.7° for high performers, indicating a higher contribution of ST motion in overall ROM in high performers. This also translated to significantly higher subjective should value and American Shoulder and Elbow Surgeons scores.

Conclusion: Patients with higher postoperative abduction ROM had more ST motion at earlier phase of abduction, and this translated to superior clinical functional outcomes.

FP5.15

Knee biomechanics during single-leg squat at 4 months predicts 1-year functional outcomes after anterior cruciate ligament reconstruction

Wang Fung Rex Mak[1], Aide Tian Yi Zang[2], Roy Tsz Hei Cheung[3], Ransi SS Subasinghe Arachchige[3], Cham Kit Wong[1], Jonathan Patrick Ng[1], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Human Movement Laboratory, School of Health Sciences, Western Sydney University

Introduction: The identification of early biomechanical markers following anterior cruciate ligament (ACL) reconstruction may enhance rehabilitation by enabling targeted interventions. This prospective study examined whether knee biomechanics during a single-leg squat (SLS) at 4 months post-surgery predict 12-month functional outcomes.

Methods: Forty-seven participants underwent biomechanical analysis of a SLS at 4 months post-ACL reconstruction, from which knee kinematics and kinetics were computed. Functional outcomes were evaluated at 12 months post-operation using the International Knee Documentation Committee (IKDC) questionnaire. Multiple linear regression models assessed biomechanical parameters as predictors of 12-month IKDC scores.

Results: Peak knee flexion angle during the SLS at 4 months independently predicted IKDC scores at 12 months (β=0.818, p=0.050). Trends were observed for peak knee flexion moment (β=-0.761, p=0.099) and isokinetic quadriceps strength at 60 degrees/ second (β=0.714, p=0.091), though these did not reach statistical significance.

Conclusion: These preliminary findings suggest that SLS biomechanics at 4 months post-ACL reconstruction may have prognostic value for 1-year functional recovery. However, the modest sample size necessitates cautious interpretation, and ongoing data collection will strengthen these observations.

FP5.16

Impact of wedged baseplates on reverse shoulder arthroplasty outcomes: a radiographic and clinical analysis

Ka Ho Jerrick Lee[1], Huk Yin Edwin Cheng[1], Geoffrey Tao Ho[1], Wai Wang Chau[1], Cham Kit Wong[2], Wang Fung Mak[3], Michael Tim Yun Ong[1], Jonathan Patrick Ng[2], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Reverse shoulder arthroplasty (RSA) relies on optimal implant positioning to maximize function, with superior tilt (RSA angle) being linked to biomechanical inefficiency and compromised outcomes. Incorporation of a wedged baseplate is theorised to improve clinical outcomes via enhancing lateralisation and reduction of the RSA angle. This study evaluates whether wedged baseplates improve postoperative range of motion (PROM) and radiographic alignment compared to non-wedged implants.

Methods: A single-centre retrospective review of 42 RSA patients (mean age, 71.7 years; 13 wedged, 29 non-wedged) was conducted. Postoperative radiographs assessed lateralisation, distalisation, and RSA angle. Clinical outcomes included PROM (forward flexion, abduction, external rotation, internal rotation), patient-reported scores, and postoperative complications.

Results: The wedged group demonstrated superior postoperative external rotation ROM (37.69°±19.00° vs 19.11°±19.96°, $p<0.05$) and a more neutral RSA angle distribution (-2.92°±7.57° vs 4.00°±9.45°, $p<0.05$) in addition to enhanced lateralisation (5.30°±1.37° vs 2.05°±5.6°, $p<0.05$). No significant differences were noted in all other clinical or radiographic metrics.

Conclusion: Wedged baseplates significantly improve external rotation ROM, optimise RSA angle, and enhance lateralisation without compromising other ROM parameters or clinical outcomes. The enhanced lateralisation in addition to correction of superior tilt suggests a biomechanical benefit with real-world translations, supporting the beneficial use of wedged baseplates in improving RSA outcomes.

Free Paper Session VI: Basic Science

FP6.1

Cascade targeting selenium nanoparticles-loaded hydrogel microspheres for multifaceted antioxidant defence in osteoarthritis

Yiting Lei[1], Alan Li[2], Rocky Tuan[1], Wei Huang[2]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics, The First Affiliated Hospital of Chongqing Medical University

FP6.2

Sensory neuron activation by brain-derived nerve growth factor harnesses stem cells to promote bone regeneration after traumatic brain injury

Zheyu Jin, Zhengming Shan, Zhenkang Wen, Ling Qin, Jiankun Xu
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP6.3

Sexual dimorphism in treatment response to low-dose semaglutide for osteoarthritis

Mingde Cao[1], Xueyou Zhang[1], Run Huang[2], Kevin Jin[2], Patrick Shu Hang Yung[1], Michael Tim-yun Ong[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park

Introduction: Recent clinical trials have demonstrated the efficacy of semaglutide in reducing pain and improving function in individuals with obesity-related knee osteoarthritis (OA). However, the mechanisms underlying the effect of semaglutide and its effect in non-obese individuals remain unexplored.

Methods: Female and male 10-week-old C57BL/6 mice (n=9/group) underwent either sham or destabilisation of the medial meniscus (DMM) surgery. In the intervention group, glucagon-like peptide-1 treatment (subcutaneous, 100 ng/g/week) began 1 week after DMM surgery. Behavioural assessments, including von Frey, open field, and catwalk analyses, were conducted weekly. Micro-computed tomography was used to examine bony changes, whereas haematoxylin and eosin and Safranin O/Fast Green staining were used to assess structural changes 7 weeks after the intervention.

Results: Weekly low-dose semaglutide injections did not alter body weight/composition but significantly attenuated cartilage degeneration in male DMM mice. Semaglutide markedly alleviated gait abnormalities and pain hypersensitivity, with more pronounced effects observed in male mice. Additionally, low-dose semaglutide reduced osteophyte formation in male mice but had no significant effect on subchondral bone sclerosis in either sex.

Conclusion: Low-dose semaglutide exhibits sex-specific therapeutic effects in OA. Furthermore, semaglutide significantly alleviates OA-related pain without notable impacts on body weight or composition, suggesting that its intra-articular actions may play a key role. Future studies should aim to elucidate the non-metabolic benefits of semaglutide for OA-related pain and the underlying mechanisms of its sex-specific effects.

FP6.4

Short-term therapeutic effects of extracellular vesicles isolated from three-dimensional culture of adipose-derived stem cells in a rat model of failed healing tendinopathy

Haining Liu[1], Tao Xu[2], Jianwei Chen[2], Pauline Po Yee Lui[1,3]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Mechanical Engineering, Research Institute of Tsinghua University
[3]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park

FP6.5

Therapeutic effect of low pH-preconditioned tendon-derived stem cells exosomes on tendinopathy

Meng Zhou[1], Dan Wang[2,3], Samuel Ka Kin Ling[4,5], Patrick Shu Hang Yung[4,5]
[1]Department of Orthopaedics and Traumatology, Faculty of Medicine, The Chinese University of Hong Kong
[2]Institute for Tissue Engineering and Regenerative Medicine
[3]School of Biomedical Sciences, The Chinese University of Hong Kong
[4]Department of Orthopaedics and Traumatology, CUHK Medical Centre
[5]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Tendinopathy is a chronic disease of an unknown aetiology and associated with inflammation. Current treatments often insufficient for complete resolution of symptoms. Exosomes are nano-sized extracellular vesicles that play a crucial role in intercellular communication between cells. Exosomes derived under acidic preconditioned tendon-derived stem cells may carry a distinct cargo that is specifically tailored to promote tissue repair.

Methods: The tenogenic bioactivity of exosomes derived from low pH conditions was compared to those from normal pH conditions through the following assays: (1) cell proliferation by Cell Counting Kit-8 assay, (2) cell migration assays, and (3) quantitative polymerase chain reaction analysis of inflammatory related markers and teno-genesis markers. Gelatin methacryloyl–loaded exosomes mediated tendon regeneration was evaluated in a rat Achilles tendon collagenase I injection model using histological and gait analysis.

Results: Exosomes derived from acidic conditions (pH 5.0) enhanced the proliferation and migration of rat adipose tissue-derived stromal cells, which exhibited decreased expression of pro-inflammatory cytokines and demonstrated increased expression of tenogenic markers. Compared to pH 7.35 exosomes, pH 5 exosome loading implantation in rat Achilles tendon resulted in significantly enhanced histological and functional tendon repair at week 4.

Conclusion: Low pH-preconditioned tendon-derived stem cell exosomes exhibit potent tenogenic bioactivity in vitro and enhance tendon repair in vivo in rat Achilles tendinopathy.

FP6.6

Neuroimmune modulation by TAFA4 protects against intervertebral disc degeneration

Jiaheng Han, Yu Ding
Orthopedics of TCM Senior Department, The Sixth Medical Centre of the Chinese PLA General Hospital

FP6.7

ChitoSilkBioPatch: a bio-inspired wound dressing scaffold for antibiotic-free diabetic wound management

Cheuk-Kin Kwan[1], Dorsa Dehghan-Baniani[1], Babak Mehrjou[2], Yu-Cong Li[1], Huan-Xiong Chen[3], Chi-Chiu Wang[4], Paul Chu[2], Wayne Yuk-Wai Lee[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Physics, Department of Materials Science and Engineering, and Department o Biomedical Engineering, City University of Hong Kong
[3]Department of Spine Surgery Hainan Province Clinical Medical Centre, The First Affiliated Hospital of Hainan Medical University
[4]Department of Obstetrics and Gynaecology, The Chinese University of Hong Kong

FP6.8

Functional study of JunB in skeletal muscle regeneration

Qin Zhou[1], Feng Yang[2], Yang Li[1], Xingyuan Liu[2], Yulong Qiao[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Division of Chemical Pathology, The Chinese University of Hong Kong

FP6.9

Advanced glycation end-product breaker alleviates hyperglycaemia, muscle functional perturbation, and osteoporosis: an aged, diet-induced hyperglycaemia mouse model

Victor Yan-Zhe Lu[1], Wei-Ting Hsiao[1], Chien-Wei Lee[2], Wayne Yuk-Wai Lee[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Centre for Translational Genomics & Regenerative Medicine Research, China Medical University Hospital, China Medical University

FP6.10

Calcitonin gene-related peptide alleviates bone ageing by upregulating Klotho expression

Weiyang Liu, Zhengming Shan, Zheyu Jin, Guangshuai Nie, Zhenkang Wen, Tongzhou Liang, Fanchu Zeng, Wenxue Tong, Ling Qin, Jiankun Xu
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Osteoporosis, a major global health burden, lacks optimal long-term therapies due to significant adverse effects associated with current pharmacological options. Notably, both Klotho (an anti-ageing protein critical for bone metabolism) and calcitonin gene-related peptide (CGRP), a neuropeptide linking the nervous and skeletal systems, decline significantly with age, suggesting their potential roles in bone ageing. This study revealed a novel CGRP-SP7-Klotho axis and demonstrated that CGRP rescues age-impaired bone formation by upregulating Klotho expression. In vitro, senescent bone marrow mesenchymal stem cells (BMSCs, P15) showed reduced osteogenic capacity, with downregulated expression of the key transcription factor SP7 and Klotho, compared to young BMSCs (P3). CGRP supplementation rescued these deficits, enhanced both SP7 and Klotho expression in senescent BMSCs. In vivo, aged mice exhibited accelerated skeletal deterioration, including thinner femoral cortices, wider trabecular spacing, and decreased density of CGRP-positive sensory nerves in the periosteum alongside reduced CGRP and Klotho expression, compared to young mice. In ovariectomised mice with femoral fractures, impaired callus formation, as observed via X-ray and histology at 2 weeks post-surgery, correlated with diminished local CGRP and Klotho levels. Crucially, local increased CGRP expression at the fracture site accelerated callus formation and fracture healing. These results revealed a dual mechanistic and therapeutic breakthrough: (1) CGRP elevation rescues age-related Klotho deficiency, and (2) the CGRP-SP7-Klotho axis represents a druggable target for osteoporosis and fracture repair in ageing populations. By bridging neuropeptide signalling and skeletal ageing, this work opens new avenues for treating age-associated bone disorders.

FP6.11

Association of circulatory proteins with adult spinal deformity risks: a Mendelian randomisation study

Gabriel Chun Yin Sung, Yat Hong Kenny Kwan
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Adult spinal deformity (ASD) affects around 32% of adult populations aged 65 and over. We aimed to investigate whether circulatory proteins played an aetiologic role in ASD risk using a Mendelian randomisation framework.

Methods: We conducted a two-sample, cis-Mendelian randomisation study with genome-wide association study summary statistics of European populations. We examined the causal role of 1632 circulating proteins, measured by the UK Biobank Pharma-Proteomics-Project (n=54219) with general ASD risk and nine of its subtypes including scoliosis, spondylolisthesis, and other spinal conditions from the FinnGen study (maximum n=366756), using Wald-ratio approach and applied Bonferroni correction for multiple testing ($p<3.06 \times 10^{-5}$). Genetic colocalisation was conducted to test for linkage disequilibrium by correlated variants.

Results: All instruments for 1632 circulatory proteins had r2>0.001, indicating low risks of linkage disequilibrium. Genetically predicted trehalase was associated with lower spondylolisthesis risk (odds ratio [OR]=0.91, 95% confidence interval [CI]=1.08-1.20), and GFRAL (glial cell line-derived neurotrophic factor family receptor alpha-like) with higher scoliosis risk (OR=1.14, 95% CI=0.87-0.95) with strong evidence for colocalisation (PP.H4=0.88-0.98). Genetically predicted ketohexokinase was associated with higher risk of ASD (OR=1.14, 95% CI=1.08-1.20), whereas lower levels of CGREF1 (cell growth regulator with EF-hand domain 1) was associated with protective effect on ASD (OR=0.90, 95% CI=0.86-0.95), with potential evidence for colocalisation (PP.H4=0.63-0.78).

Conclusion: We found four novel genetic associations between circulatory proteins with risks of three ASD phenotypes. These findings can aid drug target discovery and development. Further investigations are needed to determine whether these proteins can be therapeutic targets of ASD.

FP6.12

Precision pulsed electromagnetic field therapy for osteoarthritis

Ye Li
Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

FP6.13

Low-magnitude high-frequency vibration combined with β-hydroxy-β-methylbutyrate treatment to prevents neuromuscular junction degeneration in age-related sarcopenia

Qianjin Wang, Wujian Lin,Can Cui, Chaoran Liu, Senlin Chai, Abudureheman Maihemuti, Xiaoxu Xu, Ronald Man Yeung Wong, Ning Zhang, Wing-Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Age-related sarcopenia, driven by neuromuscular junction (NMJ) degeneration, poses a significant health burden. We investigated whether combining low-magnitude high-frequency vibration (LMHFV) with β-hydroxy-β-methylbutyrate (HMB) may protect against sarcopenia by targeting NMJ integrity and function.

Methods: Sixty 6-month-old SAMP8 mice were randomised into four groups: control, LMHFV alone (35 Hz, 0.3 g, 20 min/day), HMB alone (500 mg/kg/day), and combination for 4 months. Assessments included muscle mass/function, body composition, fibre typing, NMJ morphology (whole-mount co-staining), and molecular analyses (qPCR/Western blot). Wnt10b's role was validated via knockdown (AAV9-siRNA) and rescue (recombinant Wnt10b).

Results: A combination of LMHFV and HMB demonstrated superior protection against sarcopenia progression versus monotherapies or control. It significantly improved muscle mass, contractile function, and body composition, while reducing intramuscular lipid accumulation. The combined treatment reversed age-related fibre-type shifts toward a youthful phenotype. It preserved NMJ structure, reducing degenerative changes and neurotransmission failure. Mechanistically, the combined treatment upregulated NMJ formation pathway components and activated Wnt10b signalling while suppressing endogenous inhibitors. Wnt10b knockdown replicated sarcopenic NMJ and functional deficits, whereas exogenous Wnt10b supplementation rescued muscle and NMJ integrity.

Conclusion: The combination of LMHFV and HMB synergistically mitigates sarcopenia by preserving NMJ architecture and function, predominantly through Wnt10b pathway activation. This signalling cascade stabilises NMJ formation components, preventing denervation. Our findings confirm the pivotal therapeutic target of Wnt10b and support the clinical translation of this non-invasive approach for combating age-related neuromuscular decline.

FP6.14

A standardised anterior cruciate ligament reconstruction model in rabbits using a transtibial guide device for injectable magnesium-based materials research and development

Xuan He[1], Ye LI[2]
[1]Department of Orthopaedics, Peking University Third Hospital
[2]Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

FP6.15

A pilot single cell RNA transcriptomic study reveals convex-concave osteogenic asymmetry via mTOR-FZD5 signalling in adolescent idiopathic scoliosis

Gen Tang[1], Kenneth Guangpu Yang[1], Huanxiong Chen[2], Tsz Ping Lam[1], Jack Chun Yiu Cheng[1], Adam Yiu Chung Lau[1], Wayne Yuk Wai Lee[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Spine Surgery, The First Affiliated Hospital of Hainan Medical University

FP6.16

Pathogenesis of type V osteogenesis imperfecta

Zhijia Tan[1], Hiu Tung Shek[2], Yanni He[1], Peikai Chen[1], Michael To[2]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Osteogenesis imperfecta (OI) is characterised by low bone mass and recurrent fractures. Type V OI is caused by a point mutation (c.-14C>T) and is characterised by radial head dislocation, calcification of interosseous membrane, and hyperplastic callus. Its molecular mechanism is not understood. In this study, we established an inducible Ifitm5flox c.-14C>T mouse model to explore the molecular mechanism.

Methods: Patients with type V OI confirmed by genetic testing were enrolled. Their clinical characteristics were collected, and the postoperative bone tissues were used for morphological analysis and single-cell RNA sequencing. We established an inducible model (Ifitm5flox c.-14C>T) that could be controlled by different Cre specifically expressed at different stages of skeletal development. We leveraged these mouse models and single cell RNA sequencing to explore how the mutant IFITM5 affecting the differentiation of skeletal progenitors.

Results: Patients exhibited radial head dislocation (100%), calcification of interosseous membrane (100%), hyperplastic callus (44%), and scoliosis (50%). Morphological analysis showed abnormal bone structure in patients, with a large amount of adipose tissue in the hyperplastic callus. Through the inducible mouse model, we found that the mutant mice (Prx1-Cre; Ifitm5flox c.-14C>T) was born with fractures of all limbs. Abnormal cartilage was found in the diaphysis with significant expression SOX9. Single cell RNA-seq data analyses also revealed the aberrant cell population expressing markers of both osteoblasts and chondrocytes. The osteogenesis was significantly inhibited. Imbalance of osteogenesis and adipogenic progenitor cells were demonstrated.

Conclusion: We elucidated that the mutant IFITM5 protein disrupted the homeostatic balance among osteogenesis, chondrogenesis, and adipogenesis.

FP6.17

SoniC/S: a rapid and efficient approach for whole-tissue optical clearing and immunofluorescent staining

Hoi Pan Harry Cheung[1], Marianne Lauwers[1], Zhengao Wang[2], Jianfeng Wang[3], Chengyun Ning[4], Dai Fei Elmer Ker[5], Dan Michelle Wang[1]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]College of Materials and Energy, South China Agricultural University
[3]College of Materials Science, Hunan University
[4]School of Materials Science and Engineering, South China University of Technology
[5]Department of Biomedical Engineering, The Hong Kong Polytechnic University

Introduction: High-resolution mapping of three-dimensional structures in biological tissues is crucial for a comprehensive understanding of various biological processes, particularly in orthopaedics, where detailed visualisation of tissue architecture can inform treatment strategies and surgical interventions. However, optical heterogeneity in these tissues, characterised by variable optical properties, poses significant challenges such as light scattering and absorption during imaging. Traditional tissue clearing methods are time-consuming, requiring 48 hours to 32 days, and the limited diffusion depth of fluorescent probes restricts the feasibility of whole-tissue imaging.

Methods: This study introduces sonication-assisted tissue clearing and immunofluorescent staining (SoniC/S), a novel method that integrates low-frequency ultrasound sonication with a commercial chemical-based clearing kit (PEGASOS) and iDISCO staining methods. The SoniC/S method was systematically evaluated on various biological tissues, including mouse skeletal muscle, rat Achilles tendon, and mouse spleen, assessed by measuring protein loss, tissue deformation, tissue transparency, light transmittance, and both macroscopic and microscopic imaging.

Results: Our findings demonstrate the efficacy of SoniC/S in achieving rapid optical clearing and whole tissue immunostaining. SoniC/S effectively cleared the tissue samples in 36 hours, while achieving transparency and light transmittance superior to commercial kits. Moreover, SoniC/S enhanced staining performance in dense collagenous tendon tissue, achieving uniform labelling in 15 hours—12.8 times faster than traditional iDISCO method.

Conclusion: The SoniC/S method represents a significant advancement in tissue clearing and immunostaining, providing a rapid and efficient solution for high-resolution imaging of complex biological structures, thereby enhancing the potential for in-depth biological research.

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FP7.1

Preoperative serum albumin level is a useful predictor of long-term survival in patients with necrotising fasciitis

Mancy Tsz-man Ching[1], Alfred Lok-hang Lee[2], Kelvin Hei-yeung Chiu[3], Douglas Kar-heng Wong[4], Jun Horng Tan[4], Henry Wai-fung Kwong[4], Margaret Woon-man Fok[4], Tak Wing Lau[4], Janus Siu-him Wong[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Microbiology, Prince of Wales Hospital
[3]Department of Microbiology, Queen Mary Hospital
[4]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP7.2

Differentiating native knee septic arthritis from non-infective arthropathies a multivariable logistic regression model from 1052 knee aspirates

Emanuel Chi-hang Sung[1], Charis Yi-lok Chan[2], Claudia Wing-yiu Chu[3], Arthur Suet-hung Cho[4], Alfred Lok-hang Lee[5], Margaret Woon-man Fok[6], Tak Wing Lau[6], Janus Siu-him Wong[4]
[1]The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, United Christian Hospital
[3]Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital
[4]Department of Orthopaedics and Traumatology, The University of Hong Kong
[5]Department of Microbiology, Prince of Wales Hospital
[6]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP7.3

Socioeconomic burden of osteoarthritis in Hong Kong: a descriptive and comparative study

Yuk Tung Chan[1], Pak Sing Yu[1], Shing Yau Wu[1], Ka Lee Li[1], Cheuk Yan Jamie Lam[1], Chun Man Lawrence Lau[2], Amy Cheung[3], Henry Fu[2], Kwong Yuen Chiu[2], Ping Keung Chan[2]
[1]The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP7.4

Machine learning prediction of reinjury at the 2-year follow-up in athletes with chronic ankle instability using clinical risk factors

Ui-jae Hwang[1], Siu-ngor Fu[1], Arnold YL Wong[1], S Jun Son[2], Oh-yun Kwon[3]
[1]Department of Physiotherapy, The Hong Kong Polytechnic University
[2]Department of Sports Medicine, CHA University
[3]Department of Physiotherapy, Yonsei University

Introduction: Limited studies have specifically examined reinjury risk in athletes with established chronic ankle instability (CAI), despite extensive research on initial ankle sprain predictors. This study aims to develop a machine learning model for predicting ankle reinjury in athletes with chronic ankle instability in subsequent 2 years and identify the most influential clinical risk factors.

Methods: Ninety-six athletes with CAI were prospectively followed for 2 years. Twenty-five candidate predictor features encompassing demographics, injury history, patient-reported outcomes, and functional performance measures were collected. The artificial bee colony (ABC) algorithm was used for feature selection from the training set (n=77). Five machine learning classifiers were trained and evaluated on a test set (n=19). Model performance was assessed using the area under the curve (AUC), accuracy, precision, recall, F1-score, and Matthews correlation coefficient. Feature importance was analysed using feature permutation importance and SHAP analysis, with partial dependence plots generated for key predictors.

Results: Forty-one athletes experienced at least one reinjury during follow-up. The ABC algorithm selected seven features: height, previous sprains, giving way, Ankle Instability Index, Biodex Overall Stability Index, ankle dorsiflexion range of motion (ADROM), and arch height index (AHI). The ABC extreme gradient boosting model achieved excellent performance with training AUC of 0.78 and test AUC of 0.88. Feature importance analysis identified ADROM, and AHI as key predictors. Partial dependence analysis revealed critical thresholds: ADROM <48° and AHI >0.38.

Conclusions: Our machine learning algorithm demonstrated excellent performance in predicting ankle reinjury in athletes with CAI, providing clinically actionable thresholds for risk stratification and targeted interventions.

FP7.5

Acupuncture for rotator cuff-related shoulder pain: a systematic review and meta-analysis

Xin Fu[1], Hio Teng Leong[2], Xiuwen Luo[2], Xin Li[3]
[1]Department of Chinese Medicine, Hong Kong Baptist Hospital
[2]Department of Rehabilitation Sciences, The Hong Kong Polytechnic University
[3]Department of Traditional Chinese Medicine, People's Hospital of Deyang City

Introduction: We systematically reviewed and meta-analysed acupuncture's effectiveness on pain and shoulder function in individuals with rotator cuff-related shoulder pain (RCRSP).

Methods: Seven electronic databases (PubMed, Medline, Embase, SPORTicus, CNKI, WangFang, and SinoMed) were searched from their inceptions to February 2024. Meta-analyses were conducted using a random-effects model, with standardised mean differences (SMDs) and risk ratios (RRs) calculated for continuous and dichotomous outcomes, respectively. Data extraction and risk-of-bias assessment (Cochrane RoB 2 tool) were performed independently. Evidence quality was evaluated via GRADE.

Results: Twelve studies involving 986 participants were included. Acupuncture significantly reduced immediate-term pain (SMD=1.81, 95% confidence interval [CI]=0.96-2.65, I^2=95%, p<0.0001) and improved immediate-term shoulder function (SMD=1.44, 95% CI=0.78 to 2.09, I^2=94%, p<0.0001). However, no significant differences were observed in pain or function during short- to long-term follow-ups. Immediate-term treatment satisfaction was higher with acupuncture (risk ratio [RR]=1.20, 95% CI=1.09-1.33, I^2=30%, p=0.0003), with no significant adverse events reported (RR=1.23, 95% CI=1.06-1.42, I^2=0%, p=0.0005). The GRADE level of evidence was moderate for immediate-term effects and low to very low for short- to long-term effects.

Conclusion: Moderate evidence supports acupuncture's effectiveness for immediate-term improvements in pain, function, and treatment satisfaction in individuals with RCRSP. No significant benefits were observed during short- to long-term follow-up. Acupuncture appears to be a safe intervention for RCRSP, with no significant adverse events reported.

FP7.6

Motor unit potential and nerve conduction velocity as novel correlates of muscle health in sarcopenia

Can Cui[1], Shichen Qi[2], Yeeling Au[1], Furu Cai[1], Ronald Man Yeung Wong[1], Ning Zhang[1], Yong Hu[1], Wing Hoi Cheung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP7.7

Use of anti-osteoporotic agents in fracture liaison service demonstrates efficacy in reduction of mortality and refracture rates: a single-centre retrospective cohort study

Zhipeng Yan, Hok Wai Brian Leung, Eleanor Wen, Chi Yuk Lau
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Geriatric hip fractures are associated with significant mortality and healthcare costs. Despite improvement in management, mortality and refracture rates remain high. In 2020, our institution implemented a multidisciplinary fracture liaison service to optimise survival outcome and secondary fracture prevention. However, its efficacy on mortality and refracture rates, particularly when stratified by comorbidity burden, requires evaluation. Charlson Comorbidity Index (CCI) prognosticates mortality based on patients' major medical comorbidities. This retrospective cohort study evaluates the impact of fracture liaison service with 3-year mortality and refracture rates; utilising subgroup analysis stratified by CCI.

Methods: Patient data were retrieved. Patients fulfilling inclusion criteria were included for evaluation of 3-year mortality in terms of Kaplan-Meier survival curve with log-rank test comparing anti-osteoporotic treatment group versus control group. A multi-variable Cox-proportional hazards regression model was utilised to adjust for confounders (age and sex) on mortality. Refracture rate was calculated by Fisher's exact test. Results were reported with α=0.05 for significance and 95% confidence interval.

Results: In total, 291 patients (105 males and 186 females) were included. Their mean age was 82.1 years. The use of anti-osteoporotic agents reduced 3-year mortality in both low-moderate CCI group (score <5, hazard ratio=0.29, 95% confidence interval [CI]=0.12-0.66, p<0.01) and high CCI group (score ≥5, hazard ratio=0.28, 95% CI=0.17-0.47, p<0.01), as well as reduced refracture rates in both low-moderate CCI group (relative risk=0.83, 95% CI=0.33-2.04, p=0.78) and high CCI group (relative risk=0.59, 95% CI=0.24-1.45, p=0.34).

Conclusion: Fracture liaison service demonstrates improvement of survivorship and reduction of refracture rate in both high and low CCI groups.

FP7.8

Effect of pulsed electromagnetic field therapy on the postural balance in patients with end-stage knee osteoarthritis: secondary analysis of a randomised clinical trial

Ioi Chit Cheung[1], Michael Tim Yun Ong[1], Gene Chi-Wai Man[1], Qian-wen Wang[1], Dennis Cham-Kit Wong[2], Rex Wang-Fung Mak[2], Gloria Yan-Ting Lam[3], Tsz Lung Choi[3], Jonathan Patrick Ng[2], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Knee osteoarthritis (OA) is a disabling condition characterised by cartilage loss. Postural balance is a crucial indicator of physical functionality and fall risk in such patients. This study investigates whether combining home-based exercise with pulsed electromagnetic field (PEMF) therapy improves postural balance in patients with end-stage knee OA.

Methods: In total, 89 patients were randomised to receive either home-based exercise alone (n=44) or combined with PEMF therapy (n=45) twice weekly for 8 weeks. Postural balance was assessed by instructing participants to perform a 15-second semi-squat and 30-second stance (eyes open/closed). Balance-related parameters, including total sway path, ellipse area, anterior-posterior (AP), and medial-lateral (ML) sway path components, were recorded at baseline, 4 weeks, and 8 weeks.

Results: The treatment group showed significant improvements in ellipse area and AP components during squat at 8 weeks ($p<0.05$). Moreover, a significant difference in AP component was observed between treatment and control groups during squat ($p<0.05$). Change in AP component during squat were correlated with improvement of extensor strength for both symptomatic ($r= -0.331$, $p<0.01$) and non-symptomatic leg ($r= -0.257$, $p<0.05$). Moreover, ellipse area, AP, ML components showed significantly better performance in eyes-open conditions, compared to eyes-closed conditions in stance posture ($p<0.05$).

Conclusion: Combining PEMF therapy with home-based exercise improved postural balance in patients with end-stage knee OA. The findings indicated an association between balance improvement and greater extensor muscle strength, while emphasising the role of visual input in maintaining balance. These factors should be considered for postural balance improvement in patients with knee OA.

FP7.9

Adherence to a digital knee rehabilitation programme in Hong Kong: a qualitative study

Naomi Cheuk Ying Chen[1], Cham Kit Wong[2], Gloria Yan Ting Lam[2], Tsz Lung Choi[2], Rex Wang Fung Mak[3], Jonathan Patrick Ng[3], Nipuna Cooray[4], Julie Brown[4], Michael Tim Yun Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[3]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[4]Division of Injury, George Institute for Global Health

Introduction: Exercise is a cornerstone of knee osteoarthritis (OA) management and post-surgical rehabilitation, but patient exercise levels often decline without ongoing clinical supervision. Digital interventions may bridge this gap by offering accessible, home-based rehabilitation support, and yet actual adherence remains poorly understood. This study explores how patients in Hong Kong engaged with Healthy Knees, a web-based clinician-provided digital knee rehabilitation programme.

Methods: In-depth, semi-structured interviews were conducted for 15 patients from the Prince of Wales Hospital, Hong Kong. Interviews were transcribed, translated, and manually analysed using a six-phase thematic analysis framework.

Results: Nine patients with anterior cruciate ligament injury and six patients with knee OA (aged 21 to 79 years) were included. Three major themes influencing adherence emerged: (1) perceived effectiveness of physical therapy and exercise based on condition and stage of recovery, (2) patient motivation and external support that is shaped by internal discipline and facilitated from digital platforms or clinicians, and (3) technology accessibility including barriers faced by older users and the importance of user-friendly, mobile-compatible platforms.

Conclusion: Adherence to digital rehabilitation is influenced by individual motivation, external prompts, technological usability, and patient demographics. The study highlights the need for more personalised, adaptable digital tools that account for varying functional levels and digital literacy. These insights contribute to the limited qualitative data on digital health adherence in Asia and inform future intervention implementation strategies.

FP7.10

Six-week structured non-surgical treatment programme can have sustained improvement for 18 months in 1362 patients with end-stage knee osteoarthritis

Wing Yip Lee[1], Linda Man Kuen Li[1], Naomi Cheuk Ying Chen[2], Chloe Sze Man Leung[1], Alan Yin Chung Tsui[1], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2]
[1]Department of Physiotherapy, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Patients with knee osteoarthritis (OA) experience prolonged wait times for total knee replacement (TKR) while symptoms progressively becoming debilitating. This study evaluates the effectiveness of a structured exercise programme on reducing knee pain and enhancing knee function.

Methods: The programme includes six sessions over 4 years, including aerobic, strength, and neuromuscular exercises, along with educational talks to adopt lifestyle changes and at-home exercise recommendations. Primary outcomes were pain (numerical pain rating scale) and function (Knee Injury and Osteoarthritis Outcome Score) at baseline, final session of year 1, and during every follow-up visit from year 2 onwards.

Results: All outcome measures, except for the Knee Society Score (KSS) and its function subscale, showed significant improvement ($p<0.05$) following the exercise programme. Patients with poor KSS were able to sustain improvements for up to 1.5 years, whereas those with fair KSS for up to 1-year, and those with good or excellent KSS for <1 year.

Conclusion: Patients categorised with poor knee function improved the most drastically with intervention benefits sustaining for up to 1.5 years. These findings suggest that the structured non-surgical treatment programme is a cost-effective in reducing pain and improving knee function for patients awaiting total knee replacement, particularly those with lower baseline function. Further research can focus on providing exercises tailored to patients' baseline level as well as evaluating effects that persist longer than a duration of 1.5 years.

FP7.11

Extracortical bone bridge with vascular bone graft reduces junctional resorption in megaprosthetic reconstruction in patients with orthopaedic oncology: a review of >10 years of experience

Ching Ngai Gabriel Leung, Ching Hin Raymond Yau, Ali Ijaz Ahmad, Siu Ming Anderson Leung, Ying Lee Albert Lam
Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Aseptic loosening commonly leads to failure after megaprosthetic reconstruction for limb salvage after oncological resection. This study assesses whether junctional bone grafting reduces loosening and reports related complications.

Methods: A retrospective review was conducted for patients who underwent limb salvage surgery with megaprosthetic reconstruction between 2002 and 2024. Data collection included demographics, tumour profiles, use of junctional bone grafts, and complications. Implant loosening, bone graft resorption, and junctional resorption were evaluated radiologically. Primary outcome was implant loosening; secondary outcomes included surgical complications and resorption rates. Statistical analysis was performed with chi-square test at $p<0.05$ significance.

Results: Among 112 patients (mean age, 40.9 years; mean follow-up duration, 6.8 years), 56.3% received junctional bone grafts (55.6% vascularised). Most patients had malignant bone tumours, mainly located in the femur. No significant association was found between bone grafting and implant loosening, although a trend toward reduced loosening was noted with bone grafting performed (grafting 3.17%, non-grafting 6.12%). Whether the patient received vascular or non-vascular bone graft did not affect loosening rates. Junctional bone grafting significantly lowered junctional resorption, particularly with vascular grafts. Surgical complication rates were similar across groups.

Conclusion: Junctional bone grafting did not significantly impact implant loosening in megaprosthetic reconstruction post-oncological resection, but it did reduce junctional resorption, especially when using vascular grafts.

FP7.12

Outcomes of arthroscopic synovectomy in metacarpophalangeal joints: a retrospective analysis of patients with inflammatory arthritis

Wing Cham Yu, Esther Ching San Chow
Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Synovectomy is effective in alleviating pain and swelling in the metacarpophalangeal joints (MCPJs) among patients with inflammatory arthritis. It can delay or prevent irreversible joint damage, especially in joints resistant to medical treatment. However, MCPJ arthroscopy is underutilised. This study reviews the outcomes of MCPJ arthroscopic synovectomy in patients with inflammatory arthritis.

Methods: A retrospective analysis was conducted on 12 patients who underwent arthroscopic synovectomies of the MCPJs (three thumbs, five index fingers, two middle fingers, one ring finger, and one little finger) between 2017 and 2023, with a mean follow-up of 56.6 months. Subjective assessments included pain scores, swelling index, and patient satisfaction. Objective assessments comprised radiological evaluations using Larsen's grading and active range of motion.

Results: The pain score improved significantly from 8.1 preoperatively to 2.3 postoperatively ($p<0.001$). The swelling index improved from 7.7 to 2.8 ($p<0.001$). Two joints showed progression in Larsen's grade, one joint showed improvement, and the remaining nine joints exhibited static grades. Active range of motion did not show significant changes. The mean symptom-free period was 55.7 months. One joint required a second arthroscopic synovectomy 44 months after the initial procedure. The mean patient satisfaction score was 8.8/10. No complications, including nerve injury or wound infection, were reported.

Conclusion: MCPJ arthroscopic synovectomy provides significant pain relief and reduces swelling in inflammatory arthritis. This procedure is safe and allows fast recovery with minimal disturbance to extensor mechanisms.

FP7.13

Multiple tendon transfers under 'wide awake local anaesthesia no tourniquet': a retrospective case series

Zhi Yang Ng[1], Tsz Ching Leo Chau[2], Chu Kay Michael Mak[2], Wing Lim Tse[2], Pak Cheong Ho[2]
[1]Department of Plastic and Reconstructive Surgery, Nuffield Orthopaedic Centre
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Wide awake local anaesthesia no tourniquet (WALANT) has gained wide acceptance in hand surgery. The literature with regard to multiple tendon transfers for nerve palsies is scarce. The purpose of the current study is to report on the clinical and functional outcomes in a retrospective case series of 14 patients with various types of nerve palsies (four radial, seven posterior interosseous nerve, two ulnar, and one median). All underwent multiple tendon transfers and various ancillary procedures under WALANT (the mean local anaesthesia volume administered was 68.9 [range, 30-115] mL) between March 2015 and March 2025. The mean age of this cohort was 49 (range, 24-69) years, with a mean operative time of 207 (range, 122-265) minutes. The mean follow-up was 37 (range, 1-106) months, with no secondary revision procedures required. Patients achieved a mean Medical Research Council scale score of 3.7 (range, 1-5) following tendon transfer.

FP7.14

Sensory outcomes of cross finger flap versus heterodigital island flap for fingertip reconstruction: an 11-year retrospective analysis

Tsang Yeung, Esther Ching San Chow, Ka Wai Cheng
Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Fingertip tissue loss necessitates reconstruction balancing sensory recovery and practicality. This study compares cross-finger flaps (CFF) and heterodigital island flaps (HIF) in sensory outcomes and morbidity.

Methods: We retrospectively analysed 22 patients who underwent fingertip reconstruction with CFF (n=10) or HIF (n=12) between 2014 and 2024. Outcomes assessed included static two-point discrimination, monofilament thresholds, operative times, and complications during postoperative follow-ups.

Results: Both techniques demonstrated comparable sensory recovery with similar static two-point discrimination measurements and preservation of protective sensation with Semmes-Weinstein monofilament test. CFF required a second operation for flap separation but still demonstrated substantially shorter cumulative operative duration. All flaps survived without major complications. Wound complications occurred more frequently with CFF, but all resolved with minimal intervention. Hypersensitivity affected some CFF cases, whereas HIF cases occasionally reported cross sensory phenomena between digits. Notably, proximal interphalangeal joint contractures occurred exclusively in the HIF cohort, whereas CFF preserved full donor-digit mobility despite temporary immobilisation, for ≥3 weeks, before flap separation.

Conclusion: CFF provides non-inferior sensory outcomes while offering practical advantages: shorter operative time, technical accessibility, and minimal donor-digit contracture risks. The observed hypersensitivity in CFF cases may be attributed to the flap's limited thickness compared to HIF. Although wound management was more frequently required with CFF, all cases resolved without jeopardising flap survivorship. Although HIF remains appropriate for select cases prioritising single-stage reconstruction, the findings of our study confirm CFF as a valuable alternative to HIF, particularly for defects within adjacent finger dorsum dimensions where microsurgical resources are limited.

FP7.15

Outcomes of reverse Sauvé-Kapandji procedure in congenital proximal radio-ulnar synostosis: a case series

Michelle Kar Lam Li, Michael Chu-kay Mak, Wing-lim Tse, Tsz Ching Leo Chau, Pak-Cheong Ho
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Congenital proximal radio-ulnar synostosis presents a significant challenge, as there is currently no established gold standard treatment to restore motion in affected patients. The reverse Sauvé-Kapandji procedure has been proposed as a potential surgical intervention to restore functional forearm motion in these patients, offering hope for improved quality of life and upper extremity function.

Methods: This case series included three patients who underwent the reverse Sauvé-Kapandji procedure between November 2023 and August 2024 at Prince of Wales Hospital, Hong Kong. The mean follow-up period was 16 months. Standardised assessment protocols were used to evaluate pain levels and range of motion improvements.

Results: Postoperatively, the mean resting pain visual analog scale (VAS) score was 0, and the mean active pain VAS score was 0.6. The mean postoperative forearm arc of motion was 45°. Complications included one case of re-ossification of the osteotomised radius and two cases of ulnar plus variance.

Conclusion: The reverse Sauvé-Kapandji procedure represents a promising surgical option for improving active forearm motion in patients with congenital proximal radio-ulnar synostosis. However, continued evolution and fine-tuning of the surgical technique are necessary to minimise the risk of re-ossification and address the challenge of ulnar shortening complications.

FP7.16

Ulnar morphology and stability of the distal radial ulnar joint

Michael Mak, Michelle Li
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: The importance of forearm bony alignment to the distal radial ulnar joint (DRUJ) stability is often under-recognised. It was often thought that the ulna should be straight and any deformity should be straightened. There is a paucity of knowledge on how its curvature affects stability. This study utilises computer simulation on anatomical models to characterise the morphology of the ulna, and the effect on the DRUJ when its distal curvature is straightened, and when a distal flexion osteotomy is performed.

Methods: Using five anatomical models, a centreline of inertial mass was computed from just distal to the coronoid process to the ulna head for analysis. DRUJ stability was assessed by radioulnar ratio after altering the ulna morphology in two ways. The distal ulnar diaphyseal angle was straightened by a virtual osteotomy at the mid-point of the angulation by aligning the two axes. In three models, a virtual volar angulation osteotomy was performed at distal 25% of the ulna at 3°, 6°, and 9°.

Results: All five ulnae were partial helixes, with centrelines that wrap around a slim cylinder with an increasing spiral at the distal third. When the distal ulna diaphyseal angle is straightened, there was a mean increase in distal radioulnar translation from 21.8% to 27.5%. A volar angulation osteotomy decreased translation up to 22.5% for pronation.

Conclusion: The ulna is spiral-shaped. The distal ulnar diaphyseal angle is an anatomical feature that stabilises DRUJ. A volar angulation osteotomy can potentially increase DRUJ stability, which can be considered when performing ulnar shortening osteotomy.

FP7.17

Multicentre subgroup analysis of Wassel type IV thumb polydactyly: a comprehensive review of anatomical features, surgical management, and outcomes

Ka Wai Cheng[1], Ching San Esther Chow[1], Kar Lam Michelle Li[2], Pui Kit Tang[3], Chu Kay Michael Mak[2], Pak Cheong Ho[2], Wing Lim Tse[2]
[1]Department of Orthopaedics and Traumatology, United Christian Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, Kwong Wah Hospital

FP7.18

Complications of intramedullary screw in proximal phalanx fractures: a systematic review

Chi Yan Leung, Man Ting Marvin Chung, Wing Yuk Ip
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Proximal phalanx fractures are one of the most common hand fractures. The use of intramedullary screw fixation has gained popularity due to its ability to provide a rigid fracture fixation, while allowing early mobilisation and rehabilitation. However, few reviews explored the complications of this surgical method on proximal phalanx fractures. This review aims at providing an updated analysis on the complications of intramedullary screw fixation on proximal phalanx fractures.

Methods: A literature search was performed in PubMed, Ovid MEDLINE, Embase, and Cochrane Controlled Register of Trials. All primary research studies were identified and screened in accordance to the PRISMA guidelines. Complications were reported qualitatively and were analysed using descriptive statistics.

Results: In total, 13 studies were included among 657 studies identified from database search. A total of 301 proximal phalanx fractures were included, with an overall mean follow-up period of 90.1 weeks. The overall complication rate was 10.0% (n=30). The most common complication was delayed union (n=8), followed by loss of reduction (n=6), and screw impingement, discomfort or pain (n=6). 18 patients received revision surgery, yielding a revision surgery rate of 6.0%. Most (15 of 18) revision surgeries involved screw removal. Two cases underwent revision fixation and three cases received splintage for extension lag.

Conclusion: Intramedullary screw fixation offers stable fixation for early mobilisation of proximal phalangeal fractures. Surgeons need to be aware of the common complications associated with the procedure.

Free Paper Session VIII: Paediatric Orthopaedics II

FP8.2

Prognostication of adolescent idiopathic scoliosis using unsupervised machine learning: a retrospective cohort study on 655 cases up to skeletal maturity

Cheuk Kin Kwan, Kenneth Guangpu Yang, Alec Lik Hang Hung, Wayne Yuk Wai Lee, Tsz Ping Lam, Jack Chun Yiu Cheng, Adam Yiu Chung Lau
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP8.3

Anterior head posture may be associated with curve progression to bracing threshold in patients with mild adolescent idiopathic scoliosis

Tsz Hang Ma, Ho Lam Vincent Wu, Tin Ngo Oscar Mak, Tsun Chiu, Kenneth Guangpu Yang, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam, Adam Yiu Chung Lau, Cheuk Kin Kwan
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP8.4

Observed trends of functional leg length discrepancy, pelvic obliquity, and curve progression in adolescents with idiopathic scoliosis treated with bracing

Tsz Ping Chong, Kenneth Guangpu Yang, Eric Cheuk Kin Kwan, Alec Lik Hang Hung, Wayne Yuk Wai Lee, Tsz Ping Lam, Jack Chun Yiu Cheng, Adam Yiu Chung Lau
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Adolescent idiopathic scoliosis (AIS) is a 3D spinal deformity that presents with body asymmetries, including pelvic obliquity and functional leg length discrepancy. However, disease progression during brace treatment and its early prognostic value remain unknown.

Methods: Medical records of skeletal immature girls (with Cobb angle 20°-45°) who underwent bracing treatment at a tertiary scoliosis clinic were reviewed retrospectively. Baseline functional leg length discrepancy (fLLD), pelvic obliquity (PO), cobb angle, curve type, and direction were measured in EOS whole spine standing radiographs before commencement of bracing. Patients with ≥18 months of follow-up were analysed longitudinally.

Results: In total, 91 patients (mean age, 12.1±0.9 years; mean Cobb angle, 24.3°±5.8°) were included. At baseline, 28.6% had fLLD ≥5 mm (mean, 7.7±2.4 mm), and 40.7% had PO ≥5 mm (mean, 8.1±2.6 mm). Among those with fLLD, 61.5% had concurrent PO. In 40 patients with ≥18 months of follow-up, 37.5% experienced curve progression. 40% had fLLD, and 45% had PO. Of the 12 patients with baseline fLLD, seven progressed and five improved (three of them resolved). Seven patients with no fLLD at baseline developed fLLD. Regarding patients with PO, seven presented as new cases and four had baseline PO resolved. Bracing provided immediate improvement for fLLD and PO in 58.3% and 50% of patients, respectively.

Conclusion: fLLD and PO of ≥5 mm is common within the AIS population requiring brace treatment. Both parameters are dynamic and fluctuate with brace wear and across the treatment course. Their progression and potential association with curve progression warrant further study in larger longitudinal cohorts.

FP8.5

Complexity in closed spina dysraphism: lessons and pitfalls learned from a multidisciplinary combined clinic

Alec Lik Hang Hung[1], Adam Yiu Chung Lau[2], Tsz Ping Lam[2], Jack Chun Yiu Cheng[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

In a combined spina bifida clinic in Hong Kong, we have observed a dramatic epidemiological shift. Owing to effective antenatal screening and folic acid supplementation, our focus has moved from classic open myelomeningocele to the more prevalent closed spina dysraphism. This presents a new set of challenges, as patients with closed spina dysraphism often have subtler, more insidious presentations. The greatest pitfall is the delayed diagnosis of neurological deterioration, in addition to core orthopaedic issues of muscle imbalance, progressive deformity, and fragile tissues remains central. Our experience highlights that the foremost challenge is identifying tethered cord syndrome, especially its occult form in which clinical decline precedes clear radiological change. A frequent and devastating pitfall is misattributing foot cavus deformities, progressive scoliosis, or gait changes to the condition's natural history rather than a treatable, tethered cord. This diagnostic delay can lead to irreversible functional loss. Therefore, the most critical lesson learned is the absolute necessity of vigilant, continuous follow-up for all at-risk patients until they reach full skeletal maturity. Any clinical change must trigger a high index of suspicion for tethered cord syndrome. Long-term surveillance is the cornerstone of avoiding irreversible neurological damage and optimising lifelong outcomes in the contemporary spina bifida population.

FP8.6

Effect of full-time rigid bracing on pulmonary function in adolescent idiopathic scoliosis

Yuen Tong Law, Lok Sze Hon, Ka Hei Lam, Oi Kwan Lam, Adam Yiu Chung Lau
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Adolescent idiopathic scoliosis (AIS) is the most widely seen form of 3D paediatric spinal deformity, with abnormal lateral displacement and rotation. Full-time rigid bracing is often prescribed, aiming for a minimum of 30% to 50% in-brace correction to prevent curve progression during skeletal growth. The effect of full-time rigid bracing on pulmonary function remains underexplored.

Methods: A systematic search was performed based on the PRISMA checklist. By searching the PubMed, Cochrane Library, and Scopus using keywords 'AIS', 'bracing', and 'pulmonary function' for studies until February 2025, 68 entries were shown. After removal of duplicated, retracted, clinical trials protocols, case reports, and systematic reviews, 17 studies with 1718 patients were included in this review.

Results: Of the patients, 824 underwent bracing and 894 were either controls or underwent other treatments. Regarding short-term effects, there was a positive relationship between bracing and a reduction in pulmonary function. The pulmonary function improved through time, yet the results remained lower than the baseline value. Regarding long-term effects, the post-bracing effect showed a decrease in pulmonary function 10 years after treatment, albeit to a smaller extent when compared to surgically treated patients.

Conclusion: Rigid bracing mimics the mechanism of restrictive lung disease. However, the effect is reversible after brace removal. The body can adapt to the stiff brace and improve the respiratory function, but result is still suboptimal compared to normal. In the long run, the correction of braces on scoliosis is extremely effective, leading to an improvement in pulmonary function compared to the group that deteriorated without corrections.

FP8.7

A scoping review on the application of new technology in the screening and diagnosis of adolescent idiopathic scoliosis

Nandini Dulani, Jamie Tsun Chiu, Anna Wai Ling Chiu, Annie Ho, Kenneth Guangpu Yang, Eric Cheuk Kin Kwan, Alec Lik Hang Hung, Tsz Ping Lam, Jack Chun Yiu Cheng, Adam Yiu Chung Lau
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Adolescent idiopathic scoliosis (AIS) affects 2% to 4% of adolescents globally. Current screening tools involve radiation exposure and high false-positive rates, necessitating safer, more accurate methods. This scoping review evaluates artificial intelligence (AI) applications in non-radiological AIS screening and diagnosis in terms of AI models, performance metrics, validation methods, and accuracy.

Methods: Following PRISMA-ScR guidelines, 16 studies (2001-2025) from PubMed, Scopus, and Web of Science were analysed. Inclusion criteria were studies involving AI and non-radiological inputs (RGB images, 3D scans, depth maps). Data on model types, performance metrics, validation, and clinical implications were synthesised.

Results: The most common AI model used was convolutional neural networks (CNNs) [71.4%], followed by support vector machines (21.4%) and artificial neural networks (7.14%). AI models achieved a mean accuracy of 91.1% (range, 72.4%-97.5%) for AIS classification and Cobb angle prediction errors of 2.9° to 6.1°. AI Models achieved 87.5% sensitivity in detecting scoliosis (Cobb ≥10°), up to 92.6% specificity (angle of trunk rotation ≥5°), and 100% specificity in 3D-based classification. AI demonstrated potential to reduce screening costs and specialist dependency, enabling preliminary assessment via smartphone apps.

Conclusions: AI demonstrates high diagnostic accuracy for non-radiological AIS screening, potentially reducing radiation exposure and healthcare burdens. Key limitations of reviewed studies include small sample sizes, inconsistent validation, and ethical concerns (eg, data privacy, automation bias). Future research requires multi-centre validation, standardised protocols, and stakeholder engagement to translate AI tools into clinical practice.

FP8.8

Acceptance and commitment therapy versus education for improving psychological well-being in parents and children with adolescent idiopathic scoliosis: a randomised controlled trial protocol

Chelsia Ka Ching Cheung, Arnold Yu Lok Wong
Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

Introduction: Adolescent idiopathic scoliosis (AIS) is a three-dimensional spinal structural changes, affecting up to 4% of adolescents. Acceptance and commitment therapy (ACT) is a transdiagnostic psychological intervention that may improve psychological well-being of both children with AIS and their parents.

Methods: In a scoliosis clinic in Hong Kong, we recruited 168 parents with mild depressive or anxiety symptoms and their children aged 10 to 18 years diagnosed with AIS and managed conservatively. Parents were randomly assigned (in a 1:1 ratio) to receive either ACT plus AIS education or AIS education alone (control). Groups of six to eight parents attended five weekly 2-hour online sessions. Dyads were reassessed for their psychological well-being immediately after treatment and at 3- and 6-month follow-ups. Primary outcomes included self-reported anxiety and depressive symptoms.

Results: As of July 2025, we recruited 103 parent-child dyads (61.3% of target). Of these, 86, 45, and 28 dyads had completed the immediate post-treatment, 3-month, and 6-month follow-ups, respectively. Preliminary results indicated that the ACT group showed greater improvements in absolute General Anxiety Disorder-7 scores (the mean score change at 6 months: -3.11 vs 0.71) and Patient Health Questionnaire-9 scores (the mean score change at 6 months: -3.78 vs -2.42), and parental psychological flexibility (the mean score change at 6 months: -8.33 vs 2.57), although these improvements were not significant.

FP8.9

A novel bone microarchitecture phenotyping model for predicting curve progression in adolescent idiopathic scoliosis at the first clinical consultation: a prospective longitudinal study of 292 girls followed up to skeletal maturity

Kenneth Guangpu Yang, Eric Cheuk Kin Kwan, Adam Yiu Chung Lau, Wayne Yuk Wai Lee, Vivian Wing Yin Hung, Alec Lik Hang Hung, Tsz Ping Lam, Jack Chun Yiu Cheng
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

FP8.10

Using ultrasound to reduce unnecessary X-ray irradiation for screening scoliosis in school children: a diagnostic validation study in 892 participants

Cheuk Kin Kwan[1], Adam Yiu Chung Lau[1], Kenneth Guangpu Yang[1], Alec Lik Hang Hung[1], Winnie Chiu Wing Chu[2], Kelly Ka Lee Lai[3], Timothy Tin Yan Lee[3], Yong Ping Zheng[3], Jack Chun Yiu Cheng[1], Tsz Ping Lam[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Imaging and Interventional Radiology, The Chinese University of Hong Kong
[3]Department of Biomedical Engineering, The Hong Kong Polytechnic University

FP8.11

Optimising the surgical journey in adolescent idiopathic scoliosis: starting with productive waiting time

Adam Yiu Chung Lau[1], Cindy Wing Hei Hui[2], Kit Chi Yeung[2], Sharon Man Ha Tsang[2], Kenneth Guangpu Yang[1], Eric Cheuk Kin Kwan[1], Alec Lik Hang Hung[1], Wayne Yuk Wai Lee[1], Tsz Ping Lam[1], Jack Chun Yiu Cheng[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Physiotherapy, Prince of Wales Hospital

Free Paper Session VIII: Foot & Ankle

FP8.12

The use of 3D-printed cutting guide improves the accuracy of distal chevron osteotomy for hallux valgus surgery

Ho Fung Yee, Shui Wah Man, Kwok Ho Tang
Department of Prosthetics and Orthotics, Queen Elizabeth Hospital

Introduction: Distal chevron osteotomy is a common procedure for hallux valgus. Alteration of the osteotomy axis and angle can result in excessive change in length of the first metatarsal and hence the increased risk of transfer metatarsalgia. However, many of the Chevron osteotomies were performed freehand without objective guidance.

Methods: Two surgeons with different experience levels (resident trainee, consultant) used two techniques (freehand or with cutting guide) to perform 15 distal chevron osteotomies on 3D-printed identical first metatarsal sawbone models. The medial cutting angle and lateral exit angle and their difference were analysed. The time taken for each osteotomy was also recorded.

Results: The use of cutting guide brought the medial angle significantly closer to the desired angle of 60° for both surgeons, regardless of experience. The lateral angle was significantly closer to 60° in the consultant subgroup.

Conclusion: The cutting guide improves accuracy in the osteotomy angle of distal Chevron osteotomy in hallux valgus surgery, regardless of surgeon experience. Precise osteotomy angles are critical for optimising hallux valgus deformity correction in clinical practice. The cutting guide reduces inter-surgeon variability, enabling less experienced surgeons to achieve reliable results. By standardising the technique, it enhances procedural consistency. Further clinical studies are required to evaluate the direct impact on patient outcomes.

FP8.13

Acute effectiveness of ankle taping in dancers with chronic ankle instability

Jojo Hoi Ching Lai[1], Tracy Cheuk Chi Tang[2], Lucy Sum Yu Lo[2], Cheryl Shu Ming Chia[3], Samuel Ka Kin Ling[3], Patrick Shu Hang Yung[3]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Hong Kong Association of Dance Medicine and Science
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Lateral ankle sprains and chronic ankle instability (CAI) are prevalent among dancers, who often have greater ligamentous laxity than other athletes. Ankle taping is a common intervention, but its efficacy remains controversial, especially in dancers with CAI. This randomised crossover study examined the acute effects of taping on ankle stability and subjective functional outcomes in dancers with CAI versus control (non-CAI).

Methods: Eighty-nine dancers from local dance institutions were recruited, with 85 having completed the study. Participants underwent four ankle functional tests with and without taping, clinical screening for ankle instability and ligamentous laxity, and completed the Cumberland Ankle Instability Tool (CAIT) and questionnaire of taping perception. The CAI group was defined as having 1+ ankle sprain(s) and CAIT score ≤24, according to International Ankle Consortium guidelines. Control group was defined by dancers with no sprains or CAIT score >24.

Results: Among the dancers, 74.1% reported prior ankle sprains, and 64.7% met CAI criteria. Ankle taping significantly improved static balance in dancers with mild instability (functional CAI or non-hypermobile) but not in those with significant instability or impaired proprioception (mechanical CAI or hypermobile). No significant improvements were observed in dynamic balance or other functional tests, suggesting limited overall taping efficacy.

Conclusion: Ankle taping showed limited evidence of improving static balance in dancers with mild CAI; it did not enhance dynamic stability or functional outcomes. These findings did not support the routine use of ankle taping for dancers with CAI, suggesting a need to explore alternative treatments specific to this population.

FP8.14

Long-term effectiveness of pulsed electromagnetic field therapy on peroneal muscles and balance function in chronic ankle instability: a double-blinded randomised controlled trial

Cheryl Shu Ming Chia, Sai Chuen Fu, Ling Qing Xiao, Violet Man Chi Ko, Patrick Shu Hang Yung, Samuel Ka Kin Ling
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: The peroneal muscles play a key role in chronic ankle instability (CAI) by stabilising the lateral ankle, preventing excessive inversion, and providing proprioceptive feedback. Individuals with CAI commonly exhibit reduced eversion strength. Traditional neuromuscular training may not effectively target these muscles for improving postural control, potentially increasing the risk of recurrent sprains. Pulsed electromagnetic field (PEMF) therapy is a safe, non-invasive intervention that may enhance muscle strength and function. This study evaluated the clinical effectiveness of PEMF in managing CAI. It was hypothesised that PEMF combined with standard rehabilitation improved clinical functions compared to standard care alone.

Methods: In this double-blind randomised controlled trial, 62 CAI participants who received standard rehabilitation were randomly assigned to a PEMF group or sham control. Assessments were made at baseline, weeks 4 and 8, and at 3-, 6-, and 12-month follow-ups. Outcomes included postural sway (foot pressure mat), dynamic balance (Y balance test), peroneal strength (handheld dynamometer), pain (visual analogue scale), and function (Foot and Ankle Ability Measure for activities of daily living and sport). Data were analysed using generalised estimating equations.

Results: PEMF significantly reduced postural sway and improved eversion strength by week 8, with effects maintained up to 6 to 12 months. Foot and Ankle Ability Measure scores improved in the PEMF group, with gains in activities of daily living sustained at 1 year. Pain during exercise decreased by 6 months. No significant between group-differences were observed for dynamic balance.

Conclusion: PEMF combined with rehabilitation enhances peroneal strength, static balance, and function in CAI, although it may not improve dynamic balance.

FP8.15

Outcome of 3D-printed patient-specific-instrument-assisted lapidus fusion versus conventional lapidus fusion for surgical correction of hallux valgus deformity: a randomised control trial

Samuel Ka Kin Ling, Rachel Lok Ting Man, Rachel Xiaoyu Wei, Elvis Chun Sing Chui, Michael Tim Yun Ong, Pauline Po Yee Lui, Lucci Lugee Liyeung, Esther Man Wai Chow, Patrick Shu Hang Yung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Hallux valgus (HV) affects up to 30% of the population, leading to pain and functional impairment. Traditional surgical correction through Lapidus arthrodesis has issues, particularly a high risk of non-union. This study examines the effectiveness of 3D-printed patient-specific instruments (PSIs) in improving surgical precision and outcomes in Lapidus fusion.

Methods: A single-blinded, parallel-group randomised controlled trial was conducted at Prince of Wales Hospital, Hong Kong, involving 54 participants who were randomised into the experimental (PSI-assisted) group (n=27) and the control (conventional fluoroscopy-guided) group (n=27) for Lapidus fusion. Participants had symptomatic HV with a HV angle of >20°. Primary outcomes included the Foot and Ankle Outcome Score and radiographic union on X-ray; secondary outcomes examined the HV angle and intermetatarsal angle correction.

Results: All 54 patients were enrolled. PSI-assisted surgeries had significantly shorter operation times than conventional surgeries (93.3±17.9 vs 119.7±17.3 minutes, p=0.009). However, no significant differences were observed in Foot and Ankle Outcome Score or fusion rate at 12 and 26 weeks postoperatively. The mean HV angle reduced from 43.7° to 13.5° in the control group and from 40.0° to 15.6° in experimental group, with no significant group differences.

Conclusion: Although 3D-printed PSIs did not significantly improve clinical outcomes, the reduced operation time suggests potential benefits in surgical efficiency. Future studies should involve larger sample sizes and long-term outcomes.

FP8.16

The role of tendon thickness in Achilles function

Samuel Ka Kin Ling[1], Wenjie Pan, Violet Man Chi Ko[2], Joe Zuru Liang[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]National Institute of Education, Nanyang Technological University

Introduction: Achilles tendon thickness, typically measured via ultrasound, has become a widely used structural parameter in both research and clinical practice for evaluating Achilles tendinopathy. This study aimed to investigate the correlations between tendon thickness and clinical symptoms, functional range, and the Ohberg ultrasound score.

Methods: In total, 65 patients with varying severity of Achilles tendinopathy were enrolled. Data collected included tendon thickness, Victorian Institute of Sport Assessment-Achilles (VISA-A) score, ankle range of motion, and Ohberg ultrasound score. Pearson and Spearman correlation analysis was performed to evaluate the linear relationships between thickness and these variables, with correlation coefficients and significance levels reported.

Results: Achilles tendon thickness showed a significant negative correlation with VISA-A scores (r= -0.266, p=0.032) and ankle range of motion (r= -0.28, p=0.025), and a significant positive correlation with the Ohberg ultrasound score (r=0.401, p<0.001). These findings indicated that increased tendon thickness was associated with worse clinical symptoms, reduced functional performance, and greater structural abnormality.

Conclusion: Achilles tendon thickness is correlated with clinical symptoms, functional status, and ultrasound structural changes, supporting its role as an important structural indicator for multidimensional assessment of Achilles tendinopathy. Thickness measurement aids in evaluating disease severity and monitoring treatment response.

FP8.17

Application of platelet-rich plasma in different foot and ankle conditions: a single-centre retrospective review

Esther Man-wai Chow[1], Samuel Ka-Kin Ling[2], Lucci Lugee Liyeung[1]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: The healing and anti-inflammatory potential of platelet-rich plasma (PRP) has been demonstrated in the management of lateral epicondylitis and knee arthritis, but the existing evidence for foot and ankle conditions remains controversial. The aim of this study is to review the outcomes of PRP injection in foot and ankle pathologies.

Methods: Patients with PRP injections for foot and ankle conditions between January 2023 and May 2025 were reviewed. The radiological findings, Foot and Ankle Outcome Score (FAOS), patient satisfaction, complications, and secondary procedures were assessed retrospectively.

Results: Twenty-six patients with a mean age of 49.3 years were included. The mean follow-up duration was 12.2 months. The most common indications were ankle arthritis (12/26), Achilles or tibialis posterior tendinopathy (7/26), and plantar fasciitis (8/26). Adjunct procedures, arthroscopic chondroplasty (n=1) and radiofrequency tenotomy (n=3), were performed in four patients. Twenty-one (80.8%) patients reported at least partial pain relief during the early follow-up at 2 and 6 weeks. For functional scores, an improving trend was observed in all aspects, except for sports at 6 weeks, followed by a gradual decline. Secondary surgeries, including ankle arthroplasty, arthroscopic procedures, or repeated injections, were scheduled for eight patients to manage the underlying pathologies. There was no adverse effect or complication reported.

Conclusion: A short-term improvement in clinical outcomes after PRP injection was observed. Further comparative studies with longer follow-up and radiological evidence are required to confirm the effectiveness of PRP in treating different foot and ankle pathologies.

FP8.18

Comparison of 1.5-cm mini-open Achilles tendon repair and the Achillon device for Achilles tendon rupture

Cheuk Yi Cherry Sham, Hoi Yan Kwong, Samuel Ka-Kin Ling
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: To compare the outcomes of the mini-open 1.5-cm medial incision with Krackow locking sutures, and the percutaneous Achillon system for the repair of ruptured Achilles tendons.

Methods: A retrospective cohort study of 46 patients with Achilles tendon rupture who underwent either the 1.5-cm mini-open repair or the percutaneous repair using the Achillon device. Only patients with ≥1 year of follow-up were recruited. Operation time, postoperative complications, and clinical function (including the foot and ankle outcome score and time needed to return to sport) were analysed.

Results: There was no significant difference between the two groups in terms of operation time and time needed to return to sports. Regarding postoperative complications, one case of re-rupture occurred in the 1.5 cm mini-open group, two such cases occurred in the Achillon group, and one case of mild infection (treated with oral antibiotics) occurred in the Achillon group. The 1.5-cm mini-open group had lower mean Foot and Ankle Outcome scores in all sub-categories, with a significant difference (p=0.005) noted only in the pain score.

Conclusion: Both surgical techniques are comparable in terms of operation time, postoperative complication, and functional outcome. Both techniques yield good outcomes, and surgeons should continue to choose the technique that their hospital resources and preferences allow. Larger prospective clinical trials with >10 years follow-up will be beneficial to help draw more conclusive recommendations.

FP8.19

Radiological and early clinical outcome in fibular nailing for Weber B fractures: a prospective evaluation of restoration of fibular anatomy

Lucci Lugee Liyeung, Esther Man Wai Chow, Samuel Ka-Kin Ling
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Weber B fractures are traditionally treated with plate fixation, but locking fibular intramedullary (IM) nailing offers a minimally invasive alternative, especially in high-risk patients with poor soft tissue conditions or comorbidities. Precise restoration of fibular anatomy in Weber B fractures is critical for ankle biomechanics. This study evaluates fibular anatomical restoration in IM nailing using four radiological markers (Dime sign, Shenton's line, talocrural angle, and talar tilt) to objectively assess reduction quality. Clinical outcomes were also assessed and correlated.

Methods: A prospective case series of 12 isolated Weber B fracture with or without syndesmosis injury, treated with fibular IM nailing between July 2024 and July 2025 was analysed. Radiological assessment (under mortise view) included Dime sign (disruption >2 mm indicates malalignment), Shenton's line (disruption >2 mm indicates malalignment), talocrural angle (normal range, 8°-15°; <5° deviation from contralateral side), and talar tilt (>10° is abnormal). Clinical outcomes included visual analogue scale for pain and Foot and Ankle Outcome Score, with early complications recorded.

Results: Radiologically, all cases preserved intact Dime sign and Shenton's line. The mean talocrural angle was 10.5° (normal range), and the talar tilt was ≤2°. Clinically, patient-reported outcomes, Foot and Ankle Outcome Score, and pain score demonstrated high satisfaction levels postoperatively. No major complications or revision operations were recorded in the short-term follow-up.

Conclusion: Fibular IM nailing achieves consistent anatomic reduction across all essential radiological parameters, confirming its efficacy in restoring ankle biomechanics, and correlates with high patient satisfaction level.

Free Paper Session IX: Adult Joint Reconstruction II

FP9.1

Replace the hip, balance the spine! Total hip arthroplasty improves global sagittal spinal imbalance and spinopelvic mobility: a prospective cohort of 163 patients with EOS whole body postural radiographs

Thomas Ka Chun Leung[1], Wing Ki Cheung[2], Ping Keung Chan[2], Amy Cheung[1], Michelle Hilda Luk[1], Lawrence Chun Man Lau[2], Kwong Yuen Chiu[2], Henry FU[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP9.2

Minimising revision: long-term outcome and survivorship of porous tantalum acetabulum components in complex primary and revision total hip arthroplasty: a 10 to 20 year study

Chun Man Lawrence Lau[1], Kin Yau Alex Wong[2], Hongjian Hu[2], Ka Chun Thomas Leung[3], Michelle Hilda Luk[1], Ping Keung Chan[1], Amy Cheung[3], Henry Fu[1], Kwong Yuen Chiu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Applied Mathematics, The Hong Kong Polytechnic University
[3]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP9.3

Minimal risk of dislocation with robotic arm–assisted total hip arthroplasty: a review of 236 hips from a tertiary referral centre

Wing Tung Ng[1], Amy Cheung[1], Michelle Hilda Luk[1], Ka Chun Thomas Leung[1], Chun Man Lawrence Lau[1], Ping Keung Chan[1], Kwong Yuen Chiu, Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Robotic total hip arthroplasty (THA) has been shown to enhance the accuracy and precision of cup placement. We hypothesise that robotic THA may lead to a reduced risk of dislocation and lower readmission rates. This study aims to evaluate the dislocation rate and early complication rates associated with robotic THA at our institutions, including Queen Mary Hospital and the Duchess of Kent Children's Hospital.

Methods: We conducted a retrospective review of 236 robotic THA cases performed at a tertiary referral centre between April 2019 and April 2025. The mean follow-up period was 36.4 months. The primary outcome measures included revision and dislocation rates, whereas secondary outcome measures included unplanned readmissions at 30 and 90 days post-surgery. Data were collected through the Clinical Data Analysis and Reporting System.

Results: One patient had three episodes of recurrent dislocation requiring close reduction and eventually revision to dual mobility. Additionally, one patient had acute haematogenous periprosthetic joint infection at 6 months and 9 months requiring debridement and liner exchange. There were no accident and emergency attendances within 90 days.

Conclusions: Robotic THA is associated with a low dislocation rate and a low readmission rate. It proves to be an effective treatment modality for end-stage arthritis.

FP9.4

Functional cup positioning in total hip arthroplasty for patients with ankylosing spondylitis: a 20-year survivorship analysis

Kai Chun Augustine Chan[1], Amy Cheung[2], Ka Chun Thomas Leung[2], Michelle Hilda Luk[2], Chun Man Lawrence Lau[1], Ping Keung Chan[1], Kwong Yuen Chiu[3], Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[3]Department of Orthopaedics and Traumatology, Hong Kong Sanatorium and Hospital

Introduction: Functional cup positioning was introduced in total hip arthroplasty (THA) for patients with ankylosing spondylitis (AS) to reduce risk of dislocation. Our study aims to investigate the long-term survivorship of THA in Asian patients with AS.

Methods: This was a retrospective study involving Asian patients with AS who underwent primary THA between 1970 and 2014. A total of 116 hips in 77 patients were included, with at least 10 years of follow-up duration (mean, 20.7 years). Primary outcomes were revision-free and dislocation-free survival of THA up to 30-years. Survival between different fixation methods were compared. Secondary outcomes include postoperative complications, re-revision, and radiographic changes.

Results: The overall revision-free survivorships were 85.9%, 65.3%, and 22.6% at 10-year, 20-year, and 30-year follow-up, respectively. The most common cause for revision was aseptic loosening (54.3%), with cup loosening being the most common (31.4%). Thirteen (35.3%) hips were reoperated for polyethene wear. Five (62.5%) hips required multiple re-revisions due to recurrent implant loosening. No hips were reoperated for dislocation. The overall 10-year dislocation-free survival was excellent at 99.1%, with three anterior and one posterior dislocation cases, most commonly (75%) occurring within 1 year of operation. Differences between cemented, uncemented, and hybrid THAs were not significant (p=0.2). Cemented cups (hazard ratio [HR]=17.4) and stems (HR=6.9) had increased risk of revision due to loosening compared to uncemented cases.

Conclusion: Primary THA in patients with AS demonstrated favourable survival at 10 years but poor longer-term survival. Functional cup positioning demonstrated excellent results in terms of minimising dislocation. Cemented components had greater risk of aseptic loosening in long term, but differences were minimal considering all-cause revision.

FP9.5

Spino-pelvic profile in patients with hip osteoarthritis in Hong Kong

Chi Kin Lo
Department of Orthopaedics and Traumatology, Yan Chai Hospital

Introduction: Patients with hip osteoarthritis commonly have abnormal spine-hip relationship. Abnormal spine-pelvic profile is associated with dislocation of hip arthroplasty. The aim of this study is to look at the spine-pelvic profile in patient with hip osteoarthritis requiring total hip arthroplasty.

Methods: All patients requiring total hip arthroplasty were recruited from Yan Chai Hospital joint replacement centre between 2024 and 2025. All patients had standing and sitting lateral radiographs of the lumbar spine taken prior to operation. The sacral slope, pelvic incidence, and lumbar lordosis were measured.

Results: Up to 5% of such patients had abnormal spine hip relationship, which predisposes them to hip dislocation after total hip replacement.

Conclusion: Abnormal spine hip relationship is not uncommon in patient with osteoarthritis of the hip. Routine X-ray of the lumbar spine should be considered for planning total hip replacement.

FP9.6

Hip-knee relationship in an Asian population

Jerone Chiu[1], Chun Ho Lau[1], Amy Cheung[2], Michelle Hilda Luk[2], Ka Chun Thomas Leung[2], Chun Man Lawrence Lau[3], Henry Fu[3]
[1]LKS Faculty of Medicine, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[3]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Hip and knee degenerations are closely related, but the prevalence of concomitant total hip arthroplasty (THA) and total knee arthroplasty (TKA) remains unknown. This retrospective study aimed to determine the prevalence, time interval, and outcomes in patients who received concomitant THA and TKA.

Methods: In this retrospective study, all THA operations performed in all public hospitals in Hong Kong between 2010 and 2019 were identified via the Clinical Data Analysis and Reporting System. Those who underwent concomitant TKA before or after THA were analysed. Influences of demographic and diagnostic factors on incidence of TKA and THA-TKA relationship were determined. Clinical outcomes were compared between patients with both THA and TKA and those with THA alone.

Results: Among 4666 THAs identified, 419 (8.98%) TKAs from 330 patients were performed either prior to or 10 years after the THA. The hazard for contralateral pairs was higher than ipsilateral pairs (hazard ratio [HR]=1.495, $p<0.001$), and the hazard for TKA after THA was higher than that for TKA before THA (HR=1.496, $p<0.001$). Older age, female sex, and rheumatoid arthritis were significant predictors for receiving TKA ($p<0.001$). Male sex and indication of avascular necrosis had significantly different THA-TKA patterns ($p<0.05$). Length of hospital stay was significantly longer in THA patients with TKA than in THA patients without TKA ($z= -2.425$, $p=0.015$).

Conclusion: A strong relationship between contralateral THA and TKA may be related to increased weight loading on contralateral side. Knee degeneration in older female patients with rheumatoid arthritis should be monitored more often. THA has good outcomes regardless of prior TKA.

FP9.7

Cementless and cemented medial congruent total knee arthroplasty: an early result

Chun Man Lawrence Lau[1], Basara Wei[1], Jessie Tsang[1], Ka Chun Thomas Leung[2], Michelle Hilda Luk[2], Ping Keung Chan[1], Amy Cheung[1], Kwong Yuen Chiu[1], Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP9.8

Clinical outcomes of posterior stabilised versus medial congruent total knee arthroplasty

Chun Man Lawrence Lau[1], Basara Wei[1], Jessie Tsang[1], Ka Chun Thomas Leung[2], Michelle Hilda Luk[2], Ping Keung Chan[1], Amy Cheung[1], Kwong Yuen Chiu[1], Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP9.9

Constrained posterior stabilised inserts yield comparable early outcomes to posterior stabilised inserts in total knee arthroplasty for severe deformities in an Asian cohort: a retrospective study

Hoi Kin Leung, Chun Yin Lee, Kwok Hung Leung
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Constrained posterior stabilised (CPS) inserts offer mid-level constraint for moderate to severe deformities in total knee arthroplasty (TKA) compared to standard posterior stabilised (PS) inserts. This study compares their early clinical and radiographic outcomes.

Methods: A retrospective cohort study was conducted for 91 patients who underwent primary TKA using CPS (n=31) or PS (n=60) at Tuen Mun Hospital between January 2022 and December 2024. Outcomes included hip-knee-ankle (HKA) alignment angles, visual analogue scale (VAS) pain scores, knee range of motion (ROM), and Knee Society Score (KSS) knee and function subscores at 3 and 6 months post-TKA. Data were analysed using Mann-Whitney *U* and Chi-squared tests (α=0.05). The mean follow-up duration was 23.5±6.6 months.

Results: At 3 months, the CPS group had lower KSS knee subscore (81.6±12.3 vs 84.6±21.7, p=0.04) and function subscore (53.0±22.0 vs 57.1±21.5, p=0.03), compared with the PS group, but the differences became non-significant by 6 months for KSS knee subscore (87.5±11.8 vs 91.8±7.53, p=0.29) and function subscore (67.3±19.2 vs 67.9±18.0, p=0.65). VAS pain scores and knee ROM were similar between groups. The CPS group had more valgus deformities (19 vs 5, p<0.01). In the varus subgroup, CPS patients had higher pre- and post-operative HKA angles (p≤0.03). No implant loosening occurred.

Conclusion: CPS inserts achieve comparable 6-month outcomes to PS inserts, effectively managing severe deformities despite early functional differences.

FP9.10

Kinematic analysis of inlay versus onlay technique for patella resurfacing in primary total knee arthroplasty

Yan Zhe Victor Lu[1], Cham Kit Wong[2], Michael LaCour[3], Richard Komistek[3], Wang Fung Rex Mak[4], Jonathan Patrick Ng[2], Yan Ting Gloria Lam[4], Tsz Lung Choi[4], Tim Yun Michael Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Mechanical, Aerospace, and Biomedical Engineering, Centre for Musculoskeletal Research, University of Tennessee
[4]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: The onlay and inlay methods are used for patella resurfacing in total knee arthroplasty. To date, kinematic analyses comparing these techniques remain scarce. This study aims to compare weight bearing kinematic profiles of inlay and onlay patellar resurfacing techniques.

Methods: In total, 28 patients using an inlay technique and nine using an onlay technique were included. Patients were asked to perform a weight-bearing deep knee bend under fluoroscopic surveillance. Kinematics were measured at maximum flexion, full extension, and 30° increments until full extension was reached. Kinematic parameters included maximum weight-bearing flexion, lateral anterior/posterior position (positive is anterior), medial anterior/posterior position, and femorotibial axial rotation (positive is external rotation). Knee Society Function Score (KSFS) and Knee Society Score (KSS) data were collected preoperatively and 12 months postoperatively.

Results: Kinematic data showed no differences in maximum weight-bearing flexion between inlay cohort (105°±7.1°) and onlay cohort (104°±21.5°). Both inlay and onlay cohorts showed consistent posterior condylar rollback for lateral condyle (-12.6±4.84 vs -11.1±8.48 mm) and medial condyle (-5.8±2.11 vs -5.4±5.18 mm). There were no differences in total femorotibial condylar motion from full extension to maximum flexion (+8.3°±5.68° vs +7.0°±6.78°). Both cohorts experienced similar postoperative improvements in KSFS (+27±27.3 vs +26±15.8) and KSS (+33±17.5 vs +36±23.0).

Conclusion: Both inlay and onlay techniques result in similar improvement in patient outcomes and weight-bearing kinematics. Surgical expertise and patient specific factors should drive decision making for patellar resurfacing techniques.

FP9.11

Comparison of clinical outcomes and kinematics of cruciate-retaining and medial congruent cruciate-retaining implants

Ashley Ying-Ying Wong[1], Michael Tim-Yun Ong[2], Tianzhi Jiang[2], Tsz Lung Choi[3], Gloria Yan-Ting Lam[3], Rex Wang-Fung Mak[1], Cham Kit Wong[3], Jonathan Patrick Ng[1], Xin Yang[2], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Cruciate-retaining (CR) TKA is a popular choice, with various designs available based on differing rationales. The Triathlon CR uses a single radius design to restore the centre of rotation to achieve a constant ligament tension and stability. The Persona CR medial congruent (MC) implant stabilises the knee through its medial conformity and anterior constraint design. This study aims to compare the functional outcomes and kinematics of these two implants.

Methods: This was a retrospective cohort study. All TKAs were robotic assisted. Clinical function scores were recorded at 6 and 12 months. Kinematics were evaluated with a marker-based motion analysis system for walking, stairs, and sit-to-stand.

Results: The study included 60 Triathlon CR and 40 Persona CR MC users. The Persona CR MC group showed significantly better Knee Society Scores at 6 and 12 months. For kinematic analysis, the Triathlon CR group had significantly higher knee valgus movement during stairs and sit-to-stand, and increased maximum knee flexion and range of motion during stairs. The Persona CR MC group demonstrated increased external rotation in all three assessments, and significantly in sit-to-stand.

Conclusion: This study demonstrates the advantage of the MC design. Instability is a crucial factor for postoperative pain. Previous studies have shown that anterior cruciate ligament–deficient knees would adapt their gait to reduce their peak knee flexion to avoid a strong quadriceps contraction that worsens the anterior translation. The increased femoral external rotation also corresponds to previous fluoroscopic studies.

FP9.12

Metaphyseal fixation devices in total knee arthroplasty: a retrospective review

Ho Yin Chan, Jeffrey Chun Yin Lee, George Kwok Hung Leung
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Metaphyseal fixation devices, including tibial sleeves and cones, are increasingly utilised in total knee arthroplasty (TKA) to manage bone loss and enhance implant stability in complex cases. This retrospective study evaluates their clinical and radiological outcomes at our centre.

Methods: A cohort of 18 patients (mean age, 68.8±8.1 years; 61.1% male) who underwent TKA with metaphyseal fixation devices (10 sleeves, 8 cones) between 2021 and 2025 was analysed. Data were retrieved from the hospital joint registry and electronic medical records, including demographics, surgical indications, implant specifications, Anderson Orthopaedic Research Institute bone defect classification, clinical outcomes (Knee Society Scores [KSS] for knee and function, complications, revision rates), and radiological outcomes (implant loosening). KSS changes were assessed using paired t-tests (α=0.05).

Results: The mean follow-up duration was 20.5±14.4 months. Indications were primary osteoarthritis with bone loss (33.3%, n=6), aseptic loosening (33.3%, n=6), periprosthetic joint infection (27.8%, n=5), and periprosthetic fracture (5.6%, n=1). All defects were Anderson Orthopaedic Research Institute type 2A (n=10) or 2B (n=8). KSS knee scores improved from 57.4±26.0 preoperatively to 83.4±12.1 postoperatively (p=0.0004, n=14). Function scores increased from 29.6±32.9 to 66.8±16.7 (p=0.0006, n=14). Two (11.1%) revisions occurred due to periprosthetic joint infections requiring polyethylene insert exchange. No implant loosening was observed.

Conclusion: Metaphyseal fixation devices in TKA yielded significant KSS improvements, low revision rates, and no loosening. These findings support their efficacy for managing bone defects.

FP9.13

Natural history of biological fixation in highly porous cementless total knee arthroplasty with minimum of 2 years of follow-up

Kai Chun Augustine Chan[1], Amy Cheung[2], Ka Chun Thomas Leung[2], Michelle Hilda Luk[2], Chun Man Lawrence Lau[1], Ping Keung Chan[1], Kwong Yuen Chiu[3], Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[3]Department of Orthopaedics and Traumatology, Hong Kong Sanatorium and Hospital

FP9.14

Timing is everything: does discharge timing affect postoperative outcomes of arthroplasty?

Tin Oi Josephine Yu[1], Yim Ling Amy Cheung[2], Michelle Hilda Luk[2], Ka Chun Thomas Leung[2], Chun Man Lawrence Lau[1], Ping Keung Lewis Chan[1], Kwong Yuen Peter Chiu[1], Chun Him Henry Fu[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP9.15

Comparing monopolar and bipolar diathermy for haemostasis in total knee arthroplasty: a randomised controlled trial

Michelle Hilda Luk[1], Ka Chun Thomas Leung[1], Chun Man Lawrence Lau[2], Amy Cheung[1], Ping Keung Chan[2], Kwong Yuen Chiu[2], Henry Fu[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP9.16

Sonication of explanted components as a clinical adjunct for the microbiological diagnosis of periprosthetic or peri-implant infections: a diagnostic accuracy study

Ka Lee Li[1], Sai Ka Li[2], Chun Man Lawrence Lau[3], Ka Chun Thomas Leung[4], Michelle Hilda Luk[4], Yim Ling Amy Cheung[4], Wai Kwan Vincent Chan[4], Chun Him Henry Fu[3], Kwong Yuen Peter Chiu[3], Ping Keung Chan[3]
[1]School of Clinical Medicine, The University of Cambridge
[2]School of Health and Medical Sciences, St George's, University of London
[3]Department of Orthopaedics and Traumatology, The University of Hong Kong
[4]Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Antimicrobial treatment in implant infections can greatly affect patient outcomes but requires rapid and successful microbiological diagnosis. Microbiological diagnosis of implant infections is made by culturing of peri-implant tissues and synovial fluid. Sonication may allow for biofilm dislodgement from implant surfaces and then the sonication fluid was cultured for bacteria. We hypothesised that sonication fluid culture would have a higher diagnostic accuracy than conventional microbiological methods.

Methods: This was a prospective study comparing conventional microbiological diagnostic methods for peri-implant infection or periprosthetic joint infection with sonication of explanted orthopaedic implants (including hip and knee prostheses). Patients were divided into peri-implant infections or aseptic failure who were reference groups for evaluating all microbiological culture methods.

Results: In total, 122 patients were included, of which 60 had peri-implant infections and 62 had aseptic failure. Implants removed included 59 knee prostheses, 40 hip prostheses, and 18 fracture-fixation implants. The sensitivity of the sonication fluid culture was inferior to peri-implant tissue cultures (33.3% vs 68.3%, $p<0.001$). The culture specificities of sonication fluid and peri-implant tissue were 100% and 98.4% respectively, and the positive predictive values were 100% and 97.6% respectively. The area under the curve for number of organisms detected in sonication fluid cultures was 0.672 (95% confidence interval, 0.612-0.732).

Conclusion: Sonication fluid culture showed a high specificity and positive predictive value, compared to conventional microbiological methods, indicating excellence at avoiding false positives. Sonication fluid culture could be considered as a clinical adjunct to conventional microbiological methods.

FP9.17

Next-generation sequencing for microbial detection in prosthetic joint infections

Rhoda Cheuk-Ying Leung[1], Allen Wing-Ho Chu[1], Wan-Mui Chan[1], Michelle Hilda Luk[2], Chun Man Lawrence Lau[3], Yim Ling Amy Cheung[2], Chun Him Henry Fu[3], Kwong Yuen Peter Chiu[3], Ping Keung Chan[3], Kelvin Kai-Wang To[1]
[1]Department of Microbiology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[3]Department of Orthopaedics and Traumatology, The University of Hong Kong

FP9.19

Enhanced recovery after surgery for total knee replacement in a Hong Kong public hospital

Ho Ken Fong[1], Wai Wang Chau[2], Ying Cheung Cheng[1], Man Kwan Wong[1]
[1]Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Enhanced recovery after surgery (ERAS) for total knee replacement (TKR) is a multimodal and multidisciplinary approach to enhance patient outcomes. ERAS was first introduced in 1997 and further refined with published guidelines for TKR in 2020. Our institute has adopted ERAS for TKR since 2017. This study aimed to outline our ERAS protocol for TKR and assess its outcomes in terms of length of hospital stay.

Methods: A retrospective cohort study was carried out to compare patients treated by ERAS after TKR (between 2021 and 2023) with a conventional historical cohort (between 2013 and 2016). Data from preoperative, immediate after TKR, and 3 months post-TKR were collected through clinical and medical records.

Results: A total of 1283 patients who underwent TKR (708 in the ERAS group and 575 in the conventional group) were recruited. Both median preoperative (0 vs 1 day, $p<0.001$) and total lengths of hospital stay (6 vs 8 days, $p<0.001$) were significantly reduced in the ERAS group. The mean interval between hospital admission and surgery was significantly shorter in the ERAS group (0.01 vs 0.04 month, $p=0.049$). In stepwise linear regression analysis, applying ERAS remained a significant predictor for a reduced length of hospital stay ($r^2=0.064$, coefficient [95% confidence interval]= -1.01 [-1.89 to -0.13], $p=0.024$) after controlling for surgical side, use of navigation, and choice of deep vein thrombosis prophylaxis and anaesthesia.

Conclusion: After implementation of ERAS in patients after TKR, the length of hospital stay was significantly decreased, regardless of the use of navigation and the choice of deep vein thrombosis prophylaxis and anaesthesia. Further multicentre large-scale long-term studies to explore long-term outcomes and quality-of-life measures post-TKR are warranted.

FP9.20

From traditional to virtual: enhancing access and clinic efficiency by migrating stable postoperative joint replacement cases to telehealth nurse clinic

Pok Man Fung
Department of Nursing, The Duchess of Kent Children's Hospital at Sandy Bay

Introduction: The rising demand for joint replacement surgeries and the shortage of orthopaedic doctors have led to frequent clinic overruns and prolonged patient waiting times. To address this, nurse-led telehealth follow-up model was implemented at Duchess of Kent Children's Hospital at Sandy Bay to manage patients with stable postoperative joint replacement to alleviate burdens on doctor's clinic.

Methods: A comparative study design was adopted. Patients with stable bilateral knee replacement who met the inclusion criteria and were capable of telehealth use via HA Go were recruited. Two groups were compared: traditional doctor-led in-person follow-ups versus nurse-led telehealth consultations. Outcome measures included clinic overrun rate, doctor-to-patient ratio, clinical outcomes (Knee Society knee score and functional score), and patient satisfaction. Statistical analysis was performed using SPSS v30.0.

Results: Following implementation on April 2024, monthly nurse-led telehealth cases increased from 0.3 to 14.8. Clinic overrun decreased from 83.3% to 36.4%, and the doctor-to-patient ratio improved from 1:21.7 to 1:14.3. No significant differences were found in Knee Society knee score and functional score between groups. Patient satisfaction was high, with 93.4% expressing agreement or above on satisfaction and 90.2% expressing confidence in nurse-led telehealth.

Conclusion: Nurse-led telehealth follow-up is effective, acceptable, and clinically comparable to traditional care. It enhances clinic efficiency, reduces doctor burden, and improves accessibility, especially for patients with mobility issues or living in remote areas. Results support wider integration of telehealth in orthopaedic follow-up care.

FP9.21 *New Zealand Orthopaedic Association Ambassador Paper*

Spinopelvic parameters associated with prosthetic impingement in patient undergoing total hip arthroplasty

Woo-sung Kim

Introduction: The orientation of the acetabular component is important for both short- and long-term survival of total hip arthroplasty (THA). Despite the placement of acetabular components in the traditionally recommended 'safe zone', dislocations and instability (including prosthetic impingement) remain an issue. The purpose of this study was to evaluate the relationship between key spinopelvic parameters and prosthetic impingement in patients undergoing primary THA.

Methods: A series of 1592 patients who underwent THA and had functional lateral radiographs and computed tomography scans taken. Two spinal parameters and two pelvic mobility parameters were investigated for their association with impingement. Each patient was evaluated for anterior and posterior impingement at all orientations within the traditional safe zone and the patient-specific functional safe zone.

Results: Patients with limited lumbar flexion (stiff spine), higher pelvic incidence–lumbar lordosis mismatch (sagittal imbalance), and increased anterior pelvic rotation from standing to flexed state were more likely to experience anterior impingement. Conversely, patient with larger posterior pelvic tilt on standing, increased posterior pelvic rotation from supine to standing exhibited increase posterior impingement. Prosthetic impingement was reduced three-fold when the target cup orientation was customised to patient's functional safe zone rather than a generic target. Additionally, 6% of patients showed unavoidable impingement even with an optimised functional cup orientation.

Conclusion: Patients with degenerative spine and adverse pelvic mobility are likely to have unfavourable functional acetabular cup orientations, resulting in prosthetic impingement. Preoperative clinical assessment and functional radiographs are recommended to facilitate the customised approach.

Free Paper Session X: Sports Medicine II

FP10.1

Barriers to rehabilitation after anterior cruciate ligament reconstruction: a qualitative focus group analysis

Sik Lok To, Tze Kit Wan, Andrew Ka Hei Fan, Nin Tai Mak
Department of Orthopaedics and Traumatology, United Christian Hospital

FP10.2

Constructing a machine learning model to predict anterior cruciate ligament re-rupture rate: a feasibility study

Ryan Wai Chung Hui[1], Elvis Chun Sing Chui[2], Jasmine Yee Lam Louie[1], Patrick Jonathan Ng[2], Rex Wang Fung Mak[2], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2], Dennis Cham Kit Wong[3]
[1]The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Graft re-rupture following anterior cruciate ligament (ACL) reconstruction remains a significant challenge despite advancements in surgical techniques and rehabilitation. There are limited studies using machine learning algorithm to predict failure after ACL reconstruction. Furthermore, rehabilitation status in terms of return to play (RTP) has also been neglected in previous studies. The aim of this study is to assess the feasibility of applying a machine learning algorithm in evaluating the significance of multiple factors in predicting ACL re-rupture.

Methods: A retrospective cohort of 100 patients from an ACL registry was included, as were 19 different prognostic features. Data were pre-processed using pandas and scikit-learn in Python. Categorical variables were encoded numerically, and a tuned gradient-boosting classifier with 100 estimators was trained to predict ACL re-rupture. The dataset was split 80:20 into training and test sets with stratified sampling to address class imbalance. Model performance was evaluated using precision, recall, F1-score, accuracy, area under the curve–receiver operating characteristic (AUC-ROC), and 5-fold cross-validation. Feature importance was visualised to identify key predictors.

Results: The gradient-boosting classifier achieved a test set accuracy of 60% (n=20). The AUC-ROC was 0.58, with cross-validation AUC-ROC scores ranging from 0.48 to 0.92 (mean=0.71). Primary/revision (0.31), Hip-index-deficits (0.13), and max flexion (0.10) were ranked as the top predictive features of re-rupture.

Conclusion: Our model demonstrated moderate performance in predicting ACL re-rupture, highlighting the potential of machine learning as a clinical tool. Further improvements, for example using MLPClassifier as an alternative, can help enhance the generalisability of our model.

FP10.3

Correlation between early postoperative clinical outcomes and bone tunnel morphological parameters on high-resolution peripheral quantitative computed tomography in anterior cruciate ligament reconstruction

Cham Kit Wong[1], Aide Tianyi Zang[2], Jerry Jiankun Xu[2], Pauline Po Yee Lui[2], Bruma Sai Chuen Fu[2], Rex Wang Fung Mak[1], Jonathan Patrick Ng[1], Michael Tim Yun Ong[2], Patrick Shu Hang Yung[2]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Complications after anterior cruciate ligament (ACL) reconstruction include bone tunnel enlargement and decreased bone density. Tunnel morphological changes can be early indicators of graft failure. However, the relationship between specific bone tunnel structural characteristics and clinical outcomes remains poorly understood. High-resolution peripheral quantitative computed tomography (HR-pQCT) can precisely evaluate these parameters.

Methods: This study investigated 33 patients (mean age, 27.09±7.29 years; 20 males) who underwent ACL reconstruction. Patients were assessed at 4 and 6 months post-surgery using HR-pQCT to measure bone volume fraction (BV/TV), trabecular thickness (TbTh), and tunnel enlargement ratios. Clinical outcomes were evaluated through isokinetic muscle strength tests, single leg hop tests, ultrasound muscle thickness measurements, and patient-reported outcomes using the International Knee Documentation Committee questionnaire and Lysholm Knee Scoring Scale.

Results: At 4 months, knee extension strength positively correlated with tibial BV/TV (r=0.351, p=0.05), femoral BV/TV (r=0.39, p=0.035), and femoral TbTh (r=0.388, p=0.034), while negatively correlating with tibial tunnel enlargement (r= -0.358, p=0.043). Vastus medialis thickness correlated with tibial tunnel enlargement (r= -0.381, p=0.029). By 6 months, single-leg hop distance correlated with femoral TbTh (r=0.397, p=0.045). Receiver operating characteristic analysis showed that femoral TbTh and BV/TV at 4 months had high accuracy (area under the curve=0.746-0.751) in predicting muscle strength.

Conclusion: Early bone tunnel characteristics are associated with functional recovery after ACL reconstruction. Early HR-pQCT assessments could guide personalised rehabilitation strategies, potentially improving patient outcomes. Larger studies with longer follow-up are needed to validate these results.

FP10.4

Decade of progress: anterolateral ligament reconstruction in primary anterior cruciate ligament surgery

Kevin Chi Him Fok[1], Tak Man Wong[2]
[1]Department of Orthopaedics and Traumatology, Queen Mary Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Lateral extra-articular procedures (LEAP) have been reported to augment primary anterior cruciate ligament (ACL) reconstruction using hamstring autografts, potentially reducing re-rupture rates and clinical failures. However, the applicability of this procedure to the Hong Kong population remains underexplored.

Methods: A review of ACL surgery outcomes at a tertiary referral hospital between 2016 and 2022 was conducted. Inclusion criteria comprised primary ACL reconstruction using hamstring autografts, single-bundle reconstruction, and a minimum follow-up of 2 years. Exclusion criteria included revision ACL reconstructions, inadequate follow-up, prisoners, and injury-on-duty cases. Primary outcome measures were re-ruptures, defined via magnetic resonance imaging or arthroscopy, and clinical failures, defined as asymmetric pivot shifts.

Results: In total, 118 male and 41 female patients (mean age, 29.3±9.1 years) were included. The mean follow-up duration was 4.1±2.1 years. Fifty-eight patients underwent anterolateral ligament reconstruction (ALLR). Fourteen (8.8%) patients experienced re-ruptures during the follow-up period, with four (2.5%) occurring within 2 years and 10 (6.3%) after 2 years. Re-ruptures were significantly more common in individuals who were smokers or have greater tibial slope and graft diameters. ALLR did not significantly reduce re-rupture rates or postoperative pivot shifts.

Conclusion: Re-ruptures were notably higher in smokers and those with greater tibial slope and graft diameters. ALLR did not decrease re-rupture rates or postoperative pivot shifts in Southeast Asians. Lateral extra-articular tenodesis has emerged as the prevalent surgical technique, warranting further follow-up to assess its efficacy.

FP10.5

Engineered hydrogels for tunable mRNA release: enhancing TGF-β3 mRNA therapy for tendon regeneration

Ruijia Huang[1], Zhenyu Zhong[2], Junling Guo[3], Yi Kuang[4], Dan Wang[2]
[1]School of Biomedical Sciences, Faculty of Medicine, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[3]College of Biomass Science and Engineering, Sichuan University
[4]Department of Chemical and Biological Engineering, The Hong Kong University of Science and Technology

Introduction: The success of mRNA vaccines in combating COVID-19 has underscored their safety and efficacy, sparking interest in their potential applications within tissue engineering, including tendon regeneration. However, the lengthy healing process of tendons necessitates sustained mRNA delivery, yet effective delivery systems remain lacking, severely limiting mRNA's therapeutic efficacy. To address this, a polyphenol-metal network-integrated hydrogel (MPNGel) system was developed for the controlled delivery of TGF-β3 mRNA-LNP to facilitate tendon repair.

Methods: The morphology, mechanical property, and biocompatibility of the MPNGel were characterised using scanning electronic microscope, compression tester, and LIVE/DEAD assay. The sustained transfection efficacy of MPNGel were verified in vivo using mice subcutaneous implantation model. The pro-tendon healing efficacy of TGF-β3 mRNA-LNP loaded MPNGel was validated using a rat Achilles tendon defect model.

Results: MPNGel achieved tunable porous architectures that modulate the diffusion pathways of loaded mRNA-LNPs, while enhancing mechanical properties and maintaining excellent cytocompatibility. This delivery system effectively modulated the release kinetics of mRNA, enabling tunable protein expression for up to 11 days in vivo following implantation. In the Achilles tendon defect model, the therapeutic effects increased as the delivery kinetics of TGF-β3 mRNA-LNP were prolonged, with optimal tendon repair outcomes observed in the group with an 11-day transfection duration.

Conclusion: This study provides new insights into the relationship between mRNA delivery kinetics and the tissue regeneration outcome, offering a promising strategy to fully harness the potential of mRNA therapy in tissue engineering.

FP10.6

Biodegradable and high-oriented piezoelectric electrospun nanofibres for enhanced tendon regeneration

Zhenyu Zhong[1], Zhihao Lin[2], Ruijia Huang[3], Zhongyi Feng[4], Yang Xu[3], Yuxin Wang[3], Dai Fei Elmer Ker[5], Zhengao Wang[2], Dan Michelle Wang[1], Chengyun Ning[4]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]College of Materials and Energy, South China Agricultural University
[3]School of Biomedical Sciences, Faculty of Medicine, The Chinese University of Hong Kong
[4]School of Materials Science and Engineering, South China University of Technology
[5]Department of Biomedical Engineering, Hong Kong Polytechnic University

Introduction: Tendon regeneration remains a major clinical challenge, as tendons have poor regenerative capacity, often leading to disordered fibrous structures, scarring, and high re-tear rates. Piezoelectric materials have emerged as promising candidates for tendon repair. However, piezoelectric materials that combine high piezoelectric effects with biodegradability remain limited in tissue engineering. We fabricated a biodegradable, highly oriented piezoelectric nanofibre membrane, known as PHNM, with enhanced piezoelectric properties using electrospinning technology, and validated its potential for tendon repair.

Methods: The highly oriented nanostructure and piezoelectric properties of PHNM were assessed by scanning electron microscopy and piezoresponse force microscopy, respectively. Its biodegradability was validated by an in vitro degradation assay in phosphate-buffered saline. The tenogenic capacity of HFNM was validated using a rat Achilles tendon defect model.

Results: The PHNM with highly oriented nanofibres was successfully obtained using the electrospinning method. The PHNM continuously degraded as soaking time in phosphate-buffered saline increased, with a total weight loss of 80% in 2 weeks. Haematoxylin and eosin staining revealed that PHNM showed less cellularity distribution and a higher ordered fibre orientation, compared to the defect group. Semi-quantitative analysis of cellular orientation further indicated that cells were more aligned in the PHNM group than in the defect group at 1-month post-surgery.

Conclusion: The PHNM, with its highly oriented nanostructure and enhanced piezoelectric properties, shows great potential in tendon tissue engineering. Future studies will focus on evaluating its in vivo performance and the underlying mechanisms that promote tendon healing.

FP10.7

Early reports of chondral lesion fixation using suture bridge technique in skeletally immature patients with open distal femoral physes

Tak-man Wong[1], Kevin Chi-him Fok[2], Janus Siu-him Wong[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP10.8

Associations between rotator cuff fatty infiltration, serum lipid levels, and statin use

Janus Siu-him Wong[1], Kevin Chi-him Fok[2], Brian Lik-hang Leung[2], Augustine Kai-chun Chan[1], Tak Man Wong[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

FP10.9

Sport-specific versus conventional biomechanical assessments in identifying anterior cruciate ligament injury risk factors in badminton

Zuru Liang[1], Tianzhi Jiang[2], Chi Yin Choi[1], Lok Ting Man[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Anterior cruciate ligament (ACL) injuries are common in badminton, often occurring during knee pivoting with reduced knee flexion and increased knee abduction angles. Although traditional biomechanical assessments such as drop landing (DL) and single-leg hop (SLH) are used to evaluate ACL injury risk, evidence suggests these methods may inadequately capture risks specific to elite athletes. Most ACL injuries in badminton occur during forward lunges (FL) and single-leg landings after jump smashes (JS). This study aimed to compare knee kinematics during badminton-specific movements (JS and FL) with conventional assessments (DL and SLH).

Methods: Seven competitive badminton players participated. Kinematic data were collected using inertial measurement unit sensors, and landing mechanics were analysed with video-based landing error scoring system. Electromyography data were used to calculate hamstring-to-quadriceps co-activation ratios. Knee kinematics were measured at initial contact during DL, SLH, FL, and JS.

Results: One participant was identified as high risk (landing error scoring system >5) during DL, whereas three exhibited knee abduction angles >5° during SLH. In FL, two participants demonstrated knee abduction >5°. During JS, four participants showed significantly greater knee abduction (>5°). Notably, two participants with excessive abduction during JS or FL were not identified as high risk in conventional assessments. Co-contraction ratios did not differ significantly across tasks.

Conclusion: Conventional assessments may inadequately identify ACL injury risk during badminton-specific movements. Incorporating sport-specific kinematic analysis (eg, JS, FL) could enhance injury prevention strategies. Future research should validate these findings in larger cohorts.

FP10.10

Constructing a machine learning model to predict cuff retear rate: a feasibility study

Yee Lam Jasmine Louie[1], Jonathan Patrick Ng[2], Wai Chung Hui[1], Chun Sing Chui[1], Wang Fung Rex Mak[2], Cham Kit Dennis Wong[2], Tim Yun Michael Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Cuff retear following arthroscopic rotator cuff repair remains a challenge despite advancements in surgical techniques. Apart from achieving a stable repair construct, meticulous patient selection is one of the most important factors in achieving a successful outcome. The aim of this study is to assess the feasibility of applying a machine learning algorithm in evaluating the significance of multiple factors in the prediction of cuff retear.

Methods: A retrospective cohort of 125 patients from a cuff repair registry and 13 different prognostic features were included. Data were pre-processed using pandas and scikit-learn in Python. Categorical variables were encoded numerically, and a tuned gradient boosting classifier with 100 estimators was trained to predict cuff retear. The dataset was split 80:20 into training and test sets with stratified sampling to address class imbalance. Model performance was evaluated using precision, recall, F1-score, accuracy, area under the curve–receiver operating characteristics (AUC-ROC), and 5-fold cross-validation.

Results: The gradient boosting classifier achieved a test set accuracy of 60% (n=20). The AUC-ROC was 0.69, with cross-validation AUC-ROC scores ranging from 0.58 to 0.83 (mean=0.72). Length of tendon retraction (0.43), degree of fatty infiltration (0.23), and number of full tendon torn (0.18) were ranked as the top predictive features of cuff retear.

Conclusion: Our model showed moderate performance in predicting cuff retear, highlighting the potential of machine learning as a clinical tool. With further expansion of the data registry, it is hoped that the model will develop with greater generalisability for surgical planning and prognostication.

FP10.11

Correlations of radiological measurements and clinical outcomes in reverse shoulder arthroplasty: 10-year experience in United Christian Hospital

Kejun David Wei, Tze Kit Kelvin Wan, Andrew Ka Hei Fan, Nin Tai Sammy Mak
Department of Orthopaedics and Traumatology, United Christian Hospital

FP10.12

Augmented reality-assisted high tibial osteotomy: surgical precision and efficiency

Elvis Chun sing Chui[1], Jamie Chiu Tsun[1], Shaolong Kuang[2], Yiu Wa Ho[1], Xin Ye[1], Junlin Ye[1], Ronald Man Yeung Wong[1], Jonathan Patrick Ng[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Shenzhen University of Technology

Introduction: Precise osteotomy is crucial for successful high tibial osteotomy (HTO) in lower limb realignment. Augmented reality (AR) can greatly improve surgical efficiency and accuracy. We assess how HoloLens 2 AR technology can guide osteotomy during HTO and allow real-time visualisation of the cutting plan and enabling immediate execution.

Methods: We used 12 synthetic bone models to simulate medial opening wedge HTO. For each simulation, we created and uploaded the preoperative osteotomy plane and correction angle to the HoloLens 2 AR system. Surgeons wore AR headsets to overlay the planned cutting line onto the models, and then performed the osteotomy and fixed it with a locking plate. The main outcome measured was the accuracy of the osteotomy, defined as the deviation from the planned cuts.

Results: All twelve osteotomies were successfully completed with AR guidance, achieving a mean deviation of 2.2 mm from the planned cuts. Surgeons effectively used AR to identify and follow the cutting plane, saving time compared to traditional methods.

Conclusion: AR-assisted HTO with HoloLens 2 enables surgeons to visualise and perform osteotomies according to preoperative plans with better accuracy and efficiency. This approach could improve the precision of the osteotomy procedure. Future studies will explore the system's impact on patient outcomes in live surgeries.

FP10.13

Artificial intelligence– and large language model–integrated reverse shoulder arthroplasty planning improves efficiency, implant positioning, and safety: a comparative study

Chun Sing Elvis Chui[1], Junlin Ye[2], Li Liang Darren Wong[3], Xin Ye[2], Xiaoli Liu[2], Cham Kit Dennis Wong[3], Wang Fung Rex Mak[2], Tim Yun Michael Ong[2], Patrick Shu Hang Yung[2], Jonathan Patrick Ng[3]
[1]Department of Occupational Therapy, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Reverse shoulder arthroplasty (RSA) demands precise preoperative planning to optimise implant placement and minimise complications. Conventional methods are time-consuming and prone to inconsistencies. This study evaluates the efficiency, accuracy, and safety of an artificial intelligence (AI)- and large language model (LLM)-integrated RSA planning system, comparing with manual planning.

Methods: The AI system processes shoulder computed tomographic scans using nnUNet for 3D segmentation, geometric analysis, and dynamic impingement simulation. It autonomously generates implant configurations, including glenoid positioning and screw trajectories, optimised for fixation and alignment. An LLM interface (Llama-2-7B fine-tuned with LoRA) allows natural language interaction for plan adjustments. Twenty RSA cases were planned manually and with AI assistance. Outcomes measured included planning time, implant alignment accuracy, screw safety, impingement-free motion, and LLM command accuracy.

Results: AI-assisted planning reduced time by 64% (9 vs 25 minutes, $p<0.001$). Implant alignment errors were lower (2° vs 5° for glenoid baseplate, $p<0.01$), and screw breaches were eliminated (0% vs 20%, $p<0.05$). AI plans also improved impingement-free motion by 15° ($p<0.05$). Measurement errors compared to surgeon labelling were minimal (eg, 4.83 mm for glenoid centre). The LLM achieved 95.2% task completion and 93.75% function call accuracy.

Conclusion: The AI-LLM system significantly enhances RSA planning efficiency, precision, and safety. Its intuitive interface maintains surgeon oversight while streamlining workflows. Although clinical validation is pending, the system's technical advantages suggest potential for improved surgical outcomes. Future studies with larger cohorts and postoperative follow-up are warranted to confirm these benefits.

FP10.14

Single-centre 20-year review of necrotising fasciitis in limbs: the PACE score for mortality prediction

Hon Yeung Steven Tsui[1], Esther Ching San Chow[1], Kin Wai Chan[2], Chak Ming Lee[2]
[1]Department of Orthopaedics and Traumatology, United Christian Hospital
[2]Department of Statistics, The Chinese University of Hong Kong

FP10.15

Postoperative vitamin D levels predict quadriceps muscle strength recovery after anterior cruciate ligament reconstruction

Victor Yan Zhe Lu[1], Cham Kit Wong[2], Xin Yang[1], Daniel Kam Wah Mok[3], Anna Siu Wai Wan[3], Rex Wang Fung Mak[4], Jonathan Patrick Ng[2], Michael Tim Yun Ong[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Food Science and Nutrition, Hong Kong Polytechnic University
[4]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Vitamin D deficiency is highly prevalent among patients undergoing anterior cruciate ligament reconstruction (ACLR) and may impede neuromuscular recovery due to its critical roles in muscle function and inflammation regulation. This prospective study investigates the relationship between 4-month vitamin D status and 6-month strength recovery while establishing a clinically relevant vitamin D threshold.

Methods: Twenty-eight patients with ACLR underwent serum 25(OH)D assessment at 4 months postoperatively. Patients were stratified by deficiency status (<20 ng/mL vs ≥20 ng/mL) for muscle strength comparison, and by 6-month extension Limb Symmetry Index (LSI) at 60°/sec (functional recovery [LSI≥90%] vs suboptimal recovery [LSI<90%]) for threshold derivation. Isokinetic dynamometry assessed extension/flexion peak torque at 60°/sec and 180°/sec. Receiver operating characteristic (ROC) analysis determined optimal predictive thresholds.

Results: Patients with non-deficient vitamin D levels (≥20 ng/mL) demonstrated significantly superior extension recovery at both 60°/sec (p=0.019) and 180°/sec (p=0.034). No significant differences emerged in flexion recovery. ROC analysis established 15.9 ng/mL as the optimal vitamin D threshold for predicting functional extension recovery (area under the curve=0.678, 95% confidence interval=0.480-0.877).

Conclusion: Vitamin D non-deficiency at 4 months post-ACLR is associated with significantly improved quadriceps strength recovery at 6 months. Furthermore, the 15.9 ng/mL threshold may identify ACLR patients at risk for suboptimal functional recovery (LSI <90%) at 6 months post-surgery. This value aligns with deficiency thresholds (<20 ng/mL) linked to impaired muscle repair and biomechanical function. These findings support routine vitamin D screening in ACLR rehabilitation, with supplementation considered for patients below 15.9 ng/mL to optimise functional outcomes.

Electronic Poster Presentations

P01

Clinical outcomes after intra-operative 3D O-arm imaging–assisted minimally invasive fixation of calcaneum fractures

Jun Rui Don Koh
Department of Orthopaedics, Changi General Hospital

Introduction: The calcaneus is the most fractured tarsal bone. Surgical fixation is indicated for displaced or intra-articular fractures. The use of intra-operative three-dimensional (3D) O-arm imaging confers advantages over traditional two-dimensional (2D) fluoroscopy and can lead to better outcomes. Less invasive approaches such as percutaneous screw fixation likewise offers benefits over conventional open surgery. This paper reports clinical outcomes after intra-operative 3D O-arm imaging–assisted minimally invasive screw fixation of calcaneum fractures.

Methods: All patients who underwent 3D O-arm imaging–assisted minimally invasive screw fixation for calcaneal fractures at our hospital were identified. Patients were followed up for a minimum duration of two years. Patients were assessed with Short Form-36 Health Survey, visual analogue score (VAS), and American Orthopaedic Foot and Ankle Society (AOFAS) Hindfoot Score.

Results: In total, five male patients aged 23 to 53 (mean, 34.6±12.3) years were included, with a mean follow-up duration of 21.4 (range, 20-23) months. The mean Short Form-36 Health Survey subscale scores were 91±10.8 for physical functioning, 70±32.6 for role limitations due to physical health, 66.7±40.8 for role limitations due to emotional problems, 75±20 for vitality, 88±11.7 for mental health, 87.5±21.7 for social functioning, 76±21.3 for bodily pain, and 84±16.4 for general health. The mean VAS was 0.6±0.9 (range, 0-2) and the mean AOFAS Hindfoot Score was 86.4±12.3 (range, 65-94).

Conclusion: 3D O-arm–assisted minimally invasive surgery for calcaneal fractures with percutaneous cannulated screws show good outcomes at 2-year follow-up.

P02

Optimum age for surgery in patients with severe adolescent idiopathic scoliosis: an AI-driven retrospective analysis

Adam Yiu Chung Lau[1], Wai Wang Chau[1], Alec Lik Hang Hung[2]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Timing for surgery in patients with severe adolescent idiopathic scoliosis (AIS) is critical for long-term health-related quality of life (HRQOL) outcomes. This study aims to determine the optimum age for surgery to achieve satisfactory long-term HRQOL recovery based on Scoliosis Research Society-22r questionnaire (SRS-22) and Spinal Appearance Questionnaire (SAQ).

Methods: We analysed longitudinal SRS-22 and SAQ data from 388 patients with severe AIS aged 10 to 18 years. Composite scores were computed (SRS-22: mean of domains; SAQ: mean of domains/2). Good recovery was defined as a score of ≥3 at the last visit. Receiver operating characteristic analysis was used to determine optimum cut-offs that predict good recovery. T-tests and linear regression were used for secondary analyses. The optimum cut-off ages based on SRS-22 and SAQ were identified separately.

Results: The mean patient age at surgery was 15.32 years. For SRS-22, the optimum age was 14.72 years (area under the curve [AUC]=0.78, 95% confidence interval [CI]=0.73-0.83, p<0.001; sensitivity=0.82, specificity=0.78). For SAQ, the optimum age was 15.18 years (AUC=0.75, 95% CI=0.70-0.80, p<0.001; sensitivity=0.68, specificity=0.62). Scores plateaued at 4 (for SRS-22) and 6 (for SAQ) years after surgery. Ages 12 to 16 years showed faster recovery (p=0.021).

Conclusion: The optimum age for surgery was between 14.72 and 15.18 years, which showed the best estimate of HRQOL recovery while allowing growth. Nonetheless, caution is suggested because early data were limited and findings were based solely on HRQOL results. Further longitudinal research is needed to confirm recovery trajectories. Using AI is commendable for predictive models.

P03

Alpha-ketoglutarate as an intermediate in tricarboxylic acid cycle attenuates muscle atrophy in sarcopenic mice

Chaoran Liu, Hei Yuet Wong, Ning Zhang, Wing-Hoi Cheung, Ronald Man Yeung Wong
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P04

Temporal relationship between tendinopathy and subsequent tendon rupture across anatomical sites: a case series

Kenney Ki Lee Lau[1], Jonathan Patrick Ng[2], Samuel Ka Kin Ling[3], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3], Pauline Po Yee Lui[3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Tendinopathy is a common precursor to tendon rupture. However, the historical progression from initial diagnosis to rupture is not yet well delineated. A clearer understanding of this interval could improve clinical monitoring and guide intervention strategies.

Methods: A retrospective cohort study was conducted on patients diagnosed with tendinopathy who later experienced a tendon rupture. Data were obtained from the Clinical Data Analysis and Reporting System. The interval (in months) between the initial diagnosis of tendinopathy and subsequent rupture was calculated for each anatomical site.

Results: The mean interval from tendinopathy onset to rupture varied, depending on the tendon location. Specifically, the mean intervals were 22±33 months for the rotator cuff (n=11), 24±32 months for the biceps tendon (n=2), 14±16 months for tendons of the hand and wrist (n=2), 75±0 months for the patellar tendon (n=1), 40±41 months for the Achilles tendon (n=26), and 37±32 months for tendons of the tibialis and peroneal groups (n=3).

Conclusion: Achilles and patellar tendons exhibited longer intervals from tendinopathy onset to rupture, suggesting a more extended degenerative process, whereas tendons of the hand and wrist tend to rupture more rapidly. These findings underscore the importance of tendon-specific monitoring and may inform optimal timing for preventive interventions.

P05

Short-term effect of pulsed electromagnetic field therapy on hamstring muscle strength after anterior cruciate ligament reconstruction with hamstring autograft: a randomised, double-blind, placebo-controlled, clinical trial

Kenney Ki Lee Lau[1], Abbey Ssu Chi Chen[1], Christine Hoi Yan Fu, Joseph Huai Yu Li, Jonathan Patrick Ng[2], Michael Tim Yun Ong[3], Patrick Shu Hang Yung[3], Pauline Po Yee Lui[3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: This study investigated the effects of pulsed electromagnetic field (PEMF) therapy on hamstring muscle strength in patients undergoing anterior cruciate ligament reconstruction (ACLR) using hamstring tendon autografts.

Methods: A double-blind, placebo-controlled, randomised trial was conducted, involving adult patients with hamstring deficits, specifically those with <85% hamstring strength at 4 months post-ACLR. Participants were randomly assigned to receive either PEMF therapy or placebo twice weekly over 8 weeks, with each session lasting for 10 minutes. Muscle properties were assessed at baseline and mid- and post-intervention stages.

Results: In total, 27 patients were randomised to either PEMF (n=13) or placebo (n=14). The PEMF group exhibited a significantly higher injured-limb-to-uninjured-limb ratio of the biceps femoris muscle thickness (p=0.029). Similarly, the PEMF group demonstrated a significantly lower semimembranosus stiffness ratio (p=0.011).

Conclusion: PEMF promoted the growth of hamstring muscles by enhancing semimembranosus and biceps femoris development to offset semitendinosus deficiency. A larger sample size and extended follow-up may reveal improvements in hamstring strength among ACLR patients with deficits.

P06

Nerve growth factor-derived peptides accelerate osteogenesis of human bone marrow mesenchymal stem cells and promote bone formation

Xiao Li[1,2], Yau Tsz Chan[1,2], Fang Hong[1,2], Yangzi Jiang[1,2]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]School of Biomedical Sciences, ITERM, Faculty of Medicine, The Chinese University of Hong Kong

P07

Calcification in human articular cartilage organoid: the possible role of NGF/TrkA signalling

Yau Tsz Chan[1,2], Rocky Sung-chi Tuan[1,2], Yangzi Jiang[1,2,3]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]School of Biomedical Sciences, ITERM, Faculty of Medicine, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P08

Dok7 is a key protein for maintaining neuromuscular junction and retarding sarcopenia by low-magnitude high-frequency vibration

Senlin Chai, Can Cui, Ning Zhang, Ronald Man Yeung Wong, Wing Hoi Cheung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Sarcopenia is an age-related degenerative disease characterised by loss of muscle strength and muscle mass. Degeneration of the function and structure of the neuromuscular junction (NMJ) is a pathological feature of sarcopenia. Dok7 co-localises with AChRs in the postsynaptic area of the NMJ and interacts with MuSK for neuromuscular synaptogenesis. Our previous study found that the improvement in NMJ morphology by low-magnitude high-frequency vibration (LMHFV) was associated with upregulation of Dok7.

Methods: 18-month-old C57BL/6J mice were divided into four groups: negative control (NC) group, NC+LMHFV group, Dok7 knockdown group, Dok7 knockdown + LMHFV group. Intramuscular pcAAV-Dok7 injection was used to knockdown Dok7. NC group mice were injected intramuscularly with blank control adeno-associated virus. Mice were also subjected to LMHFV intervention (35 Hz, 0.3 g, 20 min/day, 5 days/week) from 18 months old. All mice were tested and sacrificed at 24 months of age.

Results: Morphological results illustrated that Dok7 knockdown resulted in a higher degree of NMJ fragmentation. Functional results illustrated that Dok7 knockdown has decreased muscle contraction force and reduced NMJ transmission efficiency. At 24 months of age, NC+LMHFV mice had higher muscle contraction force and NMJ transmission efficiency, compared to those in the NC group. There was no significant difference in muscle contraction force and NMJ transmission efficiency in the Dok7 knockdown and Dok7 knockdown + LMHFV group mice.

Conclusion: LMHFV treatment improved NMJ morphology and function in 24-month-old mice. However, the therapeutic effect of LMHFV was blocked after Dok7 knockdown.

P09

Scaling up decellularised human tendon-derived stem/progenitor cell sheet for clinical translation

Pauline Po Yee Lui[1], Yuk Wa Lee[1], Katie Tsz Yan Mok[1], Kenney Ki Lee Lau[2], Christine Hoi Yan Fu[2], Joseph Huai Yu Li[2], Lawrence Chun Man Lau[3], Chu Jun Deng[4], Chi Ming Wong[4], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[3]Department of Orthopaedics and Traumatology, The University of Hong Kong
[4]Department of Health Technology and Informatics, The Hong Kong Polytechnic University

Our team developed and tested a rat decellularised tendon-derived stem/progenitor cell sheet (dTDSC sheet) for tendon graft healing following anterior cruciate ligament (ACL) reconstruction in an animal model. To prepare for future clinical translation, this study aimed to scale up the dTDSC sheet using human tendon-derived stem cells (TDSCs) and evaluate its characteristics. TDSCs were isolated from the hamstring tendons of three patients undergoing ACL reconstruction. The TDSC sheet was fabricated using our patented technology in either a 100 mm or 150 mm dish. The cell sheet was subsequently decellularised using our proprietary protocol. We assessed its cellularity, dsDNA content, collagenous and non-collagenous protein levels, and growth factor content. A dTDSC sheet up to 150 mm in diameter was successfully formed. Cells were absent, as confirmed by haematoxylin and eosin staining, DAPI staining, and transmission electron microscopy. More than 99.75% of dsDNA was removed following decellularisation. Transmission electron microscopy also revealed the presence of collagen fibres. The collagenous and non-collagenous protein contents of the dTDSC sheet were preserved, compared to the TDSC sheet. Both TDSC and dTDSC sheets contained VEGF, bFGF, BMP-2, and TGF-β1, although the levels were reduced in the dTDSC sheet. In summary, we successfully fabricated a cell-free human dTDSC sheet containing growth factors, with a size sufficient for clinical application.

P10

Protein-based silk material promotes engineered cartilage formation

Hongji Zhang, Fengjie Zhang, Chao Wan
School of Biomedical Sciences, The Chinese University of Hong Kong

P11

Mechanical tensile loading and stressing alter extracellular matrix deposition of human meniscus tissue resident progenitor cells

Sichen Yang[1,2], Jing SUN[1,2], Yau Tsz Chan[1,2], Rocky Sung-Chi Tuan[1,2], Yangzi Jiang[1,2]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]School of Biomedical Sciences, ITERM, Faculty of Medicine, The Chinese University of Hong Kong

Adult human meniscus stem/progenitor cells (hMeSPCs) are tissue resident progenitor cells of meniscus subject to mechanical stimulations, resulting in varied physiological performance. We previously reported that how mild cyclic tensile loading regimen (10% stretch, 1 Hz, 1 h/day) enhance extracellular matrix (ECM) accumulation and remodelling of 3D-cultured hMeSPCs. However, influence of fast and intense tensile loading (eg, 20% of stretch, 2 Hz) on hMeSPCs is not yet revealed. We then established a mechanical-tensile-loading platform to implement tensile stretch to 3D photo-crosslinked gelatin methacryloyl (GelMA) via magnetic beads to imitate in-situ meniscus stress loading to the encapsulated hMeSPCs. This platform can implement considerable frequent stretch up to 4 Hz with a maximum 34% of hydrogel extension in length (patent filed). We then seeded the hMeSPCs (n=8 biological donors from arthroplasty) into GelMA hydrogel and introduce a fixed frequent of 1-2 Hz, and 10% to 20% of stretching to the 3D cultured hMeSPCs, which is a biomimetic situation of joint meniscus load in fast walk (1 Hz, 120 step/min) and stress scenario (2 Hz, 20% strain). The cell-hydrogel cultures were then collected and analysed by histology and immunohistochemistry after 14 days of culture and loading. We observed increased cartilage-like ECM deposition in the hydrogel after 10% ($p<0.05$) and 20% stretch ($p<0.01$), compared with no stretching control. The porosity is not significantly changed by different loading parameters. In summary, the in vitro findings provided better understanding of the mechanobiology of hMeSPCs, consolidating the knowledge for further cell-based therapy in meniscus-related diseases.

P12

Age-related meniscus repair under physiological dynamic mechanical loading

Jing Sun[1,2], Yau Tsz Chan[1,2], Ki Wai Kevin Ho[3], Sung Chi Rocky Tuan[1,2], Yangzi Jiang[1,2]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]School of Biomedical Sciences, ITERM, Faculty of Medicine, The Chinese University of Hong Kong
[3]Department of Orthopaedics and Traumatology, Prince of Wales Hospital

The dynamics of meniscus repair in vivo are governed by both biological and biomechanical cues. Healing of meniscus tears is often hindered by age-related changes such as reduced cellular proliferation, altered extracellular matrix composition, and increased expression of senescence markers like β-galactosidase. We here explore the evolving landscape of meniscus repair strategies through the lens of stem cell activation, cellular ageing, and senescence under biomimetic mechanical loading. Human meniscus progenitor cells (hMeSPCs, n=9) were isolated and expanded in vitro, and were characterised by positive expression of stem cell-like surface markers. Controlled tensile strain was applied to the gelatin methacryloyl (GelMA) hydrogel-encapsulated cells through a homemade hydrogel-based bioreactor1, which enabled the 3D-cell culture of hMeSPCs for >15 days with 94% of the cell survival rate. RNA sequencing of 3D loaded cells showed significant reduction of the age and osteoarthritis-related genes such as IL-11 and S100B, and the mechanical response gene cluster, extracellular matrix dynamic gene cluster, and the senescence-related gene cluster were profiled accordingly. Cell senescence was evaluated by SA-β-Gal staining, and a significant reduction of senescence was found in the loaded group, compared with the static group. Together, these findings improve the understanding of the interplay between ageing and repair, and pave the way for development of novel therapies that integrate regenerative medicine with anti-ageing science.

P13

Association of anterior pelvic tilt with curve progression to bracing threshold in patients with mild adolescent idiopathic scoliosis

Ho Lam Vincent Wu, Tsz Hang Ma, Tin Ngo Oscar Mak, Tsun Chiu, Kenneth Guangpu Yang, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam, Adam Yiu Chung Lau, Cheuk Kin Kwan
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P14

Global burden of neck pain in adolescents and young adults: a 32-year review

Jiaheng Han, Yu Ding
Orthopedics of TCM Senior Department, The Sixth Medical Centre of PLA General Hospital

P15

Using 3D ultrasound to predict curve progression to surgical threshold in adolescent idiopathic scoliosis: a prospective cohort study of 282 patients

Cheuk Kin Kwan[1], Kenneth Guangpu Yang[1], Alec Lik Hang Hung[1], Wayne Yuk Wai Lee[1], Kelly Ka Lee Lai[2], Timothy Tin Yan Lee[2], Yong Ping Zheng[2], Jack Chun Yiu Cheng[1], Tsz Ping Lam[1], Adam Yiu Chung Lau[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Biomedical Engineering, The Hong Kong Polytechnic University

P16

Subdural abscess with concomitant epidural abscess in lumbar spine: a rare occurrence of life-threatening spinal infection not to be missed

Cheuk Yin Tam[1], Suk Ying Jodhy Mak[1], Kit Yan Jimmy Lau[1], Siu Man Leung[2], Chun Man Ma[3]
[1]Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital
[2]Department of Orthopaedics and Traumatology, Tai Po Hospital
[3]Department of Orthopaedics and Traumatology, North District Hospital

Subdural with concomitant epidural abscess is a rare but severe spinal infection. Only a few case reports are available in the literature, and there is no consensus regarding management guidelines. Prompt identification and treatment is essential for saving patients' life and neurology. A 71-year-old woman with well-controlled hypertension, asthma complained of back pain and fever. There was tenderness over lumbar spine without neurological deficit. Blood culture yielded *Staphylococcus aureus*. Magnetic resonance imaging of the lumbar spine showed epidural abscess at L4/5 and an intradural lesion displacing cauda-equina to the right from L2 to L5. The lesion was likely to be arachnoiditis or underlying space occupying lesion. Patient deteriorated with septic shock and confusion afterwards and emergency operation was performed. A tiny epidural defect was noted at L4/5 and abnormal dural turgid appearance at L2/3. Intraoperative ultrasound revealed fluid collection at subdural space. Durotomy was extended and drained 20 mL of pus subdurally. She experienced immediate improvement in vital signs, neurology remained intact. Intra-operative culture yielded *S aureus*. She completely recovered after 6 weeks of intravenous cloxacillin and then vancomycin. Follow-up after 7 weeks showed complete resolution of collection and mass effect. Subdural abscess causes significant morbidity and is potentially fatal, but the diagnosis may not be apparent. Differential diagnoses of spinal infection include epidural abscess, spondylodiscitis, and intra-medullary abscess, whereas differential diagnoses of subdural mass include haematoma, arachnoiditis, and intradural tumours. Vigilance and careful analysis of clinical and radiological features is essential. Early operation and appropriate antibiotic treatment is cornerstone for satisfactory infection control.

P17

Clinical and structural correlates of the knee-to-wall test in Achilles tendinopathy: diagnostic utility and multidimensional relationships

Samuel Ka Kin Ling[1], Wenjie Pan[1], Man Chi Ko[2], Joe Zuru Liang[1], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]National Institute of Education, Nanyang Technological University

Introduction: The knee-to-wall test for ankle range of motion (ROM), a reliable measure of weight-bearing ankle dorsiflexion, is increasingly used to assess functional limitations in Achilles tendinopathy. Reduced ankle ROM has been linked to biomechanical impairments; its diagnostic utility for symptom severity and relationships with structural tendon changes and quality of life remain underexplored. This study investigated (1) ankle ROM's predictive value for severe symptoms (Victorian Institute of Sport Assessment-Achilles [VISA-A] score <70) and (2) its linear correlations with clinical, structural (tendon thickness), and quality-of-life (QoL) measures.

Methods: In 65 patients with Achilles tendinopathy, their ankle ROM (maximal foot-to-wall distance) was measured, as were VISA-A scores, ultrasonographic tendon thickness, and Shot Form-36 scores. Diagnostic performance was evaluated via receiver operating characteristic curve analysis. Pearson correlations assessed linear relationships between ankle ROM and clinical/structural/QoL parameters.

Results: Ankle ROM demonstrated fair predictive ability for VISA-A score <70 (AUC = 0.707, 95% CI: 0.571–0.842), with an optimal cut-off of 9.5 cm (sensitivity=46.8%, specificity=94.1%). Ankle ROM correlated positively with VISA-A score (r=0.410, p<0.001) and Short Form-36 Health Survey (r=0.309, p=0.014), and negatively with tendon thickness (r= -0.28, p=0.025).

Conclusion: The knee-to-wall test is a clinically meaningful tool for Achilles tendinopathy, offering moderate diagnostic value for severe symptoms and reflecting interrelated functional, structural, and QoL impairments. Its high specificity suggests utility in ruling out milder cases, while correlations highlight its role in comprehensive assessment. Future studies should integrate ankle ROM with multimodal biomarkers to refine prognostic accuracy.

P18

BAIBA promotes muscle cell differentiation through the PI3K/Akt pathway

Tao Huang, Ally Wong, Ning Zhang, Louis Wing Hoi Cheung, Ronald Man Yeung Wong
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Sarcopenia is a progressive and generalised skeletal muscle disorder characterised by the loss of muscle mass, strength, and function. Resistance exercise is recommended as a first-line treatment for sarcopenia. During and after exercise, skeletal muscle tissue can produce and release BAIBA, a non-protein amino acid. BAIBA has been studied in various disease such as obesity; it promotes new bone formation and cardiovascular diseases. In our previous study, we demonstrated that extra intake of BAIBA can improve the muscle mass, muscle strength, and muscle physical performance and decrease the body weight and percentage of fat mass on sarcopenic mice. In this study, we further study the mechanism of BAIBA on muscle cell.

Methods: The C2C12 cell line and muscle-derived stem cells (MDSC) were treated with 5, 10, and 20 μM BAIBA. Myogenic induction medium was used to perform the multi-lineage differentiation induction. Wortmannin were used to inhibit the PI3K. Major histocompatibility complex staining, quantitative polymerase chain reaction, and Western blot was performed.

Results: In vitro, the C2C12 cell line and MDSC in BAI formed more muscle fibre, compared with the control group. Relative expressions of myogenesis and atrophic genes Myog and Myod in BAI group were higher, and Atrogin1 Murf1was decreased. PI3K/Akt phosphorylation levels were significantly increased in BAI-treated.

Conclusion: Extra intake of BAIBA can promote muscle cell differentiation through the PI3K/Akt pathway.

P19

Spikey copper nanoparticle enables osteosarcoma therapy via highly efficient doxorubicin delivery and photothermal therapy

Qinyu Tian, Fanchu Zeng, Naping Xiong, Wenxue Tong, Ling Qin
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P20

Magnesium combined with black phosphorus changes the chemical potential for osteosarcoma phototherapy and bone healing promotion

Fanchu Zeng, Qinyu Tian, Wenxue Tong, Ling Qin
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Osteosarcoma is a malignant bone tumour commonly affecting children and adolescents. Current treatment includes neoadjuvant chemotherapy, surgical excision, and adjuvant chemotherapy. However, there are treatment resistance, metastatic progression, and bone defects after surgery. Innovative therapies are needed to enhance efficacy and support bone regeneration. This study presents a theranostic nanoparticle based on black phosphorus (BP) conjugated with magnesium (Mg) to simultaneously enhance photodynamic therapy (PDT) and photothermal therapy (PTT) by increasing the chemical potential energy.

Methods: BP was functionalised with polyethylene glycol (PEG) conjugated to CD47 antibodies to enhance tumour targeting and prolong stability. PEG-Se-Se-DSPE enabled tumour microenvironment-responsive release of BP and Mg^{2+}. K7M2 osteosarcoma cell line was used to assess cellular targeting, reactive oxygen species generation, and cytotoxicity under near-infrared irradiation. An orthotopic osteosarcoma mouse model was established to evaluate biodistribution, tumour inhibition, and bone regeneration through fluorescence imaging, tumour volume monitoring, and histological analysis.

Results: The BP-Mg composite demonstrated enhanced energy conversion efficiency and generated more reactive oxygen species for PDT and localised heat for PTT. CD47-functionalised PEG coating extended BP stability and improved tumour specificity, contributing to enhanced therapeutic outcomes. In addition, upon degradation in the tumour microenvironment, BP released PO_4^{3-} and Mg^{2+} facilitated bone defect repair and contributed to a synergistic immunotherapeutic effect.

Conclusion: This multifunctional nanoparticle integrates PDT, PTT, immunotherapy, and bone regeneration, addresses the key limitations of current osteosarcoma treatments. The BP-Mg system demonstrates strong potential for clinical translation as a comprehensive therapeutic strategy.

P21

Tensile force orchestrates metabolic reprogramming to drive histone lactylation and reparative macrophage polarisation in distraction osteogenesis

Rongjie Wu, Huating Wang, Sien Lin
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Previous studies have identified increased M2 macrophages in response to shear force; however, how tensile force regulates macrophage fate during distraction osteogenesis (DO) remains unclear. This study aimed to characterise mechanoresponsive macrophages in DO and uncover their molecular mechanisms.

Methods: Single-cell sequencing was performed on callus tissues from DO and rapid DO models at postoperative day 10, with the latter assumed to lack mechanical stimulation due to collagen rupture. Immunofluorescence staining was used to assess macrophage polarisation in vivo. To examine the direct effect of tensile force, RAW264.7 cells were subjected to cyclic stretching. Lactate levels were measured, and western blotting was used to assess histone lactylation.

Results: Single-cell analysis revealed a higher proportion of M2 macrophages in DO callus, characterised by elevated expression of Arg1, Spp1, and Vegfa, and enrichment in glycolysis and mechanical response pathways. Immunofluorescence confirmed an increased presence of $Arg1^{+}/Spp1^{+}$ macrophages in vivo. Cyclic stretching promoted M2 polarisation in vitro, increasing Spp1 and Vegfa expression. Both intracellular and extracellular lactate levels rose over time in response to tensile force. Mechanistic studies revealed enhanced histone lactylation. Among the modified sites, H3K18la, previously associated with M2 polarisation, was the most sensitive to tensile force-induced lactate production.

Conclusion: Tensile force promotes reparative macrophage polarisation through glycolytic activation and histone lactylation. These findings provide new insight into how mechanical stimulation regulates macrophage fate in DO.

P22

Micro- and nano-plastic exposure: a new risk factor for impaired fracture healing

Ming Yi, Baoqi Li, Qianjin Wang, Chaoran Liu, Can Cui, Louis Wing Hoi Cheung, Ronald Man Yeung Wong, Ning Zhang
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P23

Clinical efficacy of gut microbiota modulation for knee osteoarthritis treatment: a systematic review and meta-analysis of clinical studies

Daniel Ioi-Chit Cheung, Michael Tim-Yun Ong, Gene Chi-Wai Man, Patrick Shu Hang Yung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Knee osteoarthritis (OA) is the most common form of arthritis. Emerging evidence suggests that the gut microbiome may influence knee OA symptoms through the gut-joint axis, potentially offering new treatment strategies. This review will systematically evaluate the effectiveness of modulating gut microbiota in knee OA management.

Methods: The PubMed, EMBASE, Cochrane Library, and Web of Science were searched for interventions modulating gut microbiota in patients with knee OA. Pre-clinical studies and non-randomised trials were excluded. Study quality was assessed using the Cochrane systematic evaluation method. RevMan was used for the meta-analysis. Outcome measures included self-reported pain, stiffness and impediment, serum high-sensitivity C-reactive protein, and physical functionality.

Results: Nine studies, involving 984 participants, were included in the qualitative synthesis and meta-analysis. The intervention group, compared to the control group, showed significant improvements in measures related to knee OA, including Western Ontario and McMaster Universities Osteoarthritis Index total score and its subscores (pain, stiffness, and physical function), visual analogue scale scores, and high-sensitivity C-reactive protein levels. Moreover, significant increases on functional improvements were observed from handgrip strength and the 30-second chair stand test. However, the study did not find any significant differences between the groups in the Timed Up and Go Test, which assesses functional mobility.

Conclusion: The overall analysis showed that gut microbiota modulation is effective in improving pain, stiffness, physical function, and inflammation in individuals with knee OA. However, additional studies are still needed to warrant these findings.

P24

Exploring the psychosocial effects of adolescent idiopathic scoliosis treatment in Hong Kong adolescents: a 24-month study

Anjaly Saseendran, Yat Hong Kenny Kwan
Department of Orthopaedics and Traumatology, The University of Hong Kong

P25

Cell-derived extracellular matrix-based biologics to reverse axonal degeneration in diabetic neuropathy

Zhamilya Zhirenova[1], Shalina Alisha Telaga[2], Anna Maria Blocki[1,2]
[1]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]School of Biomedical Sciences; Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong

Diabetic neuropathy (DN), a complication of diabetes mellitus, causes axonal degeneration and sensory loss in the periphery, contributing to diabetic wounds and increasing the risk of limb amputation. Existing therapeutic strategies for DN have limitations in addressing the underlying nerve damage, necessitating the exploration of novel approaches to reverse axonal degeneration. This project aims to develop pro-reparative composite biologics derived from decellularised extracellular matrix (ECM) or conditioned media (CM) obtained from mesenchymal stromal cells (MSCs) and investigate the therapeutic potential in reversing axonal degeneration in vitro. Several candidate ECM- and CM-based biologics were synthesised using established methods and solubilised to enable effective delivery into uninjured neuropathic skin. Schwann cell progenitors (SCPs) and Schwann cells were differentiated from induced pluripotent stem cells and neuron-like cells were derived from PC12 cells to evaluate the bioactivity of the biologics through functional assays in vitro. Preliminary findings indicate that soluble extracts of MSC-derived ECM enhanced SCP proliferation and neurotrophic gene expression, although SCP migration remained unchanged. In neuronal cultures, ECM-based biologic promoted neurite outgrowth and increased the expression of neuronal regeneration-associated genes. Notably, this biologic partially restored neurite outgrowth and supported SCP metabolic activity in diabetic-like microenvironment. The proposed approach for synthesising ECM-based biologics warrants further investigation as a potential alternative approach for the treatment of DN.

P26

Exercise therapy beyond conservative management? Effects of preoperative exercise on adolescent idiopathic scoliosis surgical outcomes: a systematic review of

Brandon Tam, Edwin Huk Yin Cheng, Kenneth Guangpu Yang, Eric Cheuk Kin Kwan, Alec Lik Hang Hung, Tsz Ping Lam, Jack Chun Yiu Cheng, Adam Yiu Chung Lau
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Adolescent idiopathic scoliosis (AIS) adversely affects health and quality of life. Despite well-established benefits and protocols for rehabilitative exercise, the role of preoperative exercise in augmenting AIS surgical outcomes is uncertain. This review aims to evaluate current evidence regarding effects of preoperative exercise on AIS surgical outcomes.

Methods: PRISMA guidelines were followed. Six databases were searched for studies published before June 2025. Inclusion criteria were surgically treated patients with AIS aged <18 years with implementation of preoperative exercise protocols. Surgical outcomes included pain intensity, blood loss, curve correction, postoperative anaesthetics, hospitalisation time, postoperative complications, spine flexibility, cardiopulmonary function, re-admission and quality of life.

Results: Ten studies involving 594 patients (339 received preoperative exercise protocols and 255 did not) were included. The mean patient age and Cobb angle were 14.81 (95% confidence interval [CI]=14.57-15.07) years and 68.23° (95% CI=67.01°-69.45°). The exercise group generally has better surgical outcomes, namely, lower pain intensity, better spinal flexibility, more significantly improved pulmonary function, shorter mean hospitalised duration (4.14 days [95% CI=3.376-4.904] vs 6.66 days [95% CI=6.32-7.00]) and reduced postoperative complications (5.2% vs 18.5%).

Conclusion: Preoperative exercise optimises surgical outcomes by preparing patients for AIS surgery, resulting in improved physical fitness and mental engagement. Patients can achieve swift recovery and better quality of life. Preoperative exercise should be implemented for AIS surgery in a standardised, integrated treatment protocol.

P27

Synovial regulatory T cells in posttraumatic osteoarthritis: from early accumulation to therapeutic targeting

Xueyou Zhang, Mingde Cao, Bruma Sai Chuen Fu, Michael Tim Yun Ong, Patrick Shu Hang Yung
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

P28

Efficacy, mechanisms, and clinical implications of GLP-1 receptor agonists on sarcopenia: a systematic review

Abudureheman Maihemuti[1], Cui Can[1], Qianjin Wang[1], Reziwanguli Amuti[2], Ning Zhang[1], Roanld Man Yeung Wong[1], Ho Ko[3], Timothy Chi-Yui Kwok[1], Wing-Hoi Cheung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Division of Intensive Care Unit, Taikang Xianlin Drum Tower Hospital, Faculty of Medicine, Nanjing University
[3]Division of Neurology, Department of Medicine and Therapeutics, The Chinese University of Hong Kong

P29

Mechanical bone loading rescues cognitive deficits by alleviating lipocalin-2-mediated cerebrovascular obstruction in Alzheimer's disease

Hui Chen[1], Sien Lin[2], Gang Li[3]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences

Introduction: Lipocalin-2 (LCN2), an osteocyte-derived cytokine secreted by osteoblasts, traverses the blood-brain barrier and is significantly elevated in the serum of patients with Alzheimer disease. LCN2 is implicated in neuroinflammation; its direct mechanistic role in driving cerebrovascular pathology and cognitive deficits remains undefined.

Methods: We applied mechanical tibial loading (5N, 9N, 12N) to 5xFAD mice. Systemic and brain LCN2 dynamics were quantified via enzyme-linked immunosorbent assay and immunofluorescence. Cerebral perfusion was monitored in real-time using laser speckle imaging.

Results: Mechanical tibial loading exerted a dose-dependent suppression of osteocyte-derived LCN2, with 9N tibial compression reducing serum LCN2 by 58%, compared with unloaded mice ($p<0.05$). This systemic decrease correlated directly with reduced LCN2 deposition in hippocampal capillaries, along with the ability to rescue cerebral perfusion deficits.

Conclusion: Our work identifies skeletal mechanotransduction as a potent regulator of osteokine LCN2, which drives cerebrovascular obstruction in Alzheimer disease. By establishing a causal bone-to-brain pathway, we propose non-invasive mechanical loading as a novel therapeutic strategy to ameliorate neurovascular dysfunction and cognitive decline.

P30

3D human skeletal muscle microphysiological system for disease modelling and therapeutic screening

Hon Fai Chan
InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park

Introduction: Current drug development faces high failure rates due to inadequate preclinical models. This work presents a human 3D skeletal muscle-on-a-chip microphysiological system (MPS) to address this gap, enabling improved disease modelling and therapeutic screening for conditions like sarcopenia.

Methods: Human pluripotent stem cells were differentiated into myogenic lineages using an established protocol. Myogenic progenitor cells were encapsulated within a 3D hydrogel and cultured in a custom microfluidic device featuring microchannels to guide aligned myotube bundle formation. Differentiation was characterised via immunofluorescent staining (eg, major histocompatibility complex, Pax7), gene expression analysis (eg, Myog, Pax7), and muscle force measurement. Muscle injury models were established by exposing bundles to hydrogen peroxide or inflammatory cytokines.

Results: Successful differentiation into multinucleated myotubes expressing major histocompatibility complex was achieved. 3D muscle bundles demonstrated significantly higher expression of the maturation marker Myog and lower expression of the progenitor marker Pax7, compared to 2D cultures. Dose-dependent reductions in cell viability, structural integrity, and muscle force were observed in response to hydrogen peroxide, confirming the platform's capability to model oxidative stress-induced injury.

Conclusion: The engineered 3D skeletal muscle MPS recapitulates key structural and functional aspects of native tissue and effectively models injury responses. This human-relevant platform offers advantages over traditional models for mechanistic studies and therapeutic screening, potentially reducing drug development costs and time.

P31

What role does preoperative computed tomography play in determining the size of the acetabular cup for total hip arthroplasty?

Junzhe Wu
Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: The dimensions of the acetabular cup play a crucial role in the success of total hip arthroplasty. This research investigated the application of preoperative computed tomography measurements in predicting the acetabular cup size in total hip arthroplasty.

Methods: This study retrospectively analysed 125 patients who underwent total hip arthroplasty between August 2014 and March 2023. Preoperative acetabular diameters were measured in axial, sagittal, and coronal planes and compared with the actual acetabular cup size used intraoperatively.

Results: In the 125 patients, the mean acetabular diameter was 51.33±3.61 mm in the axial plane (60.0% within one actual acetabular size) and 51.56±3.33 mm in the sagittal plane (63.8% within one actual acetabular size), whereas the actual acetabular diameter was 50.98±3.14 mm.

Conclusion: Preoperative computed tomography measurements can be effectively utilised to estimate the dimensions of the acetabular cup intraoperatively.

P32

Structural alteration of cell-derived extracellular matrix: effect on its biological functions in vitro and in vivo

Lih Ying Shin[1], Meng Zhou[2], Ho Ying Wan[1], Wenming Zhu[1], Xiaolan Ma[1], Dan Michelle Wang[1], Anna Blocki[1]
[1]Institute for Tissue Engineering and Regenerative Medicine, InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Extracellular matrix (ECM) directs cell behaviour through biochemical and biophysical cues. We demonstrated that ECM deposited by osteogenically induced mesenchymal stem cells (MSCs) enhanced osteogenic differentiation of reseeded MSCs. Here, we explored how alterations in biophysical cues influence the ECM's osteoinductive capacity. Cell-derived ECM (cECM) structure was modified by targeting the collagen I network through LOX inhibition with β-aminopropionitrile during synthesis or collagenase digestion post-decellularisation. For in vivo investigation, urea solubilisation was used to disrupt ECM structure, followed by assessment in a mouse calvarial defect model. Characterisation using Bio-AFM revealed that matrices exhibited a Young's Modulus of approximately 300 kPa, except for cECMs treated with lowest β-aminopropionitrile and highest collagenase concentrations, which resulted in a significant decrease and increase in the Young's modulus, respectively. Both changes in cECM elastic properties resulted in a profound accumulation of integrin α5 at sites of focal adhesions in reseeded MSCs. Quantitative polymerase chain reaction analysis showed that these MSCs exhibited the lowest expression levels of osteogenic markers. Indeed, functional differentiation of MSCs on both modified substrates resulted in a marked reduction of alkaline phosphatase activity and matrix calcification, indicating a reduction osteogenic potential of modified matrices. In vivo, urea-solubilised ECM promoted neobone formation during early stages of bone healing, while cECM retaining its microarchitecture supported superior long-term regeneration. Diverse treatments resulted in varying levels of matrix disruption, which in turn influenced bioactive performance depending on the method applied. The structural integrity of cECM proved to be critical for its functional performance over time in vivo.

P33

Abnormal brain structure and function in people with shoulder pain: a systematic review of neuroimaging studies

Bin Fan, Chung Liang Hsu, Yu Lok Arnold Wong, Shuqi Chen, Hio Teng Leong
Department of Physiotherapy, The Hong Kong Polytechnic University

Introduction: Shoulder pain (SP) is a prevalent musculoskeletal disorder. Emerging evidence indicates maladaptive brain plasticity in individuals with SP. This systematic review summarised structural and functional brain abnormalities in those with SP and explored their correlation with clinical outcomes.

Methods: PubMed, Web of Science, EBSCO, and EMBASE were searched from inception to June 2025. Two reviewers independently screened studies, assessed the risk of bias using JBI checklist, and graded evidence using GRADE.

Results: Five cross-sectional studies were included. The diagnosis of SP included rotator cuff tears, adhesive capsulitis, and nonspecific SP. The methodological quality of these studies ranged from moderate to high. There was low-certainty evidence that individuals with SP demonstrated a lower thalamus grey matter, compared to healthy controls. Low-certainty evidence also suggested structural differences in grey matter of several brain regions (eg, amygdala, prefrontal, postcentral, and temporal cortices) in individuals with SP compared to healthy controls. There is low-certainty evidence supporting functional abnormalities in specific brain areas (eg, thalamus, prefrontal, anterior cingulate, middle temporal, orbitofrontal, precentral, and postcentral cortices). Low-certainty evidence also indicated that structural and functional abnormalities in the brain were associated with pain intensity, pain threshold, pain duration, shoulder function, and psychological outcomes.

Conclusion: Low-certainty evidence substantiates that SP is associated with structural and functional abnormalities in brain regions responsible for pain processing, emotion regulation, and sensorimotor integration. However, their correlations with clinical outcomes require further validation.

P34

Synthetic dermal substitute for treating lower limb wound infection

Man-Wai Esther Chow[1], Ka-Kin Samuel Ling[2], Lucci Lugee Liyeung[1]
[1]Department of Orthopaedics and Traumatology, Prince of Wales Hospital
[2]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Extensive skin defects can be disabling and carry the risk of wound infection. Temporary coverage by synthetic dermal substitute is a potential solution to bridge the prolonged healing process while protecting the deep structures and minimising the need for complicated reconstruction. We illustrated its application in infected wounds in a case series.

Methods: Patients with lower limb wounds treated with synthetic dermal substitute between November 2023 and June 2025 were included. Underlying pathologies, risk factors, types of bacterial infection, and wound healing progress were reviewed retrospectively.

Results: Nine patients (mean age, 64.7 years) were included. The risk factors for wound infection were diabetes (n=3), peripheral vascular disease (n=2), immunosuppressant use (n=1), and post-traumatic or postoperative complications (n=3). Muscle and/or bone were exposed in seven (77.8%) patients. Most (88.9%) cultures yielded polymicrobial, and the most common pathogens were *Staphylococcus* and *Corynebacterium*. Dermal substitutes were applied under local or regional anaesthesia in four patients. Negative pressure therapy was applied in all patients to enhance wound granulation. Infection control was achieved in six (66.7%) patients, and the mean time to negative culture was 102.2 days. Additional procedures were performed in three patients, including skin graft (n=3) and free flap reconstruction (n=1). There was no adverse reaction.

Conclusion: Synthetic dermal substitute is a safe wound coverage option for deep infected wounds in lower limbs. Its application in frail patients who cannot tolerate multiple surgeries or complicated flap reconstruction warrants further evaluation.

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Inconsistent perceptions and willingness to use tele-exercise for osteoarthritis between patients and physiotherapists: a cross-sectional survey in Hong Kong

Union He Yi Hsieh[1], Mengqi Li[2], Lok Chun Chan[3], Ping Keung Chan[4], Kim Bennell[5], Chunyi Wen[1]
[1]Department of Biomedical Engineering, The Hong Kong Polytechnic University
[2]School of Nursing, The Hong Kong Polytechnic University
[3]Department of Biomedical Engineering, The Hong Kong Polytechnic University
[4]Department of Orthopaedics and Traumatology, The University of Hong Kong
[5]School of Health Sciences, The University of Melbourne

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High fat diet modulates PI3K-AKT signalling pathway in tendon derived stem cells

Angel Yuk Wa Lee[1], Patrick Shu Hang Yung[1], Pauline Po Yee Lui[2]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park

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Collagen-based hydrogel for management of chronic cartilage insufficiency: a case report and review of treatment options

Kai Chun Augustine Chan[1], Kevin Chi Him Fok[2], Tak Man Wong[1]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Symptomatic knee articular cartilage defects could be debilitating and could progress to osteoarthritis. We present a case of successful treatment of knee chondral defect with a collagen-based hydrogel, along with a comprehensive review of alternative treatment options. A 20-year-old man with a history of recurrent twisting knee injury during rugby games presented with chronic right-side knee pain on squatting and walking stairs. Magnetic resonance imaging showed grade II chondromalacia at the lateral patellar facets. Arthroscopic debridement of focal chondral lesion with injection of type I collagen-based hydrogel (Chondrofiller) was performed. Patient reported complete resolution of pain and restoration of full range of motion at postoperative 3 months.

Methods: A narrative review on treatment of knee chondral defects was conducted with a literature search in Pubmed, Scopus, Cochrane using keywords of knee, cartilage defects, chondral defects, and hydrogel.

Results: Absorbable collagen-based hydrogels have only been used in hip chondral defects. Choice of hydrogel on knee cartilage in our case was a relatively new technique to restore patellofemoral articular cartilage. The hydrogel acts as a protective cover for damaged cartilage, simultaneously promoting chondrocyte migration. Other treatment options for chondral defects include microfracture for smaller defects, and osteochondral autologous transplantation, and autologous chondrocyte implantation for larger lesions. However, there is no consensus on the optimal option.

Conclusion: Long-term studies are needed to affirm effectiveness of newer treatments involving collagen implants.

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Engineered exosomes restore chondrocyte metabolic activity through sustained drug release to treat osteoarthritis

Songlin He[1,2], Liangbin Zhou[1,2], Yunzhu Cao[1,2], Jun Liu[1,2], Yuwei Zhang[1,2], Sung-Chi Rocky Tuan[1,2,3], Zhong Alan Li[1,2,3]
[1]Department of Biomedical Engineering, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[3]Institute for Tissue Engineering and Regenerative Medicine, School of Biomedical Sciences, The Chinese University of Hong Kong

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Engineered dual-targeted periodontal ligament stem cell–derived exosomes conjugated with cRGD/NGF-mimetic peptides for targeted spinal cord regeneration

Yuwei Zhang[1,2], Songlin He[1,2], Mingde Cao[2,3], Sai Chuen Bruma Fu[2,3], Patrick Shu Hang Yung[2,3], Sheung Wai Law[2,3], Sung-Chi Rocky Tuan[1,2], Zhong Alan LI[1,2]
[1]Department of Biomedical Engineering, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park
[3]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

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Impact of axial loading on spinal alignment in idiopathic scoliosis: do heavy schoolbags affect the spine? A systematic review

Samuel Chiron Ng, Samantha Natalie Tai, Tsz-Ping Lam
Department of Orthopaedics and Traumatology, Faculty of Medicine, The Chinese University of Hong Kong

P41

Empty toe phenomenon: 30 years later

Timothy Aaron Kuan, Ho Yeung Lai, Michal Matthew Chan, Weng Io Ng
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

The empty toe phenomenon is a rare closed degloving injury involving toe phalangeal displacement from their soft tissue envelope. Its optimal management remains unclear due to rarity of the pathology. This case report details a novel surgical approach with successful preservation of a degloved 5th toe. A 68-year-old woman sustained a left foot crush injury by a bus, resulting in the displacement bony structures from the 5th toes into the 4th toe's envelope and multiple foot fractures. Emergency surgery featured open reduction via a dorsal C-shaped incision over the 4th webspace, K-wire fixation of the 4th/5th toes, lateral column external fixation for an associated cuboid fracture, and prophylactic dorsal fasciotomies. Postoperatively, the 5th toe maintained perfusion without ischaemia. K-wires were removed at 8 weeks. At 1-year follow-up, the patient had no pain, numbness, or functional limitations. Radiographs confirmed fracture healing, and the toe remained viable with no necrosis. This case demonstrates that prompt open reduction using a C-shaped incision, which optimises exposure while minimising soft tissue trauma, combined with K-wire fixation and prophylactic fasciotomy, can achieve full toe survival and excellent function. Prognosis likely benefited from intact initial perfusion, isolated single-toe involvement, and a tuft fracture pattern. Fasciotomy may mitigate compartment syndrome risk in crush injuries with multiple fractures. This approach offers a viable strategy for preserving degloved toes, contrasting historical amputation outcomes.

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Effects of a power-assist device for manual wheelchair users with spinal cord injury: a pilot study

Kenneth Yiu[1], Chor Yin Lam[2], Vincent Ng[3], Oi Wai Iris Yan[4], Paul Aarne Koljonen[5]
[1]Department of Orthopaedics and Traumatology, Tuen Mun Hospital
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong
[3]Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre
[4]Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre
[5]Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Spinal cord injury can lead to paraplegia. Manual wheelchairs are primary means of mobility for such patients. However, many complain of upper limbs symptoms, especially in the shoulder, after pushing the wheelchairs for a prolonged period. There is limited clinical research on power-assist devices. This study aims to investigate daily distances travelled, symptoms of shoulder pain, and user satisfaction on power-assist devices.

Methods: Patients were recruited from MacLehose Medical Rehabilitation Centre. They received 3-hourly training sessions of using a power-assist device (SmartDrive, Permobil). Daily travelled distances and Wheelchair User's Shoulder Pain Index were measured in 4-week period with and without the device. The Chinese version of Quebec User Evaluation of Satisfaction with Assistive Technology was used to rate the users' satisfaction.

Results: Ten subjects were recruited; 6 of them completed the study. There were no statistically significant changes ($p=0.307$) in daily travelled distances. The Wheelchair User's Shoulder Pain Index improved after using the power-assist device for 4 weeks ($p<0.05$). The device was rated more or less satisfactory or quite satisfactory.

Conclusion: The power-assist device did not increase the distance travelled by users with spinal cord injury. However, it may be useful in improving the associated shoulder pain. The product was generally rated satisfactory by users.

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AdipoRon enhanced self-renewal and tenogenic effects of inflamed tendon-derived stem/progenitor cells

Katie Tsz Yan Mok[1], Patrick Shu Hang Yung[1,2], Pauline Po Yee Lui[1,2]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]InnoHK Centre for Neuromusculoskeletal Restorative Medicine, Hong Kong Science Park

Introduction: Chronic tendinopathy is characterised by heightened inflammation and abnormal differentiation of tendon-derived stem/progenitor cells (TDSCs). Adiponectin, a hormone-like factor, exhibits anti-inflammatory, anti-apoptotic, and tissue regenerative properties across various cell types. Our unpublished findings revealed an upregulation of adiponectin expression in both clinical specimens and an animal model of tendinopathy, indicating a potential role for adiponectin in promoting tendon repair and suppressing inflammation. However, its efficacy in mitigating the adverse effects of chronic tendon injury remains unexplored. This study aimed to explore the impact of AdipoRon, an agonist of adiponectin receptors, on self-renewal, inflammation resolution, survival, and cell fate of inflamed TDSCs.

Methods: TDSCs were isolated from wild-type mice. Inflamed TDSCs were treated with AdipoRon, and the clonogenicity and gene expression of inflammatory cytokines were assessed. Viability, apoptosis, and senescence changes were analysed to evaluate the effects of AdipoRon on cell survival, while the expression of tenogenic and non-tenogenic markers was measured to examine improvements in cell fate.

Results: AdipoRon significantly increased cell viability, clonogenicity, and expression of tenogenic markers, while simultaneously decreasing apoptosis, senescence, inflammatory cytokine expression, and non-tenogenic marker expression in inflamed mouse TDSCs.

Conclusion: The supplementation of AdipoRon effectively boosted self-renewal, inflammation resolution, survival, and tenogenic effects of inflamed TDSCs, positioning AdipoRon as a promising therapeutic candidate for tendinopathy treatment.

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Preferential type IIA muscle fibre atrophy in early quadriceps wasting following anterior cruciate ligament injury

Jian Ting Li[1], Sai Chuen Fu[1], Xue You Zhang[1], Mingde Cao[2], Patrick Shu Hang Yung[1]
[1]Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong
[2]Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital

Introduction: Quadriceps atrophy and weakness are major obstacles to return-to-play after anterior cruciate ligament (ACL) injury. A shift from oxidative to glycolytic fibres occurs post-ACL reconstruction, potentially impairing endurance. The origins and progression of this fibre-type switching remain unclear. This study uses a murine ACL rupture model to characterise quadriceps fibre-type changes, muscle mass, oxidative stress, and locomotor activity over time.

Methods: Twenty male mice underwent unilateral ACL rupture. Quadriceps muscles were collected at 1, 2, and 4 weeks post-injury to assess fibre-type distribution, atrophy, and oxidative damage. Muscle composition and oxidative stress were analysed using immunofluorescence staining, while muscle atrophy was measured by wet weight and cross-sectional area. Locomotor activity was evaluated using the open field test at baseline and post-injury.

Results: Quadriceps weight and cross-sectional area decreased at 1 and 2 weeks post-injury, peaking at 2 weeks. Both type IIA and IIB fibres reduced in size, with type IIA showing greater, sustained atrophy, reflected by a decreased type IIA/IIB fibre size ratio persisting at 4 weeks. Type IIB fibre size recovered by 4 weeks. The MyHC-IIa to MyHC-IIb fibre ratio declined over time. Ambulatory distances decreased at 1 and 2 weeks and recovered by 4 weeks. Oxidative damage progressively increased over 4 weeks.

Conclusion: ACL rupture leads to preferential type IIA atrophy, persistent fibre-type shifts, and progressive oxidative damage, despite partial recovery of muscle mass and locomotor activity. These findings suggest that rehabilitation should address not only muscle size but also fibre composition and oxidative stress to optimise functional recovery and reduce reinjury risk.

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Post–total hip arthroplasty iliopsoas impingement treated with arthroscopic iliopsoas tenotomy: a case report

Lik Hang Brian Leung, Chi Him Kevin Fok, Tak Man Wong
Department of Orthopaedics and Traumatology, Queen Mary Hospital

Iliopsoas tendinitis with impingement due to mechanical irritation is a known cause of groin pain after total hip arthroplasty. Various surgical options have been reported for patients with refractory symptoms. Arthroscopic iliopsoas tenotomy has gained popularity. We report a case of a 65-year-old woman with symptoms of debilitating left groin pain and reduced range of motion of her left hip due to iliopsoas impingement 2 years after total hip arthroplasty. Conservative treatments failed to improve her symptoms, which affected activities of daily living. Left hip arthroscopy was performed by outside-in technique via anterolateral and mid-anterior portals. Anterior hip capsule was debrided arthroscopically until iliopsoas muscle and tendon were identified. The iliopsoas tendon was then released at pelvic brim. Postoperatively, the patient noted an immediate relief of impingement symptoms and a significant improvement in the range of motion of her left hip. The patient was able to resume all activities of daily living and exercises at postoperative 3 months. Arthroscopic iliopsoas tenotomy can be a safe and effective option for symptoms alleviation while avoiding more invasive surgical interventions such as open surgery or revision arthroplasty.

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Motor imagery performance and tactile acuity in adults with rotator cuff–related shoulder pain versus healthy controls: a cross-sectional study

Lok Yung Tse, Wan Yiu Winnie Lee, Kwan Yi Ng, Ka Ho Chan, Sze Hang Chin, Hio Teng Leong
Department of Physiotherapy, The Hong Kong Polytechnic University

Introduction: Rotator cuff–related shoulder pain (RCRSP) is common. Maladaptive central pain mechanisms are evident in various shoulder pain conditions, indicated by disrupted motor imagery in left-right judgment tasks (LRJT) and decreased tactile acuity from two-point discrimination (TPDP). The aim of this study is to evaluate tactile acuity and motor imagery performance in individuals with RCRSP.

Method: This is a cross-sectional study; 40 individuals with RCRSP and 40 age-matched pain-free participants were evaluated for performance in LRJT and TPDP.

Results: Individuals with RCRSP demonstrated significantly longer response times during the LRJT, compared to healthy controls (r=0.38, p<0.001). No significant differences were found between groups in the number of accuracy during the LRFT (p<0.239), as well as in the TPDP between symptomatic and asymptomatic shoulders in individuals with RCRSP (mean difference= -0.36 cm, p=0.142), and between groups (mean change= -0.14 cm, p=0.282).

Conclusion: Individuals with RCRSP do not demonstrate reduced tactile acuity but slower response times in LRJT, indicating heightened cognitive processing demands. These indicate the potential role of motor imagery training into conventional RCRSP rehabilitation training.

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Comparison of clinical and functional outcomes between elastomeric-web knee brace and valgus offloading knee brace for medial knee osteoarthritis: a randomised controlled trial

Chun Hei Wong[1], Michael Tim Yun Ong[2], Giant Pak Hi Tse[3], Patrick Shu Hang Yung[1]
[1]*Department of Prosthetics and Orthotics, Prince of Wales Hospital*
[2]*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*
[3]*Department of Prosthetics and Orthotics, Alice Ho Miu Ling Nethersole Hospital*

Introduction: Valgus offloading knee brace is effective in pain reduction and improvement in knee function for patients with knee osteoarthritis (OA). However, some patients may feel discomfort due to skin irritation and bulky design of the knee brace. Therefore, knee brace with elastomeric-web design is recommended as alternative. This study aimed to identify and compare the clinical and functional effects of the two knee braces with different design in patients with knee OA.

Methods: A prospective randomised controlled trial was conducted, and 36 patients with medial knee OA were recruited and randomly assigned to the intervention group (elastomeric-web knee brace, OA Reaction Web) and control group (valgus offloading knee brace, Unloader One X). Pain and knee function were measured at baseline and week 6 using the Knee Injury and Osteoarthritis Outcome Score (KOOS), visual analogue scale (VAS), 30-second chair stand test (30s CTS), and 40-metre fast-paced walk test. Compliance to knee brace was checked by a questionnaire. The paired samples t test, independent samples t test, and Chi-squared test were used for data analysis.

Results: For the intervention group, significant improvements were showed in KOOS, VAS, and 30s CTS between baseline and week 6. Moreover, the intervention group showed significantly larger improvement in sport and recreation subscale of KOOS, compared to the control group (p=0.048). However, no significant differences were found between groups in other subscales of KOOS, VAS, 30s-CTS, and 40-metre fast-paced walk test. There was no significant difference between groups in compliance to knee brace.

Conclusion: Elastomeric-web knee brace provides similar effect as valgus offloading knee brace in pain reduction and improvement in knee function.

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Latissimus dorsi and teres major tendon rupture repair: a case report

Tak Man Wong[1], Kevin Fok[2]
[1]Department of Orthopaedics and Traumatology, The University of Hong Kong
[2]Department of Orthopaedics and Traumatology, Queen Mary Hospital

P49 ***Malaysian Orthopaedic Association Ambassador Paper***

Delayed dilemma: diagnostic challenge in paediatric atlantoaxial fracture dislocation

Syed Mohd Esmat Hussaini B Syed Mohd Ridzuan

Traumatic paediatric atlantoaxial fracture dislocations impose complex challenges due to unique anatomical structures with a tendency for delayed diagnosis. In general, the incidence of cervical spine injuries accounts for approximately 1% to 2% of all paediatric trauma. An 8-year-old girl presented 1 month after falling down a stair with persistent neck pain, stiffness, and left upper limb weakness. She was referred to our hospital after three visits to local general practitioner due to persistent symptoms. Initial radiographs and computed tomographic scans revealed C2 burst fracture with C1/C2 body dislocation. A suspicious lytic lesion was identified over the C2 body. Magnetic resonance imaging showed complex C2 fracture with bilateral C2 exiting nerve root impingement and spinal canal stenosis. There was an atlantodental interval of 2.0 mm with an acute C1-C2 kyphotic angle of 50°. She was initially managed with halo vest application to assist fracture reduction and kyphosis correction. Subsequently, posterior instrumentation with lateral mass screw fixation over C1, C3, and C4 was performed to maintain reduction and stability. Transpedicular biopsy of C2 finding was reported as fibrous stroma and osseous tissue, confirming the absence of infection or malignancy. Postoperatively, the neck pain resolved, and neurological status had returned to normal gradually. Paediatric cervical spine injuries are rare and require a high index of suspicion for early diagnosis to avoid catastrophic complications such as paraplegia and respiratory distress. Comprehensive investigations are pertinent to exclude pathological causes of fracture such as malignancy and infection.

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We would like to express our deepest gratitude to the organising partners and supporting organisations for their honorable contributions and support throughout this Annual Congress:

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