



The Hong Kong Orthopaedic Association 41st Annual Congress

香港骨科醫學會 第四十一屆週年大會

Challenges in Orthopaedics - COVID-19 and Beyond

 6 – 7 November 2021
二零二一年十一月六日至七日

 Hong Kong Convention and Exhibition Centre
香港會議展覽中心

Programme & Abstracts

香港醫學專科學院出版社
HONG KONG ACADEMY OF MEDICINE PRESS

CONTENTS

Welcome Message from the President of The Hong Kong Orthopaedic Association	2
Welcome Message from the Co-Chairmen of the Organising Committee	3
Organising Committee	4
Overseas and Local Faculties	5
Floor Plan	8
Programme at a Glance	9
Programme in Detail	10
Abstracts	
Award Paper Session	21
Award Poster Session	26
Free Paper Session I: Rehabilitation, Others	29
Free Paper Session II: Adult Joint Reconstruction I	37
Free Paper Session III: Basic Science	49
Free Paper Session IV: Paediatric Orthopaedics and AGM of Paediatric Orthopaedics Chapter	55
Free Paper Session V: Trauma	60
Free Paper Session VI: Adult Joint Reconstruction II	74
Free Paper Session VII: Spine	84
Free Paper Session VIII: Foot and Ankle	94
Free Paper Session IX: Hand and Microsurgery	99
Free Paper Session X: Sports Medicine	107
Electronic Poster Presentations	114
Author Index	127
Acknowledgement to the Organising Partners, List of Sponsors, Acknowledgement to Sponsor	132

Welcome Message from the President of The Hong Kong Orthopaedic Association



Dear Fellows, Members and Honourable Guests,

On the behalf of the Hong Kong Orthopaedic Association, it is my great pleasure to greet you all with a very warm welcome to our 41st Annual Congress of the Hong Kong Orthopaedic Association.

The main theme of this Congress is “Challenges in Orthopaedics – COVID-19 and Beyond”.

For the past 2 years, the COVID-19 pandemic has resulted in unprecedented changes to our lives. We have developed many new “pandemic ways” of living covering communication, work, medical services, etc. The whole world has been re-shaped, and a “New Normal” has been established. As orthopaedic surgeons, our services have also been affected and changed with this pandemic. How to face the “New Normal” and overcome the challenges that it brings become a hot topic for discussion.

This Congress is a good platform for us to share ideas, knowledge, and experiences. We can learn the wisdom and knowledge from experts and scholars from overseas and local. Through the academic discussing and clashing of ideas, we may explore solutions to tackle the impact of the pandemic and the “New Normal” that it brings.

This Congress is also a good platform to foster friendships and relationships. With the interruption of international travel and numerous infection control measures, we are physically separated from our international friends and colleagues. However, our connection and friendships will not be weakened. All the fellows and friends from overseas are sincerely invited to join our annual Congress in the form of teleconference.

I would like to express my sincere gratitude to all members of the Organising Committee, led by Co-chairmen Dr Tak-man Wong and Dr Edmund Leung-kei Yau for organising a fantastic programme, inspiring us to overcome the challenges of COVID-19 and beyond.

Finally, I wish you all a fruitful and enjoyable Congress.

I look forward to welcoming you in Hong Kong.

Dr Yau-bun WONG

President, The Hong Kong Orthopaedic Association (2021-2022)

Welcome Message from the Co-Chairmen of the Organising Committee



Dear Honourable Guests and Colleagues,

We are delighted to welcome you to the 41st Annual Congress of the Hong Kong Orthopaedic Association (HKOA). The theme this year is ‘Challenges in Orthopaedics – COVID-19 and Beyond’.

COVID-19 has spread around the world, undermining our society, the economy and affecting the daily lives of people in unprecedented ways. However, the pandemic has also taught us how to adapt to a ‘new

normal’ and make our orthopaedic community agile.

For the Annual Congress this year, the health of every participant is our priority. We hope all the experts and our colleagues can share their experience in a safe environment. Considering various factors including the recent local COVID-19 situation in Hong Kong, international travel restrictions, and the success of our hybrid Annual Congress last year, we decided to keep our Annual Congress in hybrid format this time – both virtual and in-person.

This year, our focus is the challenges faced by orthopaedic surgeons – not only the challenges arising from COVID-19, but also those we encountered in day-to-day clinical practice such as surgical difficulties and complications. Experts will share their experiences and wisdom in facing these challenges.

Despite the physical distancing resulted from the pandemic, we would like to maintain our friendship with overseas experts and local fellows. It is an opportunity to explore means of professional exchange between Hong Kong and other parts of the world. We would also like to regain the vitality of members of the HKOA by arranging social events, such as the annual dinner, while conforming to the local social distancing requirement.

Last but not least, we would like to express our sincere gratitude to the Organising Committee of the Annual Congress for their hard work, to the Council of the HKOA for their tremendous support, and to all invited speakers for their great contributions. We would also like to thank our sponsors for their unrelenting support. Finally, we particularly wish to thank all of you – honourable guests, friends, and colleagues. Without your active participation and support, this year’s Annual Congress will never be a success.

Dr Tak-man WONG, Dr Edmund YAU
Co-Chairmen, Organising Committee

Organising Committee



Co-Chairmen

Honorary Secretary

Honorary Treasurer

Scientific Subcommittee

Co-Conveners

Members

Dr Tak-man WONG
Dr Edmund Leung-kai YAU
Dr Dennis King-hang YEE
Dr Margaret Woon-man FOK

Dr Tak-man WONG
Dr Edmund Leung-kai YAU
Dr Christian Xinshuo FANG
Dr Margaret Woon-man FOK
Dr Angela Wing-hang HO
Dr Alex Ching-lik HUI
Dr Jeffrey Justin Siu-cheong KOO
Dr Michael Kin-wai LAM
Dr Richard Hin-lun LEE
Dr Lin-wing LOK
Dr Michael Tim-yun ONG
Dr Michael Siu-hei TSE
Dr Ronald Man-yeung WONG
Dr Dennis King-hang YEE
Dr Tsz-lung CHOI
Dr Alex Ching-lik HUI
Dr Gary Tze-wang CHAN
Dr Benny Yu-nang TSE
Dr Michael Siu-hei TSE
Dr Chi-wai CHAN
Dr Ping-tak CHAN
Dr Sheung-tung HO
Dr Yuen-lun LEE
Dr Wing-yuk MOK
Dr Hin-keung WONG

Publication Subcommittee

Social Function Subcommittee

Information Technology Audio-visual and Venue Subcommittee

Extended Abstract Adjudicators

Overseas and Local Faculties

OVERSEAS SPEAKERS — Plenary Sessions and Concurrent Sessions

Professor Theerachai APIVATTHAKAKUL

Head of Department of Orthopaedics
Faculty of Medicine
Chiang Mai University
Thailand



Professor Joshua Chia-hsieh CHANG

Director
Department of Pediatric Orthopedics
Chang Gung Memorial Hospital
Taoyuan, Taiwan



Professor Keen-wai CHONG

Consultant Orthopaedic Surgeon, BJIOS Orthopaedics, Singapore
Chairman, Orthopaedic Foot Ankle Society Singapore



Dr Russell COHEN

Orthopedic Surgeon
Arizona Sports Medicine Center
United States



Dr Takafumi HIRANAKA

Chief of Department of Orthopaedic Surgery and Joint Surgery Centre
Takatsuki General Hospital
Japan



Professor In-ho JEON

Professor in Department of Orthopaedic Surgery
Asan Medical Center, College of Medicine
University of Ulsan, South Korea
Chair of Shoulder Elbow Committee, SICOT
Vice President of APOA Hand & Upper Limb Society



Dr Ekavit KEYURAPAN

Clinical Instructor
Division of Sports Medicine
Department of Orthopaedic Surgery
Faculty of Medicine, Siriraj Hospital
Mahidol University
Bangkok, Thailand



Mr Abhay KHOT

Consultant Paediatric Orthopaedic Surgeon
Royal Children's Hospital Melbourne
Australia



Professor Dr Markus KNUPP

Head of the Foot and Ankle Centre
Mein Fusszentrum
Basel, Switzerland



Associate Professor Gabriel Ka-po LIU

Head & Senior Consultant
Division of Spine Surgery
National University Hospital
Singapore



Professor Cong-feng LUO

Professor of Orthopaedic Surgery
Shanghai Jiao Tong University Affiliated Shanghai Sixth People's Hospital
China



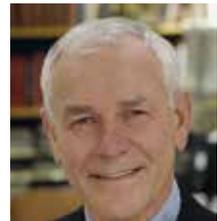
Dr Anna MILLER

Associate Professor of Orthopaedic Surgery
Vice Chair & Chief of Trauma Division
Washington University School of Medicine
United States



Professor Bernard F MORREY

Professor of Orthopaedic Surgery
Mayo Clinic
University of Texas
San Antonio, United States



Dr Nattakorn PAOPONGTHONG

Department of Orthopaedic Surgery
Phrae Hospital
Phrae, Thailand



Professor Joon-ho WANG

Professor of Orthopaedic Surgery
Director of Bone & Joint Center, Director of Sports Medicine Center
Samsung Medical Centre, Sungkyunkwan University School of Medicine
South Korea



Dr Watit WUTTAMANOP
Department of Orthopaedic
Songklanagarind Hospital
Songkhla, Thailand



LOCAL SPEAKERS — Plenary Sessions and Concurrent Sessions

Mr Jacky Ting-cheung CHAN

Dr Lewis Ping-keung CHAN

Dr Ping-tak CHAN

Professor Kenneth Man-chee CHEUNG

Dr Christian Xinshuo FANG

Dr Evelyn Eugenie Yue-ling KUONG

Dr Qunn-jid LEE

Dr Frankie Ka-li LEUNG

Dr George Kwok-hung LEUNG

Dr Ka-kin LI

Dr Wilson LI

Dr Samuel Ka-kin LING

Professor Keith Dip-kei LUK

Dr Wan-yiu SHEN

Dr Kwai-ming SIU

Dr Kam-kwong WONG

Dr Raymond Nang-man WONG

Dr Yat-wa WONG

Dr Peter Wai-pan YAU

Professor Patrick Shu-hang YUNG

OVERSEAS AND LOCAL SPEAKERS — Lunch Symposia

Dr Joanne King-yun LAM

Consultant Endocrinologist



Dr Wilson LI

Chief of Service

Department of Orthopaedics & Traumatology

Queen Elizabeth Hospital



Dr Kin-cheung MAK

Orthopaedic Surgeon



Professor Karl STOFFEL

Professor and Chair of the Division Hip/Pelvis Surgery

University Hospital Basel

Switzerland



Professor Niek van DIJK

University of Amsterdam Orthopaedic Department

Amsterdam Academic Medical Center (AMC),

Chief Ankle Unit

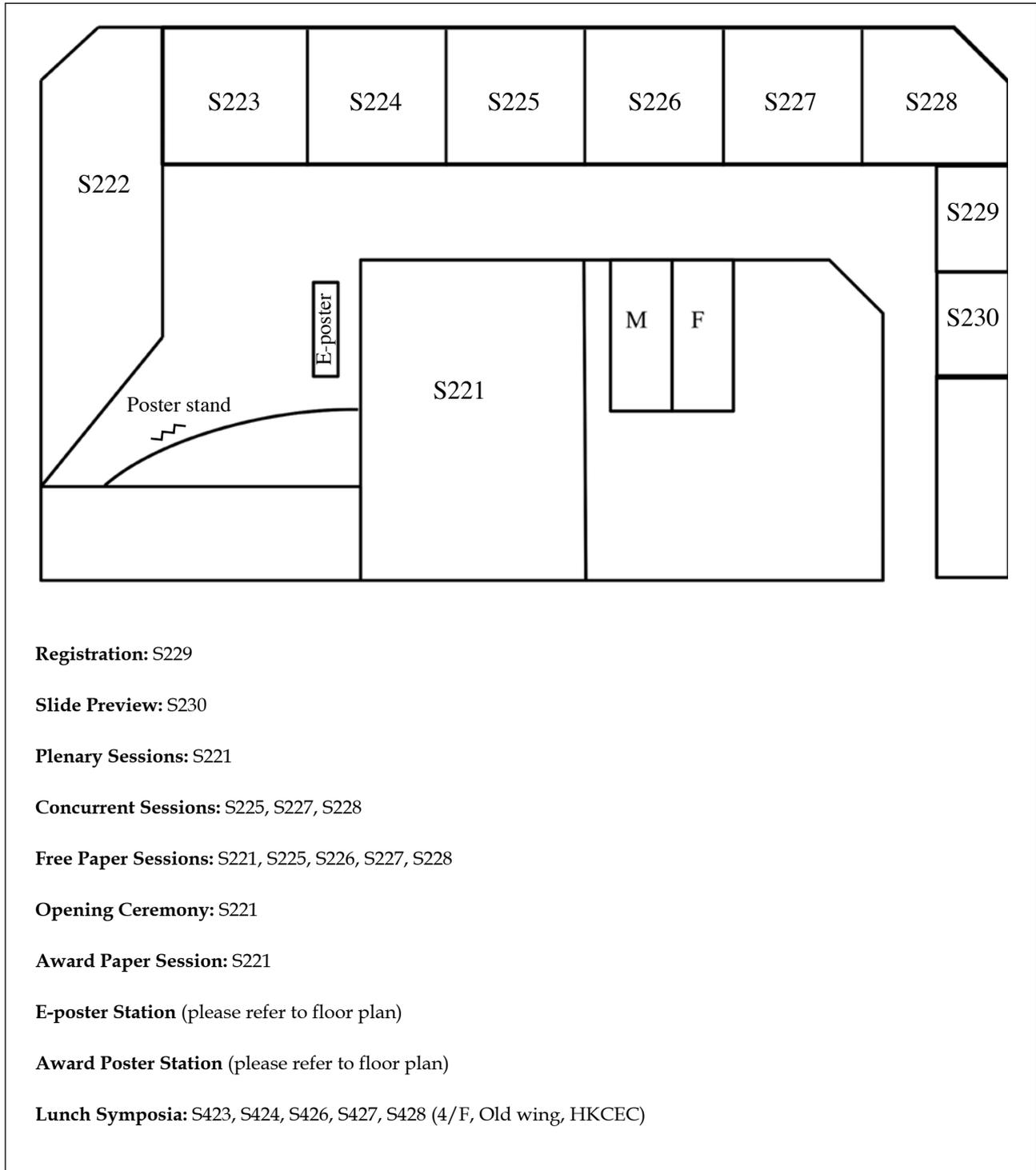
FIFA Medical Centre of Excellence Madrid (Spain) and Porto (Portugal)

Amsterdam Academic Medical Center



Floor Plan

The Hong Kong Convention and Exhibition Centre



Programme at a Glance

Saturday, 6 November 2021

08:00 – 10:00	Free Paper Session I: Rehabilitation, Others Free Paper Session II: Adult Joint Reconstruction I Free Paper Session III: Basic Science Free Paper Session IV: Paediatric Orthopaedics and AGM of Paediatric Orthopaedics Chapter Free Paper Session V: Trauma (07:30 – 10:00)	Room S221 Room S225 Room S226 Room S227 Room S228
10:00 – 10:30	Coffee Break / Exhibition	
10:30 – 12:00	Plenary Session I: Treating the Not Too Old	
12:00 – 12:30	Opening Ceremony	
12:30 – 13:30	Lunch / Lunch Symposium	
13:30 – 15:45	Award Paper Session	
15:45 – 16:15	Room S221 Foyer Award Poster Presentation	Coffee Break / Exhibition
16:15 – 17:45	Room S221 Plenary Session II: Complex, Complicated and Challenges	Concurrent Session I: Paediatric Orthopaedics Concurrent Session II: Trauma (AADO & AO Trauma Seminar) Concurrent Session III: Adult Joint Reconstruction
17:45 – 18:15	Annual General Meeting of The Hong Kong Orthopaedic Association	
19:00 – 22:00	Congress Banquet	

Sunday, 7 November 2021

08:00 – 10:00	Free Paper Session VI: Adult Joint Reconstruction II Free Paper Session VII: Spine Free Paper Session VIII: Foot and Ankle Free Paper Session IX: Hand and Microsurgery Free Paper Session X: Sports Medicine	Room S221 Room S225 Room S226 Room S227 Room S228
10:00 – 10:30	Coffee Break / Exhibition	
10:30 – 12:00	Room S221 Plenary Session III: Overcome Difficulty	Concurrent Session IV: Hand Concurrent Session V: Sports Medicine Concurrent Session VI: The Hong Kong College of Orthopaedic Surgeons
12:00 – 13:00	Lunch / Lunch Symposium	
13:00 – 14:30	Room S221 Plenary Session IV: Challenges over COVID-19 Pandemic	Concurrent Session VII: Spine – 15th Anniversary of the HKOA Spine Chapter Concurrent Session VIII: Foot and Ankle – Management on Foot Deformity from Toddler to Senior
14:30 – 15:00	Coffee Break / Exhibition	
15:00 – 16:30	Plenary Session V: Cases that I Learnt From	
16:30 – 16:45	Closing Remarks	

Programme in Detail

Saturday, 6 November 2021

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 – 10:00	S221	Free Paper Session I: Rehabilitation, Others (CY Lam, Calvin Chiu)	
1.1		Yes it counts – joint fluid cell count is non-inferior to machine learning algorithm in diagnosing septic arthritis	Chi Ho Ng
1.2		Necrotising fasciitis – has epidemiology changed and what predicts mortality?	Yan Chi Leung
1.3		Harnessing the power of information technology to promote bone health and vitamin D for our young population under the adverse COVID environment	Adrian Pak Ho Leung
1.4		Identification of sarcopenic older adults by cluster analysis	Cheuk Kin Kwan
1.5		Telerehabilitation after total knee replacement: a systematic review	Mei Po Tsang
1.6		Effect of hydrotherapy on physical functions in patients after unilateral unicompartmental knee arthroplasty: a retrospective cohort study	Mei Yan Lau
1.7		Knowledge gaps in biophysical changes after powered robotic exoskeleton walking by individuals with spinal cord injury – a scoping review	Christopher Chun Hei Yip
1.8		The effect of exergaming on balance in stroke patients: a systematic review	Selina Sin Ling Ngai
1.9		Back to community and being active again – exercise training programme for patients with knee osteoarthritis in MacLehose Medical Rehabilitation Centre	Shun Shing Yeung
1.10		Monitoring functional performance and accelerometry-based activity participation 1 month after total knee replacement	Kania Wan
1.11		Modified version of Comprehensive Osteoarthritis Management Programme (COME) for patients with knee osteoarthritis during the COVID-19 pandemic	Yan Lai Ng
1.12		The first reported fracture liaison service for vertebral fractures in China: in a region with one of the longest life expectancies – is muscle the missing gap?	Linus Chee Yeen Lee
1.13		Semi-automatic computer-aided system for scoliosis bracing design	Chun Sing Chui
1.14		Enhance functional performance of fragility hip fracture cases by cognitive and activity of daily living training in an acute hospital	Yuk Ping Wong

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 – 10:00	S225	Free Paper Session II: Adult Joint Reconstruction I (SY Lee, TL Choi)	
2.1		Continuous glucose monitoring in total knee arthroplasty with preoperative high dose dexamethasone: a randomised controlled study	Brian Lik Hang Leung
2.2		Effect of postponement of elective knee replacement surgery on morbidity in COVID-19 pandemic: a single-centre retrospective analysis	Hui Hong Wong
2.3		Level of joint line and mid-flexion laxity after robotic-assisted total knee arthroplasty	Vincent Wai Kwan Chan
2.4		Prediction of total joint arthroplasty sizes with patient-specific characteristics, hand and foot sizes	Vincent Wai Kwan Chan
2.5		Early experience with bicruciate-retaining total knee arthroplasty	Kevin Ki Wai Ho
2.6		Accuracy and outcome of a handheld navigation device in total knee arthroplasty	Sheryl Man
2.7		Radiolucent lines surrounding a thick cobalt chromium tibial tray with minimum 5 years of follow-up	Chi Him Tong
2.8		The influence of tibial sloping on the clinical outcome in total knee arthroplasty: a randomised controlled trial	Chi Kit Chan
2.9		Posterior pelvic tilt is associated with a high Kellgren and Lawrence grade in an elderly population from the MusFit Cohort	Cheuk Kin Kwan
2.10		Predicting the need of knee arthroplasty for patient triage at specialist outpatient clinics: a logistic regression analysis	Lok Sze Lee
2.11		Metal-on-highly crosslinked polyethylene in total hip arthroplasty – a winning combination at 15-20 years of follow-up	Amy Cheung
2.12		Long-term results of isolated liner exchange: does fixation technique matter?	Thomas Wai Kiu Liu
2.13		Understanding anteversion with robotic arm-assisted total hip arthroplasty	Henry Fu
2.14		The effect of surgical helmet system on intra-operative surgeon-derived contamination in total knee arthroplasty	Hongtai Chen
2.15		Early experience of one-stage revision for the management of PJI	Tao Li
2.16		Synovial fluid alpha defensin lateral flow assay – specific but not sensitive for periprosthetic joint infection	Michael Yu
2.17		Lower synovial white blood cell count and prior antibiotic use is associated with culture-negative periprosthetic joint infection	Constance Wong
2.18		To screen or not to screen? A 10-year retrospective analysis of preoperative methicillin-resistant <i>Staphylococcus aureus</i> screening in primary knee and hip replacement	Thomas Ka Chun Leung
2.19		Retrospective study on effectiveness of continuous passive motion after total knee replacement	Kim Ming Hong Chau
2.20		Improvement in activities of daily living and quality of life following total joint replacement rehabilitation	Hoi Yi Chan
2.21		Use of telecare service for preoperative occupational therapy assessment before total joint replacement during the COVID-19 pandemic	Hoi Yi Chan
2.22		End-stage osteoarthritis is an independent risk factor for sarcopenia: a pilot cross-sectional study	Man Hong Cheung

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 – 10:00	S226	Free Paper Session III: Basic Science (Louis Cheung, Kelvin Yeung)	
3.1		Injectable hydrogels encapsulating magnesium and 3D-engineered polycaprolactone conduits for peripheral nerve regeneration	Zhi Yao
3.2		Osteoinductive intramedullary implant accelerates bone regeneration and prevents nonunion in bone transport	Gang Li
3.3		In vitro study on the antibacterial effect of 100% medical grade manuka honey	Vincent Wai Kwan Chan
3.4		The development of a magnesium-releasing and mechanically stable calcium phosphate bone cement possessing osteogenic and immunomodulation effects for promoting bone fracture regeneration	Tak Man Wong
3.5		How dentin matrix protein 1 plays a role in low-magnitude high-frequency vibration accelerated osteoporotic fracture healing via regulation of mineralisation	Michelle Meng Chen Li
3.6		The influence of synovial lymphatic drainage function in anterior cruciate ligament rupture model	Mingde Cao
3.7		MSCx secretome enhanced proliferation, tenogenesis and inflammation resolution of inflamed human tendon-derived stem cells	Pauline Po Yee Lui
3.8		Cranial bone transport promotes angiogenesis, neurogenesis and modulates meningeal lymphatic function in acute ischaemic stroke	Shanshan Bai
3.9		The mechanism and function of nerve invasion in osteophytes during osteoarthritis progression	Wenxue Tong
3.10		Single cell analysis of chondrosarcoma cells reveals early markers for benign to malignant transformation	Kelvin Sin Chi Cheung
3.11		<i>LBX1</i> modulates skeletal muscle regeneration upon chemical-induced injury through polyamine pathway	Wayne YW Lee
3.12		<i>Sirt3</i> , a longevity gene, regulates osteocyte function and the response of bone to exercise in mice	Wayne Yuk Wai Lee
3.13		Deciphering bisphosphonates-induced delayed fracture healing and the mechanisms underlying the efficacy of magnesium at single cell resolution	Jiankun Xu
3.14		Using prediction equation on muscle mass evaluation to improve the accuracy of sarcopenia diagnosis with bioimpedance analysis validated with dual-energy X-ray absorptiometry	Simon Kwoon Ho Chow
3.15		Preventing muscle denervation in SAMP8 sarcopenic animal model, effectiveness of mechanical stimulation in neuromuscular junction degeneration	Simon Kwoon Ho Chow
08:00 – 10:00	S227	Free Paper Session IV: Paediatric Orthopaedics and AGM of Paediatric Orthopaedics Chapter (Arthur Mak, LW Lok)	
4.1		Coupling of peak height velocity with decreased bone density and quality provide the link between low bone mineral density being a prognostic factor for curve progression that mostly occurs during pubertal growth spurt in adolescent idiopathic scoliosis	Kenneth Guang Pu Yang
4.2		Osteogenesis imperfecta patients with scoliosis – quality of life and surgical impact	Janus Siu Him Wong
4.3		The potential use of handgrip strength assessment to predict curve progression in adolescent idiopathic scoliosis girls	Rufina Wing Lum Lau
4.4		Local experience with anterior vertebral body tethering for scoliosis in Hong Kong	Kenny Yat Hong Kwan
4.5		Clinical outcomes of bracing for early-onset idiopathic scoliosis: a retrospective cohort study on 111 patients	Rufina Wing Lum Lau
4.6		Prevalence and features of metacarpal pseudoepiphysis in Hong Kong Chinese children	Aaron Wai Lun Woo
4.7		The impact of novel nusinersen treatment on hip stability in spinal muscular atrophy patients	Hayley Hoi Ning Ip
4.8		Epidemiology of developmental dysplasia of the hip and selective ultrasound screening programme in New Territories West Cluster	On Ki Lee
4.9		Changes in fracture incidence in the paediatric population during COVID-19: implications on their bone health	Gloria Sze Chung Leung

Time	Room	Topic (Moderators)	Faculty / Presenter
07:30 – 10:00	S228	Free Paper Session V: Trauma (Raymond Ng, Terence Pun)	
5.1		Sarcopenia and associations with quality of life measures among patients with atypical femoral fractures	Victor Hin Ting Yick
5.2		Open fractures for open doctors – does time of presentation affect mortality?	Ching Yau Wong
5.3		Fracture-related infections – a retrospective single centre study from 2003 to 2020	Ryan Chun Kiu So
5.4		Predictors of mortality in fracture-related infections – survival analysis with a mean follow-up of 5.8 years	Henry Chun Hin Leung
5.5		Antimicrobial susceptibility among Staphylococcal fracture-related infections	Alicia Hoi Ying Liu
5.6		Femoral neck system versus multiple cannulated screws for the treatment of intracapsular femoral neck fractures – a propensity score matched cohort study	Hiu Yan Leung
5.7		Hiking-related orthopaedic injuries: another epidemic during the COVID-19 pandemic	Yau Chun Chong
5.8		Femoral neck system for the treatment of intracapsular femoral neck fractures in patients <65 years	Calvin Tsoi
5.9		Neurolysis did not reduce 1-year mortality in fragility hip fracture patients unfit for operative treatment	Siu Kei Kam
5.10		Preoperative leukocytosis and postoperative outcome in geriatric hip fracture patients: a retrospective cohort study	Stephen Pui Kit Tang
5.11		A retrospective propensity scores matched case-control study comparing cemented and cementless modular hemiarthroplasty for patients with displaced intracapsular neck of femur fractures >65 years of age	Samuel Yan Jin Fang
5.12		Randomised controlled trial on analgesic effect of preoperative fascia iliaca compartment block in geriatric patients with hip fracture	Kelvin Tze Kit Wan
5.13		Computed tomography analysis of axial glenoid bone stock in Hong Kong's local population and its clinical implications to reverse shoulder arthroplasty	Wing Sum Li
5.14		Optimising the treatment choice of midshaft clavicular fracture: a systematic review and meta-analysis of randomised controlled trials	Zhipeng Yan
5.15		Does osteoporosis cause more severe infection and delayed healing in osteosynthesis-associated infection?	Ronald Man Yeung Wong
5.16		Defining the fit and ideal entry site of the Fibula Rod System – a computed tomography-based study	Yan Chun Cheung
5.17		Which patients should we perform direct arthroplasty in neck of femur fracture patients? 1-Year results from 233 patients in a tertiary hospital	Linus Chee Yeen Lee
5.18		Genetic risk factors for atypical femoral fractures – a multi-centre genome-wide association study of 2539 patients with the Hong Kong Osteoporosis Study cohort	Janus Siu Him Wong
5.19		Sterilised 3D PRINTed bone models versus conventional computed tomography imaging for operative visualisation for complex fracture repair surgery – a single-blinded randomised multicentre study (The SPRINT study): interim data	Sana Law
5.20		S2-alar-iliac screw insertion without continuous fluoroscopy – cadaver study comparing conventional versus targeting jig versus robotic assistance	Colin Shing Yat Yung
5.21		Evaluation of a prototype wireless head-mounted display system in knee arthroscopy – a randomised cross-over study	Christian Fang
5.22		Effect of axial dynamisation on time-to-union and mechanical failures in displaced atypical femoral fractures – A multicentre cohort analysis of 223 cases	Christian Fang
5.23		Lower mortality following surgical management for distal femur fractures: a cohort study	Benedict Yan Yui Cheung
5.24		Computational simulation of a novel surgical screw guide system to determine the optimal trajectory for S2-alar-iliac screw fixation in minimally invasive pelvic and spine surgery	Christian Fang
5.25		Our experience of fixing distal femur fracture with double plating	Tsang Yeung
5.26		Development and initial evaluation of a novel (VRU) implant prominence rating scale for predicting outcome and the need for implant removal in distal radius volar plating	Thomas Ka Chun Leung
10:00 – 10:30		Coffee Break / Exhibition	

Time	Room	Topic (Moderators)	Faculty / Presenter
10:30 – 12:00	S221	Plenary Session I: Treating the Not Too Old (Jeffrey Justin Koo, Richard Lee)	
10:30 – 11:00		OA elbow in young physically demanding patients	Bernard F Morrey
11:00 – 11:20		Choice of treatment in young patients with osteoarthritis of knee	Takafumi Hiranaka
11:20 – 11:40		The right time to treat before the kids get too old	Abhay Khot
11:40 – 12:00		Don't wait until you get to total knee station	Joon-ho Wang
12:00 – 12:30	S221	Opening Ceremony (Michelle Li, Douglas Wong)	
12:00 – 12:05		Welcome Address	Tak-man Wong, Edmund Leung-kai Yau
12:05 – 12:10		Presidential Address	Yau-bun Wong
12:10 – 12:25		Speech of Guest of Honour	Jack Chun-yiu Cheng
12:25 – 12:30		Present souvenir to the Guest of Honour	Yau-bun Wong
12:30 – 13:30		Lunch / Lunch Symposium	
12:30 – 13:30	S423-S428	Lunch Symposium: sponsored by DePuy Synthes (Christian Fang)	
		Advances in femoral neck fractures management	Karl Stoffel
13:30 – 15:45	S221	Award Paper Session (TM Wong, Edmund Yau)	
AP01		Prediction of total joint arthroplasty sizes with patient-specific characteristics, hand and foot sizes	Vincent Wai Kwan Chan
AP02		Metal-on-highly crosslinked polyethylene in total hip arthroplasty – a winning combination at 15-20 years of follow-up	Amy Cheung
AP03		The potential use of handgrip strength assessment to predict curve progression in adolescent idiopathic scoliosis girls	Rufina Wing Lum Lau
AP04		Injectable hydrogels encapsulating magnesium and 3D-engineered polycaprolactone conduits for peripheral nerve regeneration	Zhi Yao
AP05		Using prediction equation on muscle mass evaluation to improve the accuracy of sarcopenia diagnosis with bioimpedance analysis validated with dual-energy X-ray absorptiometry	Simon Kwoon Ho Chow
AP06		Cross-cultural adaptation of Chinese Victorian Institute of Sports Assessment – Achilles questionnaire for Achilles tendinopathy	Violet Man Chi Ko
AP07		MSCx secretome enhanced proliferation, tenogenesis and inflammation resolution of inflamed human tendon-derived stem cells	Pauline Po Yee Lui
AP08		LBX1 modulates skeletal muscle regeneration upon chemical-induced injury through polyamine pathway	Wayne YW Lee
AP09		Alarming high incidence of hypovitaminosis D in patients undergoing joint replacement surgery – risk factor analysis in a multivariable logistic regression model	Ping Keung Chan
AP10		Predicting the need of knee arthroplasty for patient triage at specialist outpatient clinics: a logistic regression analysis	Lok Sze Lee
AP11		In vitro study on the antibacterial effect of 100% medical grade manuka honey	Vincent Wai Kwan Chan
AP12		Clinical and radiological outcome of osteoscopic-assisted treatment of enchondroma in hand with artificial bone substitute or bone graft: a 7-year case series and literature review	Bernard Wai Tat Yung
15:45 – 16:15	S221	Award Poster Presentation (Dennis Yee) Foyer	
BP01		Vitamin D status correlates with bone mineral accrual towards pubertal peak bone mass for adolescent idiopathic scoliosis: a 6-year prospective cohort study	Kenneth Guang Pu Yang
BP02		Prevalence and risk factors of task-related shoulder pain among workers who performed forehead temperature check during the Covid-19 pandemic	Karen Ka Man Ng
BP03		The novel Proximal Femur Maturity Index for patients with idiopathic scoliosis	Prudence Wing Hang Cheung
BP04		Effect of magnesium intramedullary nail on fracture healing of type ii diabetic mice	Dick Ho Kiu Chow
BP05		The use of alternate in-brace and out-of-brace radiographs to avoid masking of curve progression in adolescent idiopathic scoliosis follow-up	Prudence Wing Hang Cheung
15:45 – 16:15		Coffee Break / Exhibition	

Time	Room	Topic (Moderators)	Faculty / Presenter
16:15 – 17:30	S221	Plenary Session II: Complex, Complicated and Challenges (TM Wong, Angela Ho)	
16:15 – 16:35		Arthroscopic treatment for massive irreparable cuff tear	Ekavit Keyurapan
16:35 – 16:55		Challenges and novel approaches in the management of complex spinal deformities	Kenneth Man-chee Cheung
16:55 – 17:15		Charcot neuroarthropathy of the foot and ankle – my surgical treatment algorithm	Keen-wai Chong
17:15 – 17:30		Discussion	All
16:15 – 17:45	S225	Concurrent Session I: Paediatric Orthopaedics (Evelyn Kuong, Alec Hung)	
16:15 – 16:35		Hip surveillance and non-surgical management of neuromuscular hip instability	Abhay Khot
16:35 – 17:00		Reconstructive surgery for neuromuscular hip instability	Abhay Khot
17:00 – 17:25		Guided growth in the management of hip dislocation in cerebral palsy	Joshua Chia-hsieh Chang
17:25 – 17:45		Salvage surgery for neuromuscular hip dislocation	Evelyn Eugenie Kuong
16:15 – 17:45	S227	Concurrent Session II: Trauma (AADO & AO Trauma Seminar) (Ronald Wong, Christian Fang)	
16:15 – 16:35		Complex fractures around the hip – tips and tricks	Anna Miller
16:35 – 16:55		Medial approach to the femur – feasibility and uses	Theerachai Apivatthakakul
16:55 – 17:15		Knee instability after posterolateral tibial plateau fractures	Cong-feng Luo
17:15 – 17:35		Common fallacies of young fracture neck of femur treatment	Wan-yiu Shen
17:35 – 17:45		Discussion	AO & AADO Panel
16:15 – 17:45	S228	Concurrent Session III: Adult Joint Reconstruction (Michael Lam, Bruce Tang, Kenneth Law, Lewis Chan)	
16:15 – 16:30		Complication of UKA, tips and tricks to avoid related complications and how to tackle complications of UKA	Takafumi Hiranaka
16:30 – 16:45		How to convert UKA to TKR: tips and tricks	Takafumi Hiranaka
16:45 – 16:50		Q&A	All
16:50 – 17:05		Spinopelvic kinematic made easy	Qunn-jid Lee
17:05 – 17:20		Impact of sagittal spinopelvic deformity on total hip replacement	Russell Cohen
17:20 – 17:35		Current concepts in dual mobility total hip replacement	George Kwok-hung Leung
17:35 – 17:40		Q&A on hip	All
17:40 – 17:45		EGM of Adult Joint Reconstruction Chapter	
17:45 – 18:15	S221	Annual General Meeting of The Hong Kong Orthopaedic Association	
19:00 – 22:00	Chancellor Room	Congress Banquet	

Sunday, 7 November 2021

Time	Room	Topic (Moderators)	Faculty / Presenter
8:00 – 10:00	S221	Free Paper Session VI: Adult Joint Reconstruction II (George Leung, Kevin Ho)	
6.1		Proximal tibial bone loss in the first two years after unicondylar knee arthroplasty: anatomical pattern, predictors and clinical correlation	Qunn Jid Lee
6.2		Mid-term survival analysis of fixed bearing unicondylar knee arthroplasty using conventional cutting guide and no anterior cruciate ligament screening: 5-year results	Qunn Jid Lee
6.3		Robotic arm-assisted unicondylar knee arthroplasty resulted in superior radiological accuracy: a case control study	Matthew Hei Yu Yeung
6.4		Radiographic comparative analysis on medial tibial bone loss for fixed bearing unicompartmental knee arthroplasty and total knee arthroplasty – retrospective cohort study from local experience	Arthur Kwok Hei Wong
6.5		Surgical accuracy and clinical outcomes of image-free robotic-assisted total knee arthroplasty	Cyrus Lau
6.6		Reducing edge loading and alignment outliers with image-free robotic-assisted unicompartmental knee arthroplasty	Wai Hong Lau
6.7		Radiological analysis of the horizontal distance between mobile-bearing insert and lateral wall of tibial tray in Oxford unicompartmental knee arthroplasties	Gloria Yan Ting Lam
6.8		Are patients' demographics helpful in predicting the size of implants for Oxford unicompartmental knee arthroplasty? A 2-year retrospective review	Karen Ka Man Ng
6.9		Role of pharmacological thromboprophylaxis in total knee arthroplasty rehabilitation for obese patient	Chun Kiu Ng
6.10		Changes in biochemical markers of nutrition before and after total knee arthroplasty	Vincent Wai Kwan Chan
6.11		What factors lead to adverse outcome after joint replacement surgery? A study of 1963 patients	Amy Cheung
6.12		Hong Kong Teaching Hospital Joint Registry: a journey of 30 plus years	Kevin Ki Wai Ho
6.13		A local survey on tranexamic acid use in arthroplasty in Hong Kong	Chi Kin Lau
6.14		Tranexamic acid in primary total hip arthroplasty: a randomised controlled trial of intravenous versus combined intravenous and intra-articular administration	Thomas Chak Ming Tang
6.15		Thromboprophylaxis should be considered in primary total knee arthroplasty – a 17-year comparative study in the incidence of pulmonary embolism	Ping Keung Chan
6.16		Intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis, a randomised controlled clinical trial	Li Li
6.17		Alarming high incidence of hypovitaminosis D in patients undergoing joint replacement surgery – risk factor analysis in a multivariable logistic regression model	Ping Keung Chan
6.18		Oral supplementation of vitamin D deficiency to reduce postoperative complications after knee arthroplasty: a randomised controlled trial	Ping Keung Chan

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 - 10:00	S225	Free Paper Session VII: Spine (TT Chan, John Wong)	
7.1		Cross-cultural adaptation of Cantonese (Hong Kong) Oswestry Disability Index Version-2.1b	Karlen Ka Pui Law
7.2		Comparison on the muscle and bone parameters in women with and without vertebral compression fractures	Tsun Kit Lau
7.3		Combined use of diaphragm pacing and exoskeleton in the rehabilitation of a patient with high cervical cord injury – a case report	Thomas Wai Kiu Liu
7.4		Does local application of vancomycin powder reduce postoperative infection in cervical laminoplasty? A retrospective review	Andrew Lok Yin Wong
7.5		Surgical outcome of interlaminar endoscopic lateral recess decompression of lumbar spine – a retrospective review	Cho Yau Lo
7.6		Radiological outcome of titanium vertical expandable cage in transforaminal lumbar interbody fusion	Cho Yau Lo
7.7		Mid- to long-term neurological survivorship in patients receiving surgery for cervical myelopathy	Victor Hin Ting Yick
7.8		Long-term outcomes of early-onset scoliosis with neurofibromatosis treated by magnetically controlled growing rod: retrospective case series long-term outcomes	Giselle Tung Kat Li
7.9		Deep learning-based fully automated vertebral endplates irregularity prediction using lumbar magnetic resonance imaging	Xihe Kuang
7.10		Screw malalignment explains tether failure in vertebral body tethering: a clinical and finite element analysis	Wanis Nafo
7.11		A simple and effective method to assess sagittal alignment of the spine: a pilot study	Ogulcan Guldeniz
7.12		Distribution of proprioceptive deficit in adolescent idiopathic scoliosis in Hong Kong: a preliminary analysis	Kenney Ki Lee Lau
7.13		The “asymmetric screw sign” for magnetically controlled growing rods: a novel predictive factor for success of distraction	Douglas Wong
7.14		A validated capsule network to predict curve progression in adolescent idiopathic scoliosis based on posteroanterior X-rays at first visit	Hongfei Wang
7.15		Is spinal proprioception altered in adolescent idiopathic scoliosis?	Kenney Ki Lee Lau
7.16		Validity of a handheld spine scanner for measuring adolescent idiopathic scoliosis: a cross-sectional study	Jack Zijian Wei
7.17		Proprioceptive deficit in degenerative cervical myelopathy	Karlen Ka Pui Law
7.18		Long segment versus short segment stabilisation in thoracolumbar spine fracture: a retrospective clinical and radiological analysis	Suk Ying Mak

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 – 10:00	S226	Free Paper Session VIII: Foot and Ankle (Alex Hui, Dennis Chan)	
8.1		Can 3-dimensional printed anatomical models assist in surgical treatment for trimalleolar fracture? A case cohort comparison on early postoperative outcomes	Ka Ming Ng
8.2		Radiological and clinical effectiveness of a Mini TightRope system in hallux valgus surgery	Oliver Ting See Ho
8.3		Cross-cultural adaptation, reliability and validity of the Cantonese-Chinese version of the Cumberland Ankle Instability Tool (CAIT-HK)	Anson Hei Ka Tong
8.4		Prevalence of ankle instability in performers of Chinese dance	Anson Hei Ka Tong
8.5		Anthropologic computed tomography investigation on the site and severity of the rotational deformity in hallux valgus	Samuel Ka Kin Ling
8.6		Case series on the efficacy of a synthetic cartilage implant for the treatment of hallux rigidus	Ashley Ying Ying Wong
8.7		The morphological differences of intrinsic foot muscles in runners with plantar fasciitis – a pilot study	Fannie On Yue Lau
8.8		Cross-cultural adaptation of Chinese Victorian Institute of Sports Assessment – Achilles questionnaire for Achilles tendinopathy	Violet Man Chi Ko
8.9		Foot pronation is not associated with the radiographic severity of knee degeneration and knee function in an elderly population from the MusFit Cohort	Cheuk Kin Kwan
08:00 – 10:00	S227	Free Paper Session IX: Hand and Microsurgery (Edmund Yau, Emily Yip)	
9.1		Ambulatory upper limb tendon surgery by wide-awake local anaesthesia no tourniquet technique under COVID-19 pandemic	Wing Tak Yung
9.2		Arthroscopic partial trapeziectomy with suture button suspensionplasty (Mini TightRope) for thumb carpometacarpal osteoarthritis: a retrospective review of intermediate-term outcomes	Karen Ka Man Ng
9.3		Clinical and radiological outcome of osteoscopic-assisted treatment of enchondroma in hand with artificial bone substitute or bone graft: a 7-year case series and literature review	Bernard Wai Tat Yung
9.4		Outcome of cement-less self-locking replacement arthroplasty of proximal interphalangeal joint for treatment of osteoarthritis, inflammatory arthritis, and posttraumatic arthritis	Gloria Sze Chung Leung
9.5		Functional outcome of heterodigital neurovascular island flap for reconstruction of finger and thumb defects	Ka Wai Cheng
9.6		Mid- to long-term radiological outcome of self-locking finger joint in proximal interphalangeal joint arthroplasty using a novel radiological classification system	Cham Kit Wong
9.7		Properly addressing the volar lunate facet rim fragment in distal radius fracture can significantly minimised the complication rate and improve the outcome	Jeffrey Justin Siu Cheong Koo
9.8		Hypoplastic thumb reconstruction with free longitudinal hemi-metatarsal graft: long-term outcome of minimal 10 years of follow-up	Michael Chu Kay Mak
9.9		Change of functional task kinematics after first carpometacarpal joint arthrodesis	Pui Man Chung
9.10		Relative motion splint can improve the proximal interphalangeal joint extension range in finger proximal phalangeal fracture	Charles Cheuk Sang Lam
9.11		Use of modified Masquelet technique for staged reconstruction in hand injury and infection: a case series	Douglas See Lok Ho
9.12		A radiographic index of radial bowing for predicting loss of forearm rotation	Michael Chu Kay Mak

Time	Room	Topic (Moderators)	Faculty / Presenter
08:00 – 10:00	S228	Free Paper Session X: Sports Medicine (Richard Lee, Alden Man)	
10.1		Comparison of clinical results in patients undergoing mini-open subpectoral biceps tenodesis versus tenotomy in arthroscopic shoulder surgery	Nga Ping Tang
10.2		The use of five-strand hamstring autograft to increase the graft size in anterior cruciate ligament reconstruction – an early experience in Kwong Wah Hospital	Keith Hay Man Wan
10.3		Clinical outcomes of subacromial balloon spacer implantation for massive and irreparable rotator cuff tear	Chun Kwong Lo
10.4		The effect of supervised exercise programme and home-based exercise programme on shoulder function in older adults	Karen Ka Man Ng
10.5		The effect of whole-body vibration on dynamic knee stability at early stage after anterior cruciate ligament reconstruction	Xin He
10.6		The role of vitamin D deficiency on quadriceps muscle atrophy after anterior cruciate ligament reconstruction	Michael Tim Yun Ong
10.7		Surgical management of unstable distal clavicle fracture: arthroscopic suture button fixation versus open fixation	Ying Kan Law
10.8		Lower psychological readiness to return to sports is associated with poor dynamic knee stability on both injured and uninjured limbs after anterior cruciate ligament reconstruction	Matthew Chun Sing Chow
10.9		Quadriceps inhibition negatively affects quadriceps strength in patients with anterior cruciate ligament injuries	Jihong Qiu
10.10		Effect of shoulder rehabilitation exercise programme on shoulder function in older adults with diabetes	Naomi Pui Yan Fung
10.11		A randomised control trial to evaluate the effect of geko device (neuromuscular electrical stimulation device) on postoperative lower limb oedema in anterior cruciate ligament reconstruction patients	Ronald Wing Hei Siu
10.12		Community-based muscle strengthening programme may promote active lifestyle and improve sarcopenic state in community dwellers – the MusFit Cohort	Cheuk Kin Kwan
10:00 – 10:30		Coffee Break / Exhibition	
10:30 – 12:00	S221	Plenary Session III: Overcome Difficulty (Lewis Chan, Dennis Yee)	
10:30 – 11:00		Big data study in paediatric orthopaedics	Joshua Chia-hsieh Chang
11:00 – 11:20		How robotic assisted arthroplasty help to tackle difficult total hip replacement	Russell Cohen
11:20 – 11:40		Hoffa fractures – where are the pitfalls	Cong-feng Luo
11:40 – 12:00		Tackling complex distal femur fractures	Anna Miller
10:30 – 12:00	S227	Concurrent Session IV: Hand (Jeffrey Justin Koo, Margaret Fok)	
10:30 – 10:50		Complications of total elbow replacement: how would I treat and stay away from trouble	Bernard F Morrey
10:50 – 11:10		My approach to post-traumatic elbow stiffness	In-ho Jeon
11:10 – 11:30		Elbow fracture dislocation: tips and pearls	Frankie Ka-li Leung
11:30 – 12:00		Case discussion	Panel Speakers
10:30 – 12:00	S228	Concurrent Session V: Sports Medicine (Sammy Mak, Michael Ong)	
10:30 – 10:45		ACL legacy	Patrick Shu-hang Yung
10:45 – 11:00		Repairing the meniscus – how far we should go?	Peter Wai-pan Yau
11:00 – 11:15		Recent hot issues in ACL reconstruction	Joon-ho Wang
11:15 – 11:30		Arthroscopic transosseous rotator cuff repair	Ekavit Keyurapan
11:30 – 11:37		The relationship of glenoid version and severity of glenoid bone loss in anterior shoulder instability patients: a retrospective cohort study	Nattakorn Paopongthong
11:37 – 11:44		Double blind, randomised control trial: intra-articular triamcinolone acetanide post-arthroscopic lysis of adhesion prevents recurrent stiffness of the knee	Watit Wuttimanop
11:44 – 11:55		Discussion	All
11:55 – 12:00		Annual General Meeting of Sports Medicine Chapter	

Time	Room	Topic (Moderators)	Faculty / Presenter
10:30 – 12:00	S225	Concurrent Session VI: The Hong Kong College of Orthopaedic Surgeons (KK Wong, PT Chan)	
10:30 – 10:50		Education technology	Frankie Ka-li Leung
10:50 – 11:10		Acquiring new skills in digital orthopaedics	Christian Xinshuo Fang
11:10 – 11:30		Faculty development	Ping-tak Chan
11:30 – 11:40		Discussion	All
12:00 – 13:00		Lunch / Lunch Symposia	
12:00 – 13:00	S426-S428	Lunch Symposium: sponsored by Amgen Hong Kong Limited (Ronald Wong)	
		Who is suitable for osteo-anabolic therapies? A case-based discussion	Kin-cheung Mak, Joanne Lam
	S423-S424	Lunch Symposium: sponsored by Pacific Medical Systems Ltd.	
		Current trends and recent advances in surgical treatment for osteochondral lesions of the talus (OCLT)	Wilson Li, Niek van Dijk
13:00 – 14:30	S221	Plenary Session IV: Challenges over COVID-19 Pandemic (TM Wong, Edmund Yau)	
13:00 – 13:20		COVID impact on orthopaedic surgery	Wilson Li
13:20 – 13:40		COVID and sports medicine	Patrick Shu-hang Yung
13:40 – 14:00		Lessons learned from the impact of COVID-19 pandemic on arthroplasty services in Hong Kong; how to prepare for the next pandemic?	Lewis Ping-keung Chan
14:00 – 14:20		Occupational therapy blended services delivery mode for orthopaedic cases during COVID-19 pandemic	Jacky Ting-cheung Chan
14:20 – 14:30		Discussion	All
13:00 – 14:30	S228	Concurrent Session VII: Spine – 15th Anniversary of the HKOA Spine Chapter (Edwin Lam, Michael Tse)	
13:00 – 13:15		How to avoid complications in spine surgery	Keith Dip-kei Luk
13:15 – 13:30		Revision surgery management – inadequate decompression	Yat-wa Wong
13:30 – 13:40		Iatrogenic instability	Ka-kin Li
13:40 – 13:50		Postoperative infection	Raymond Nang-man Wong
13:50 – 14:00		Approach to dural tear	Kam-kwong Wong
14:00 – 14:30		Case discussion	All
13:00 – 14:30	S227	Concurrent Session VIII: Foot and Ankle – Management on Foot Deformity from Toddler to Senior (SW Man, Charles Li)	
13:00 – 13:20		Deformity correction in foot and ankle: questions in my mind	Samuel Ka-kin Ling
13:20 – 13:40		Corrective osteotomies of the hindfoot – why, when, how?	Markus Knupp
13:40 – 14:00		Fibula axis calcaneal overlap – my method of radiological evaluation and surgical planning for pes planovalgus	Keen-wai Chong
14:00 – 14:20		Surgical management of neuromuscular and traumatic foot & ankle deformity	Kwai-ming Siu
14:20 – 14:30		Discussion	All
14:30 – 15:00		Coffee Break / Exhibition	
15:00 – 16:30	S221	Plenary Session V: Cases that I Learnt From (Margaret Fok, Michael Tse)	
15:00 – 15:20		Spine cases sharing	Gabriel Ka-po Liu
15:20 – 15:40		Complications of elbow instability treatment: how to avoid?	In-ho Jeon
15:40 – 16:00		Foot and ankle cases sharing	Markus Knupp
16:00 – 16:20		Posterior approaches and techniques to the tibial plateau	Theerachai Apivotthakakul
16:20 – 16:30		Discussion	All
16:30 – 16:45	S221	Closing Remarks	Tak-man Wong, Edmund Leung-kai Yau

Award Paper Session

AP01

Prediction of total joint arthroplasty sizes with patient-specific characteristics, hand and foot sizes

Vincent Wai Kwan Chan, Ping Keung Chan, Henry Fu, Man Hong Cheung, Amy Cheung, Kwong Yuen Chiu
Department of Orthopaedics and Traumatology, Queen Mary Hospital

No copyright transfer for abstract printing.

AP02

Metal-on-highly crosslinked polyethylene in total hip arthroplasty—a winning combination at 15-20 years of follow-up

Amy Cheung,¹ Henry Fu,¹ Ping Keung Chan,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Kwong Yuen Chiu²
¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*
²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Highly crosslinked polyethylene (HXLPE) has been used with great success in THA since its debut in the late 1990's. However, reports regarding this bearing couple in its second decade of service are still scant. The aim of this study was to 1. Determine the long term clinical and radiological results of and 2. Investigate what factors affect wear in THA using a metal-on-HXLPE articulation.

Methods: 60 THA using a single brand of HXLPE liner. Cementless cup and 28 mm hip ball were performed in 49 patients. Age, sex, Charlson Comorbidity Index (CCI) and need for revision surgery was recorded. Linear and volumetric wear was determined using the Martell method.

Results: Mean age at operation was 51.2 ± 12.1 (range, 29-73) years. Mean duration of follow-up was 16.9 years (range 15-19.3 \pm 1.13 years). Osteolysis was not present in the latest follow-up radiographs. Revision-free survival was 95%. Mean linear and volumetric wear rate was 0.038 mm/year (0-0.09 \pm 0.0219) and 71.7 mm³/year (0.01-159.7 \pm 40), respectively. Acetabular component position was not found to be related to both linear and volumetric wear. No significant difference was found in the linear and volumetric wear rates of thinner and thicker liners (≤ 8 mm and > 8 mm) ($p=0.906$).

Discussion and Conclusion: HXLPE is associated with low linear and volumetric wear rates which has virtually obviated osteolysis and has translated to excellent survivorship even at long-term follow-up. In vivo oxidation does not appear to be a concern at this point in its service cycle.

AP03

The potential use of handgrip strength assessment to predict curve progression in adolescent idiopathic scoliosis girls

Rufina Wing Lum Lau,¹ Ka Yee Cheuk,² Vivian Wing Yin Hung,² Wayne Yuk Wai Lee,² Kenneth Guangpu Yang,² Alec Lik Hang Hung,² Jack Chun Yiu Cheng,² Tsz Ping Lam²

¹*School of Medical and Health Sciences, Tung Wah College*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Adolescent idiopathic scoliosis (AIS) patients have deranged muscle and bone qualities. A unique correlation pattern of handgrip strength and bone qualities was found in AIS as compared to controls. This study aimed to investigate whether baseline muscle and bone parameters in AIS could predict curve progression.

Methods: 126 AIS girls aged 12-14 were recruited, followed up until skeletal maturity and sub-grouped into progressive (pAIS) and stable (sAIS) groups according to SRS criteria. Maximum handgrip strength was measured with a standard dynamometer, lean mass at extremities and trunk was measured by bioelectrical impedance analysis, bone qualities and mechanical properties of non-dominant distal radius were measured by high-resolution peripheral quantitative computed tomography (HR-pQCT). Logistic regression model was used to determine the predictors for curve progression.

Results: 44 AIS (34.9%) had curve progression with Cobb angle $\geq 6^\circ$ before skeletal maturity. pAIS had similar age, curve severity and lifestyle but lower weight, Thumb Ossification Composite Index (TOCI), lower trunk (5.7%) and arm lean mass (8.9%), weaker dominant handgrip strength (8.8%), deranged cortical compartment (lowered vBMD by 6.5%) and lower bone mechanical properties (stiffness and estimated failure load lowered by 13.2% and 12.5%) when compared with sAIS. The best cut-off of maximum dominant handgrip strength was 19.75 kg for distinguishing pAIS from sAIS (75% sensitivity and 52.4% specificity) by receiver operating characteristic (ROC) analysis.

Discussion and Conclusion: pAIS showed poorer muscle and bone parameters than sAIS. A cut-off of 19.75 kg in dominant handgrip strength was identified which might predict AIS curve progression.

AP04

Injectable hydrogels encapsulating magnesium and 3D-engineered polycaprolactone conduits for peripheral nerve regeneration

Zhi Yao,¹ Weihao Yuan,¹ Jiankun Xu,¹ Wenxue Tong,¹ Dick Ho Kiu Chow,¹ Ye Li,¹ Hao Yao,¹ Xu Li,¹ Liming Bian,² Ling Qin¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Biomedical Sciences and Engineering, South China University of Technology, Guangzhou International Campus, Guangzhou, China*

No copyright transfer for abstract printing.

AP05

Using prediction equation on muscle mass evaluation to improve the accuracy of sarcopenia diagnosis with bioimpedance analysis validated with dual-energy X-ray absorptiometry

Keith Yu Kin Cheng, Simon Kwoon Ho Chow, Wing Hoi Cheung, Ronald Man Yeung Wong

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: To cross-validate skeletal muscle mass measurements between bioimpedance analysis (BIA) and dual-energy X-ray absorptiometry (DXA) for the screening of sarcopenia in the community and to estimate the prevalence of sarcopenia in Hong Kong.

Methods: Screening of sarcopenia was provided to community dwelling older adults. Appendicular skeletal muscle mass (ASM) was evaluated by BIA (InBody 120 or 720) and DXA. Handgrip strength and/or gait speed were assessed. The Asian Working Group for Sarcopenia 2019 criteria was used for diagnosis and prevalence was estimated. Agreement analysis was performed to cross-validate ASM by BIA and DXA. Multiple regression was used to explore contribution of measured parameters in predicting DXA ASM from BIA.

Results: A total of 1587 participants (age 72 ± 12 years) were recruited. 1065 participants were screened by BIA (InBody 120) with 18 followed up by DXA, while the remaining 522 participants were assessed by the BIA (InBody 720) and DXA. The ASMI evaluated by BIA showed a mean difference of 2.89 ± 0.38 kg/m² (InBody 120) and 2.97 ± 0.45 kg/m² (InBody 720) against DXA. A significant overestimation of muscle mass was measured by BIA compared to DXA ($p < 0.005$). BIA data were adjusted using prediction equation and mean difference reduced to -0.02 ± 0.31 kg/m². Prevalence of sarcopenia in Hong Kong in older adults ≥ 65 years was 39.4% by DXA.

Discussion and Conclusion: BIA was found to overestimate skeletal muscle mass compared to DXA. With adjustments, BIA can be used as a quick and reliable tool for screening sarcopenia in community and clinical settings.

AP06

Cross-cultural adaptation of Chinese Victorian Institute of Sports Assessment—Achilles questionnaire for Achilles tendinopathy

Violet Man Chi Ko, Ngo Nam Lau, Rachel Xiao Yu Wei, Ji Hong Qiu, Daniel Tik Pui Fong, Sai Chuen Fu, Patrick Shu Hang Yung, Samuel Ka Kin Ling

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Achilles tendinopathy is a common overuse musculoskeletal condition. The Victorian Institute of Sports Assessment (VISA-A) is a patient-reported outcome for assessing symptom severity in patients with Achilles tendinopathy. It is a valid and reliable tool that has been used widely for measuring and monitoring treatment outcomes for Achilles tendinopathy. The results of VISA-A range between 0 and 100 points. The overall study objective is to adapt the VISA-A questionnaire cross-culturally and assess its reliability for Chinese-speaking individuals.

Methods: VISA-A was translated and adapted cross-culturally according to international guidelines for self-reported questionnaires. The orthopaedic surgeon, physiotherapist, and professional translator performed the five steps in creating Chinese VISA-A, including translation, synthesis, reverse translation, review, and pretesting. Healthy individuals ($n=16$), recreational athletes ($n=14$), and patients with Achilles tendinopathy ($n=3$) were recruited to assess the psychometric properties of Chinese VISA-A. All participants completed Chinese VISA-A twice.

Results: The mean Chinese VISA-A score in patients with Achilles tendinopathy was 69 (95% confidence interval (95% CI)=52-86). It was significantly lower than the healthy control score of 96 (95% CI=93-99). The overall test-retest reliability of Chinese VISA-A was good (ICC=0.90).

Discussion and Conclusion: Chinese VISA-A demonstrates good reliability for measuring symptom severity in patients with Achilles tendinopathy. Chinese VISA-A can assess Chinese-speaking patients with Achilles tendinopathy, both in research and clinical setting.

AP07

MSCx secretome enhanced proliferation, tenogenesis and inflammation resolution of inflamed human tendon-derived stem cells

Yuk Wa Lee, Shiyi Yao, Michael Tim Yun Ong, Patrick Shu Hang Yung, Pauline Po Yee Lui

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Mesenchymal stem cells (MSCs) and their secretome are emerging treatments for tendinopathy but their underlying mechanisms remains unclear. There has been no study on the effect of MSCx secretome on the functions of inflamed TDSCs. This study aimed to examine the effect of different concentrations of MSCx secretome on the functions and inflammatory response of TDSCs under an inflammatory environment in vitro. MSCx secretome was supplied by Rohto Advanced Research Hong Kong Ltd. hTDSCs were treated with different doses of MSCx secretome with/without IL-1 β stimulation. The viability, proliferation and migration, expression of inflammatory markers, extracellular matrix (ECM) remodelling markers and multi-lineage differentiation markers in inflamed hTDSCs after treatment with MSCx secretome was examined. IL-1 β significantly reduced the viability and migration of hTDSCs (Figure 1A-D). The addition of MSCx secretome dose-dependently increased the viability, proliferation and migration of hTDSCs with/without IL-1 β stimulation. IL-1 β induced the expression of pro-inflammatory markers, up-regulated the expression of adipogenic marker and reduced the expression of tenogenic markers in hTDSCs. The addition of MSCx secretome significantly reversed the effect of IL-1 β . In summary, the tendon regenerative potential of TDSCs was compromised in an inflammatory environment which might explain ECM degeneration, tissue metaplasia and failed healing in tendinopathy. MSCx secretome enhanced the viability, proliferation, migration, tenogenesis and inflammation resolution of inflamed TDSCs. It might be useful as a cell-free stem cell-based therapy for the treatment of tendinopathy.

AP08

LBX1 modulates skeletal muscle regeneration upon chemical-induced injury through polyamine pathway

Yujia Wang,¹ Mengheng Li,² On Chan,² Tsz Ping Lam,¹ Alec LH Hung,¹ Jack CY Cheng,¹ Daniel Mok,² Wayne YW Lee¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University*

No copyright transfer for abstract printing.

AP09

Alarming high incidence of hypovitaminosis D in patients undergoing joint replacement surgery—risk factor analysis in a multivariable logistic regression model

Ping Keung Chan,¹ Wing Chiu Fung,² Amy Cheung,¹ Vincent Wai Kwan Chan,¹ Henry Fu,¹ Man Hong Cheung,² Chun Hoi Yan,³ Kwong Yuen Chiu²

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

³*Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital*

No copyright transfer for abstract printing.

AP10

Predicting the need of knee arthroplasty for patient triage at specialist outpatient clinics: a logistic regression analysis

Ping Keung Chan,¹ Lok Sze Lee,² Wing Chiu Fung,² Thomas Chak Ming Tang,² Angus Lok Wang Wong,² Shun Shing Yeung,³ Yan Lai Ng,⁴ Vincent Wai Kwan Chan,¹ Tak Wing Lau,¹ Kwong Yuen Chiu²

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Orthopaedics and Traumatology, The University of Hong Kong

³Department of Physiotherapy, MacLehose Medical Rehabilitation Centre

⁴Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre

No copyright transfer for abstract printing.

AP11

In vitro study on the antibacterial effect of 100% medical grade manuka honey

Vincent Wai Kwan Chan,¹ Derek Ling Lung Hung,² Amy Cheung,¹ Man Hong Cheung,³ Henry Fu,¹ Ping Keung Chan,¹ Kwong Yuen Chiu³

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Microbiology, Queen Mary Hospital

³Department of Orthopaedics and Traumatology, The University of Hong Kong

No copyright transfer for abstract printing.

AP12

Clinical and radiological outcome of osteoscopic-assisted treatment of enchondroma in hand with artificial bone substitute or bone graft: a 7-year case series and literature review

Bernard Wai Tat Yung,¹ Jeffrey Justin Siu Cheong Koo,¹ Michael Chu Kay Mak,² Fiona Wai Ping Yu,³ Wing Lim Tse,² Pak Cheong Ho²

¹Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

²Department of Orthopaedics and Traumatology, Prince of Wales Hospital

³Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: The addition of osteoscopy to the surgery can allow direct visualisation of the bone cavity during and after curettage of the tumour without excessive damage to the bone cortex, which could potentially lead to a better clearance of tumour tissue and a lower rate of recurrence.

Methods: The study data were retrieved retrospectively from the Clinical Management System of Hospital Authority. Eleven patients who received surgery from December 2013 to November 2020 in either PWH or AHNH were included in this study. The duration of follow-up ranged from 3 to 65 months, with a mean of 20.9 months.

Results: The total active motion (TAM) of patients ranged from 220 to 280, with a mean of 257. The percentage of TAM compared to the contralateral side ranged from 81.5% to 100%, with a mean of 94.4%. The percentage of grip strength compared with the contralateral side ranged from 62% to 100%, with a mean of 86.2%. The QuickDASH score of patients ranged from 0 to 46.9, with a mean of 7.7. For the wound aesthetic rating, nine out of eleven patients reported as excellent. For the radiological outcome, the postoperative X-ray of all patients showed bone filling defect <3 mm, which belonged to Group 1 in the evaluation system proposed by Tordai et al (1990). None of the patients showed any radiological signs of recurrence.

Discussion and Conclusion: Our study showed that patients with enchondromas in hand treated with this minimal invasive method demonstrated good functional and radiological outcome.

Award Poster Session

BP01

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

Kenneth Guang Pu Yang, Wayne Yuk Wai Lee, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

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

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

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

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

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

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

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

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

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

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

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

No copyright transfer for abstract printing.

BP04

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

Dick Ho Kiu Chow,¹ Wenxue Tong,¹ Lizhen Zheng,¹ Kathy Oi Lan Lui,² Ling Qin¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Chemical Pathology, The Chinese University of Hong Kong*

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

BP05

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

Prudence Wing Hang Cheung,¹ Sachiko Kawasaki,² Hideki Shigematsu,² Masato Tanaka,² Yuma Suga,² Yusuke Yamamoto,² Yasuhito Tanaka,² Jason Pui Yin Cheung¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Orthopaedic Surgery, Nara Medical University, Kashihara City, Nara, Japan*

No copyright transfer for abstract printing.

Free Paper Session I: Rehabilitation, Others

FP1.1

Yes it counts—joint fluid cell count is non-inferior to machine learning algorithm in diagnosing septic arthritis

Chi Ho Ng,¹ Chris Yuk Kwan Tang,² Ningbo Fei,³ Tak Wing Lau,² Janus Siu Him Wong³

¹*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*

No copyright transfer for abstract printing.

FP1.2

Necrotising fasciitis—has epidemiology changed and what predicts mortality?

Yan Chi Leung,¹ Margaret Woon Man Fok,² Alfred Lok Hang Lee,³ Tak Wing Lau,² Janus Siu Him Wong⁴

¹*The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Microbiology, Prince of Wales Hospital*

⁴*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP1.3

Harnessing the power of information technology to promote bone health and vitamin D for our young population under the adverse COVID environment

Adrian Pak Ho Leung, Jessica Kit Lam Tsui, Tsz Ping Lam, Jack Chun Yiu Cheng, Michael Tim Yun Ong, Wayne Yuk Wai Lee

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: A community-based vitamin D (Vit-D) promotion project was launched in 2015 as a previous survey revealed more than 65% of adolescents in Hong Kong have Vit-D insufficiency. This new project “Promoting bone health and Vit-D for children and adolescents” aimed to continue and improve on the previous project with full utilisation of information technology to promote bone health and Vit-D for our young population under the adverse COVID environment. Our objectives are to promote bone health and Vit-D to the youngsters through: (1) updating and increasing the variety of educational materials with the latest information and; (2) knowledge transfer through liaison with primary, secondary schools and NGOs serving the adolescents.

Methods: The aesthetics and information of slideshows, videos and dietary calcium calculator were updated with enhancement. In terms of content diversification, promotional content was compiled into infographics, Instagram posts, and a new videogame that are appealing to teenagers. We also mentioned the potential impacts of COVID-19 on Vitamin-D status and bone health of the population. Knowledge would be disseminated to primary and secondary schools, NGOs.

Results and Discussion: This project serves to increase public awareness on Vit-D and encourages people to adjust their lifestyle for better bone health. Under the rampant pandemic restricting social contacts when education talk and in-person communication are prohibited, we fully utilise the power of information technology empowering the dissemination of knowledge through the web, Instagram with multimedia and gamification elements, thus fulfilling our objectives of promoting bone health and Vit-D for the adolescents.

FP1.4

Identification of sarcopenic older adults by cluster analysis

Sai Chuen Fu,¹ Michael Tim Yun Ong,¹ Cheuk Kin Kwan,¹ Yuen Man Wu,¹ Jojo Jiao,² Bik Chu Chow,² Lobo Hung Tak Louie,² Sally Siu Yin Cheung,² Patrick Shu Hang Yung¹

¹Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

²Department of Sports, Physical Education and Health, Hong Kong Baptist University

Introduction: Sarcopenia is defined as low skeletal muscle mass and strength in the elderly people. Instead of using arbitrary cut-off values, it is necessary to combine contributions of muscle mass, muscle strength and muscle function in diagnosis of sarcopenic subjects with related health problems.

Methods: Subjects were recruited from a health-promotion programme (MusFit cohort). Skeletal muscle mass was measured by bioelectrical impedance analysis (BIA). Together with gait speed and hand grip strength, sarcopenia subjects were either identified with guidelines by Asian sarcopenia workgroup (ASWG), or by a cluster analysis. Health-related quality of life was evaluated by SF-36 questionnaires and presence of musculoskeletal pain.

Results: 156 female subjects were recruited from the MusFit cohort. By ASWG criteria, 37% were diagnosed as sarcopenia, while 47% sarcopenia cases were detected by clustering. Sarcopenic subjects exhibited a declined quality of life, and higher rates of shoulder pain and knee pain. Cluster analysis identified more sarcopenia subjects with low grip strength ($p < 0.001$) and poor physical functioning ($p = 0.024$) yet with muscle mass above ASWG cut-off values. Overweight was significantly associated with sarcopenia status diagnosed by ASWG ($p < 0.001$) but not by clustering ($p = 0.738$).

Discussion and Conclusion: ASWG criteria may underestimate the prevalence of sarcopenia by misclassifying subjects with weak grip strength and muscle mass above cut-off values as non-sarcopenic. Overweight/obesity may present a key confounding factor for diagnosis of sarcopenia. Clustering of low muscle strength, low muscle mass and low muscle functions identified sarcopenic subjects with poor health that may need further medical help.

FP1.5

Telerehabilitation after total knee replacement: a systematic review

Mei Po Tsang, Michael Tim Yun Ong, Patrick Shu Hang Yung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: The aim of this study is to compare the effectiveness of telerehabilitation with those of conventional in-person rehabilitation on patients underwent total knee replacement.

Methods: Six electronic databases: PubMed, Medline, EMBASE, Cochrane Library, ScienceDirect and CINAHL databases were systematically searched for randomised control trials (RCTs) that investigated the effectiveness of telerehabilitation as compared to conventional face-to-face rehabilitation on patients following TKR, from inception to 30 September 2020. Relevant journals and reference lists of reviews and included studies were manually searched for additional trials by two independent reviewers. PEDro scale was used to assess the methodological quality of included RCTs.

Results: Eleven RCTs involving 1825 patients are included in the systematic review. Overall, the results revealed that the effectiveness of telerehabilitation is comparable to conventional in-person rehabilitation in improving variable clinical outcomes including the knee range of motion, muscle strength, pain score, Western Ontario and McMaster Universities Osteoarthritis index score, time up and go test, Patient-Specific Functional Scale on patients underwent TKR. In addition, significantly higher patient compliance to exercise programme, less utilisation of hospital resources and lower cost in telerehabilitation in comparison with in-person rehabilitation were found. High satisfaction rate to telerehabilitation was reported as well.

Discussion and Conclusion: Telerehabilitation was comparable to conventional in-person rehabilitation in improving clinical outcomes following TKR and is a significant good alternative rehabilitation intervention for patients following TKR given the significantly lower cost with telerehabilitation.

FP1.6**Effect of hydrotherapy on physical functions in patients after unilateral unicompartmental knee arthroplasty: a retrospective cohort study****Mei Yan Lau,¹ Kevin Ki Wai Ho,² Cheuk Hang Mak,¹ Ka Man Lo,³ Anthony Wing Keung Lau,¹ Chin Ting Cheung¹**¹*Department of Physiotherapy, Alice Ho Miu Ling Nethersole 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: Despite the increasing popularity of adding hydrotherapy into postoperative physiotherapy, there are no studies investigating effects of hydrotherapy on patients after unicompartmental knee arthroplasty (UKA). Therefore, aim of this study was to investigate the effects of hydrotherapy on physical functions on patients after primary unilateral UKA with the model of Oxford® Partial Knee (Zimmer Biomet, UK).

Methods: A retrospective cohort study of 68 patients who had primary unilateral Oxford-Model UKA were recruited, and divided into hydrotherapy group which received hydrotherapy and conventional physiotherapy, and control group which received conventional physiotherapy only. Knee Society Function Score was measured before operation, 6 months and 1 year after operation. Self-reported walking tolerance, Timed Up and Go Test (TUGT) and 30-second Chair Stand Test (30CST) were measured before and after completion of rehabilitation.

Results: Hydrotherapy group had statistically significantly higher Knee Society Function Score than control group 6 months ($p=0.038$) and 1 year ($p=0.030$) after operation. It also had statistically significantly higher self-reported walking tolerance ($p=0.011$) after rehabilitation. There were no significant differences in TUGT ($p=0.199$) and 30CST ($p=0.464$) between two groups after rehabilitation.

Discussion and Conclusion: There are positive effects, which can last for at least one year, of hydrotherapy in improving physical functions of patients after UKA. Combination of hydrotherapy with conventional postoperative physiotherapy is better than conventional physiotherapy alone. Since there are no prior studies investigating the effects of hydrotherapy on patients after UKA, this study provides clinical insights in considering adding hydrotherapy in addition to conventional land-based physiotherapy in postoperative UKA rehabilitation.

FP1.7

Knowledge gaps in biophysical changes after powered robotic exoskeleton walking by individuals with spinal cord injury—a scoping review

Christopher Chun Hei Yip,¹ Paul Aarne Koljonen,² Kenneth Man Chee Cheung,¹ Yat Wa Wong,² Clive Chor Yin Lam¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: In addition to helping individuals with spinal cord injury (SCI) regain the ability to ambulate, robotic exoskeletons also provide an array of secondary biophysical and psychosocial benefits which can reduce the complications resulting from prolonged immobilisation. This scoping review seeks to provide an overview of the known effects of overground exoskeleton use, on the prevention of secondary health complications, changes to the QOL, as well as the viability of their use in the local community settings. The secondary objectives are to identify gaps in the literature currently available, and to make recommendations on focus study areas and methods for future investigations.

Methods: PubMed, Cochrane and Embase databases and reference lists of key articles were searched to identify studies related to exoskeletons and spinal cord injury, from database inception to 26 June 2021.

Results: 638 articles were gathered from the initial search. After screening through the full-texts, 55 articles relating to our search criteria were identified, of which studies related to cardiovascular effects were most commonly evaluated (28).

Discussion and Conclusion: Overground exoskeletons have much potential in maintaining good health and improving the quality of life in individuals with SCI. This review has identified several focus areas in need of further investigation. We have also identified pitfalls such as heterogenous methodologies, disparate study populations and dissimilar training programmes, which need to be overcome in future studies.

FP1.8

The effect of exergaming on balance in stroke patients: a systematic review

Selina Sin Ling Ngai, Michael Tim Yun Ong, Patrick Shu Hang Yung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Post-stroke patients' motor and balance deficit, with a higher risk of falls, can result in a higher risk of stroke-related death. Therefore, balance training is of high importance in post-stroke rehabilitation. Meanwhile, exergaming has been of increasing interest in the rehabilitation field as it has shown a positive effect in helping different groups of patients with sensorimotor impairments. This systematic review is to investigate the effect of using exergame as training on the balance of post-stroke patients and to compare if exergaming can be better than conventional training.

Methods: A bibliography search in four electronic databases was performed. Randomised controlled trials in English and Chinese, fulfilling the defined eligibility criteria were included. Data about the participants, intervention and outcome measures on balance and gait were extracted. The PEDro Scale was used to assess the studies' methodological quality.

Results: A total of 12 articles, 371 participants were included in this systematic review. There is evidence supporting the significant improvement in balance and gait of both the exergaming group (EG) and conventional training group (CG). Greater improvement in static and functional balance was observed in the EG than the CG in some studies.

Discussion and Conclusion: Using exergaming and conventional training are both effective in improving the balance of post-stroke patients. It is recommended to implement exergames into post-stroke rehabilitation as it provides more enjoyment and motivation. Further investigation is needed to find out an optimal protocol and the effectiveness of replacing part of conventional training with exergaming.

FP1.9

Back to community and being active again—exercise training programme for patients with knee osteoarthritis in MacLehose Medical Rehabilitation Centre**Shun Shing Yeung,¹ Raymond Chi Chung Tsang,¹ Ho Fun Fung,¹ Yuk Fong Fong,¹ Ho Sing Lee,² Yan Lai Ng,³ Ping Keung Chan,⁴ Kwong Yuen Chiu⁴**¹*Department of Physiotherapy, MacLehose Medical Rehabilitation Centre*²*Department of Nursing, MacLehose Medical Rehabilitation Centre*³*Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre*⁴*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: Since 2016, the Comprehensive Osteoarthritis Management (COME) programme for patients with knee osteoarthritis (OA) began in MacLehose Medical Rehabilitation Centre. COME programme consists of 3-hour multidisciplinary education, 10 physiotherapy exercise sessions and 6 occupational therapy sessions of coping skills. This presentation is to review the 2-year results.

Methods: Patients with radiological stages of Kellgren-Lawrence Grade I to III were recruited and assessed at baseline, 6 weeks, 3 months and one year with telephone follow-up. Outcomes assessed: physical performance with 1-minute chair-stand test and quadriceps strength with dynamometer; pain on walking or stairs climbing; weekly time on physical activities and exercise training; functional status with Patient Specific Function Score (PSFS) and self-efficacy with Self-Exercise Efficacy Scale (SEE); QOL with Euro-QoL five dimensions in three levels (EQ5D3L) and health with EQ5D3L VAS scale (EQ-VAS).

Results: 192 patients completed the programme with 1-year follow-up. Significant improvements observed: One-minute chair-stand test increased by 13.1 ± 10.1 repetitions, quadriceps strength increased by 5.0 ± 6.9 and 4.7 ± 7.1 kgf in left and right side respectively at 3 months ($p < 0.001$). Pain reduced by 1.1 ± 2.8 points, time spent on training and physical activities increased by 42.0 ± 45.5 and 85.5 ± 118.5 minutes, PSFS improved by 3.5 ± 2.9 points, SEE improved by 14.2 ± 19.9 points, EQ5D3L increased by 0.1 ± 0.2 points, EQ-VAS improved by 6.6 ± 19.8 points at 1 year ($p < 0.001$). 80% of patients would continue exercise at fitness rooms of the Leisure and Cultural Services Department.

Discussion and Conclusion: The COME is effective to improve patients' physical performance, quality of life and self-efficacy to maintain exercise habit.

FP1.10

Monitoring functional performance and accelerometry-based activity participation 1 month after total knee replacement

Kania Wan,¹ Yan Lai Ng,¹ Ping Keung Chan,² Chun Hoi Yan,³ Kwong Yuen Chiu³, Cecilia Li⁴

¹*Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

⁴*Department of Rehabilitation Sciences, The Hong Kong Polytechnic University*

Introduction: Functional performance and activity participation are two major outcomes for patients with total knee replacement (TKR) done. The follow-up in these aspects helps monitor progress after the surgery and identify the needs of ongoing rehabilitation.

Methods: Elderly patients with TKR done completed a course of inpatient rehabilitation before discharge. A longitudinal study was conducted with functional performance and activity participation measured by TKR-specific assessments at baseline, discharge and 1 month after discharge. A commercial grade accelerometer was used for measuring the daily step counts at 1 month after discharge.

Results: 27 subjects were recruited through convenience sampling during September 2018-December 2019. The results showed that functional performance was significantly improved at discharge and post 1-month discharge as reflected by Knee Injury and Osteoarthritis Outcome Score (KOOS) ADL subscale score ($F(2, 50)=118.17, p<0.01$). There were 25 patients participated in the step count measure. Eight patients (32%) were more active with >5000 daily steps collected while 15 patients (60%) whose steps were between 1000 to 4999 daily. There were 2 patients (8%) with <1000 daily steps collected.

Discussion and Conclusion: The review of patients' actual performance provides accurate information on the use of the replaced joint in daily activities. Problems hindering resumption of active participation can also be identified for referral to the appropriate rehabilitation services. The availability of step counts was made feasible through accelerometry and its application was tested to be workable in elderly patients with the potential use in tele-rehabilitation.

FP1.11**Modified version of Comprehensive Osteoarthritis Management Programme (COME) for patients with knee osteoarthritis during the COVID-19 pandemic****Yan Lai Ng,¹ Christine Ng,¹ Kania Wan,¹ Shun Shing Yeung,² Sin Kwan Lau,³ Ping Keung Chan,² Chun Hoi Yan,⁴ Kwong Yuen Chiu⁴**¹*Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre*²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*³*Department of Nursing, MacLehose Medical Rehabilitation Centre*⁴*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: People's lifestyle has changed significantly during COVID-19 pandemic. Common behavioural changes include prolonged home stay, suspension of leisure activities, repeated house cleaning and reduced social interaction to prevent the risk of being infected. The modified version of COME programme (MCP) enhanced both home-based leisure activity pursuits and the joint protection during household tasks. The objective of this study is to evaluate the effectiveness of programme.

Methods: The programme consisted of 6 sessions with OT and PT training. Compared to the conventional COME programme, 40 minutes of leisure activity training led by OT was added to the programme. The whole OT session included knowledge dissemination on joint protection strategies in housework, activity pacing strategy and knee-health leisure activity selection. Main outcomes included Pain Self-Efficacy Questionnaire (PSEQ) and Functional Assessment of Chronic Illness Therapy (FACIT) Evaluation was conducted before and after the 3-week programme.

Results: Nineteen patients diagnosed with knee OA were referred for the MCP. 7 participants completed the programme, and 8 participants were still undergoing the training. 4 participants dropped out from the programme. Among the 15 participants completed the assessment, 60% (n=9) reported reduced participation in leisure activity due to the pandemic situation. For the 7 participants who completed the MCP, results showed both PSEQ ($t=9.379$, $p<0.001$) and FACIT ($t=14.718$, $p=0.001$) significantly improved after the programme.

Discussion and Conclusion: The preliminary results showed that the additional input from OT in MCP was essential in helping patient overcoming the activity restriction during pandemic situation.

FP1.12

The first reported fracture liaison service for vertebral fractures in China: in a region with one of the longest life expectancies—is muscle the missing gap?

Linus Chee Yeen Lee, Sheung Wai Law, KoKo Ko, Wai Wang Chau, Simon Kwoon Ho Chow, Wing Hoi Cheung, Ronald Man Yeung Wong

Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Vertebral fragility fractures are one of the earliest and most common fragility fractures. Up to 50% of secondary fractures occur 12 to 24 months after the first fragility fracture. The objective of this study was to implement a dedicated fracture liaison service (FLS) and improve solutions into decreasing imminent fractures for future use nationwide in China.

Methods: A dedicated FLS was initiated in 2016 at our centre. Patients ≥ 50 years with vertebral compression fractures were recruited. All patients were offered dual-energy X-ray absorptiometry (DXA) investigation and given education and fall prevention advice. Patients were treated with calcium and vitamin D supplements and denosumab injections and followed up at baseline, 6, 12, 18 and 24 months. The primary outcome was the imminent fracture rate, or the re-fracture rate occurring within 2 years of the initial vertebral fracture.

Results: 226 patients (38 males; 188 females) with a mean age of 77.3 ± 8.56 years were recruited into our FLS for vertebral compression fractures over 2 years. 11.1% (25 patients) had a fall within 2 years, in which 1 resulted in a major osteoporotic fracture. The remaining 225 did not suffer from a re-fracture within the 2-year time period.

Conclusion: Current results show that whilst FLS can prevent imminent fracture risk. Patient disability and fall rates have an area of improvement. Future FLS should incorporate muscle and sarcopenic assessments routinely. Additionally, research on novel interventions would significantly improve patient outcomes.

FP1.13

Semi-automatic computer-aided system for scoliosis bracing design

Chun Sing Chui,¹ Sheung Wai Law,¹ King Lok Liu,² Kam Wah Ho,² Lik Hang Hung,¹ Ajax Lau,³ Pak Leung Tsang,¹ Wing Fung Yau,⁴ Wing Hoi Cheung,¹ Shu Hang Yung¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Paediatric Orthopaedics and Scoliosis Clinic*

³*Department of Prosthetics and Orthotics, Prince of Wales Hospital*

⁴*Koln3D Technology Medical Ltd*

No copyright transfer for abstract printing.

FP1.14

Enhance functional performance of fragility hip fracture cases by cognitive and activity of daily living training in an acute hospital

Yuk Ping Wong,¹ Ting Cheung Chan,¹ Connie Mi Suen Lee,¹ Milly Miu Lan Lee,¹ Hoi Yi Chan,¹ Viola Siu Ping Wong,¹ Tak Wing Lau²

¹*Department of Occupational Therapy, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

No copyright transfer for abstract printing.

Free Paper Session II: Adult Joint Reconstruction I

FP2.1

Continuous glucose monitoring in total knee arthroplasty with preoperative high dose dexamethasone: a randomised controlled study

Brian Lik Hang Leung, Vincent Wai Kwan Chan, Henry Fu, Man Hong Cheung, Amy Cheung, Ping Keung Chan, Kwong Yuen Chiu

Department of Orthopaedics and Traumatology, Queen Mary Hospital

Introduction: Intravenous dexamethasone is widely used in total knee arthroplasty (TKA); however, one of its side effects is hyperglycaemia. Our study aimed to investigate the effect of preoperative high-dose intravenous dexamethasone and perioperative hyperglycaemia with continuous glucose monitoring (CGM) technology.

Methods: We performed this stratified block randomisation study, where primary TKA patients were stratified into the dysglycaemic group (diabetes and prediabetes) (DG) and normoglycemic group (NG), according to their preoperative HbA1c level and past diabetic history. Patient in each stratum was randomised into no or 16mg of dexamethasone. The perioperative intravenous fluids and calories intake was standardised. CGM device continuously monitored the blood glucose from preoperation to postoperative day 4 in all patients. We compare the average blood glucose levels and the average duration of hyperglycaemia between patients with or without preoperative dexamethasone in DG or NG.

Results: A total of 47 primary TKAs were recruited. The average blood glucose levels in DG with or without dexamethasone was 7.85 mmol/L and 7.00 mmol/L, respectively. In NG, the results were 6.52 mmol/L and 6.22 mmol/L, respectively. The average duration of hyperglycaemia with or without dexamethasone was 15.69% and 10.00%, respectively. In NG, the results are 5.67% and 2.33%, respectively. The glycaemic status and 16mg of dexamethasone were insignificant in affecting the average blood glucose level or the time in hyperglycaemia ($p>0.05$).

Conclusion: We showed that the use of preoperative intravenous high dose dexamethasone in TKA did not increase the risk of perioperative hyperglycaemia regardless of their diabetic statuses.

FP2.2

Effect of postponement of elective knee replacement surgery on morbidity in COVID-19 pandemic: a single-centre retrospective analysis

Hiu Hong Wong, Tsz Lung Choi, King Hang Yee, Yan Ting Lam, Chi Ho Fan

Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

No copyright transfer for abstract printing.

FP2.3

Level of joint line and mid-flexion laxity after robotic-assisted total knee arthroplasty

Vincent Wai Kwan Chan,¹ Kam Wai Chen,² Ching Hei Choi,² Ping Keung Chan,¹ Amy Cheung,¹ Man Hong Cheung,³ Henry Fu,¹ Kwong Yuen Chiu³

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Prosthetics and Orthotics, Queen Mary Hospital

³Department of Orthopaedics and Traumatology, The University of Hong Kong

No copyright transfer for abstract printing.

FP2.4

Prediction of total joint arthroplasty sizes with patient-specific characteristics, hand and foot sizes

Vincent Wai Kwan Chan, Ping Keung Chan, Henry Fu, Man Hong Cheung, Amy Cheung, Kwong Yuen Chiu

Department of Orthopaedics and Traumatology, Queen Mary Hospital

No copyright transfer for abstract printing.

FP2.5

Early experience with bicruciate-retaining total knee arthroplasty

Kevin Ki Wai Ho, Michael Tim Yun Ong

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: One of the goals of a total knee arthroplasty (TKA) is to mimic the normal function of the knee. Traditional prosthesis involves the sacrifice of the ACL, or with PCL is common and has produced good results. However, the normal four-bar linkage system of normal knee kinematic is lost. The concept of bicruciate-retaining TKA may improve knee proprioception and satisfaction. We present our early experience of a bicruciate-retaining TKA.

Methods: From February 2021 to July 2021. We have performed 8 TKAs in 6 patients, 4 male and 2 female. The mean age was 63 years old. The integrity of the ACL was assessed either clinically or with MRI. Three TKA were done with conventional instruments and five were done robot-assisted.

Results: The average length of stay was 4 nights. The average tourniquet time with the conventional instruments and robotic-assisted were 105 minutes and 85 minutes respectively. No patients require conversion from a bicruciate-retaining TKA to either CR/PS knee. One patient presented with a superficial wound infection and was treated with debridement. The preoperative KSS and KFS were 48 and 57, respectively. The postoperative KSS and KFS at 3 months were 98 and 95 respectively.

Discussion and Conclusion: TKA that preserves cruciate ligaments provide a stable, well-functioning knee. Our early experience shows that retaining both cruciate ligaments during knee arthroplasty is an attractive concept that is worth considering. Robot assistance may provide the accuracy and efficiency for bony resection with bi-cruciate-retaining TKA.

FP2.6**Accuracy and outcome of a handheld navigation device in total knee arthroplasty****Sheryl Man,¹ Wai Wang Chau,² Michael Tim Yun Ong,² Kevin Ki Wai Ho²**¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: The purpose of this study was to compare the accuracy of the accelerometer-based KneeAlign 2 (KA2) navigation system against conventional methods for accurate positioning of the femoral and tibial components in total knee arthroplasty (TKA).

Methods: A total of 181 consecutive cases of elective primary TKA were reviewed; 90 were performed with conventional alignment methods, and 91 with accelerometer-based KA2 navigation system. Preoperative and postoperative radiological alignment were measured and compared.

Results: Our data showed that KA2 navigation was significantly more accurate than conventional alignment methods for optimal positioning of the tibial component in both the coronal and sagittal plane, while no significant difference between the 2 groups was appreciated in the positioning of the femoral component in the coronal plane. Nevertheless, it should be noted that both alignment methods were able to achieve a satisfactory placement of femoral and tibial component placement in the coronal plane, within the accepted range used in this study of $90 \pm 3^\circ$. However, only the KA2 navigation system was able to achieve such accuracy for the tibial component in the sagittal plane with the mean posterior slope within the range of $0 \pm 2^\circ$.

Discussion and Conclusion: Both conventional alignment and KA2 navigation can achieve a neutral mechanical axis, mean femoral and tibial varus/ valgus angle within the accepted range. KA2 navigation can produce a more accurate tibia component than with conventional technique.

FP2.7

Radiolucent lines surrounding a thick cobalt chromium tibial tray with minimum 5 years of follow-up

Henry Fu,¹ Chi Him Tong,¹ Ping Keung Chan,¹ Amy Cheung,¹ Man Hong Cheung,² Vincent Wai Kwan Chan,¹ Kwong Yuen Chiu²

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Cementation technique is critical to the survivorship of modern cemented total knee arthroplasty (TKA). Radiolucent lines (RLL) are common after TKA. This study aimed to evaluate the natural history of RLLs surrounding a thick cobalt chromium tibial tray which theoretically has increased stress shielding and bone resorption.

Methods: All DePuy Attune TKAs, using 1st generation tibial tray (non S-plus tray), operated at an academic institution between March 2014 to March 2016 were retrospectively reviewed. Postoperative anteroposterior (AP) and lateral radiographs were analysed for presence of RLLs, zonal involvement and progression. Bone resorption was documented according to the method by Song. Risk factors for RLLs were evaluated.

Results: 233 Attune TKAs with minimum 5 years of follow-up were included. RLLs were seen in 40.3% (94/233), predominantly affecting zone 1 (medial tibial tray) (76.2%) on AP view and zone 3A (anterior keel) (83.3%). A larger preoperative varus mechanical axis was associated with presence of zone 1 RLL ($p=0.014$). Bone resorption was observed in 41.2% (96/233) of TKAs and correlated significantly with the presence of RLL (odds ratio 2.67, $p<0.001$). Gender, BMI, postoperative alignment, MPTA and tibial slope did not correlate with presence of RLLs. Postoperative Knee Society Knee Score and Functional Score were comparable between RLL and non-RLL groups. 5-year survivorship was 98.2% with 4 revisions, 2 of them for tibial tray aseptic loosening showing RLL progression. The mere presence of RLLs did not demonstrate significant correlation with loosening.

Conclusion: Despite RLLs and bone resorption being commonly observed surrounding a thick cobalt chromium tibial tray, 5-year survivorship is still excellent at 98.2%.

FP2.8

The influence of tibial sloping on the clinical outcome in total knee arthroplasty: a randomised controlled trial

Chi Kit Chan, Yiu Chung Wong, Qunn Jid Lee, Wing Kin Law

Department of Orthopaedics and Traumatology, Yan Chai Hospital

Introduction: Biomechanical studies showed posterior tibial sloping (PTS) is positively correlated with the range of flexion. This has not been well supported by the clinical studies. The purpose of this randomised control trial is to investigate the effect of PTS on clinical results in total knee arthroplasty (TKA) among Chinese population.

Methods: Total 75 patients were recruited for simultaneous bilateral posterior-stabilised TKA. Each side was randomly assigned with either 0° or 7° posterior tibial slope. The same TKA procedure using the same approach was performed by the same surgeon on each knee to minimise any confounding factors. Computer navigation was used in all cases to maximise the accuracy. The postoperative range of movement and patient reported outcome scores for a total 5-year follow-up time were compared and analysed for any significant differences.

Results: All patients achieved improvement in their range of movement, KSS knee score and pain scores after surgery. However, there were no statistically significant differences in the maximum flexion achieved, KSS knee score, Pain score and Forgotten joint score between the knees with 0° or 7° posterior tibial slope.

Discussion and Conclusion: Although biomechanical studies had proposed that more tibial slope can result in better range of movement after TKA, this clinical study showed no significant difference in clinical outcomes.

FP2.9**Posterior pelvic tilt is associated with a high Kellgren and Lawrence grade in an elderly population from the MusFit Cohort**

Cheuk Kin Kwan,¹ Sai Chuen Fu,¹ Michael Tim Yun Ong,¹ Kevin Ki Wai Ho,¹ Jojo Jiao Jiao,² Bik Chu Chow,² Lobo Hung Tak Louie,² Sally Siu Yin Cheung,² Patrick Shu Hang Yung¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Sports, Physical Education and Health, Hong Kong Baptist University*

Introduction: Osteoarthritis causes a major disease burden. Postural changes of the spine were suggested to affect biomechanics of the knee, leading to degeneration. However, the relationship between radiographic staging and postural changes have not been investigated. In this study, association between sagittal spinal posture and radiographic grading of knee osteoarthritis was investigated.

Methods: Forty-six elderly participants with mean age of 69.2 years were invited from a health-promotion programme (MusFit cohort) for assessment. Xray was retrieved for Kellgren and Lawrence (KL) grade, and function was assessed with the Knee injury and Osteoarthritis Outcome Score (KOOS). The sagittal spinal posture was classified into 4 types as ideal alignment, kyphotic-lordotic posture, flat-back posture, and sway-back posture, which flat back and sway back posture demonstrates posterior pelvic tilt. A Fisher exact test was performed to investigate the association between posterior pelvic tilt with radiological grading and knee function.

Results: Sixteen out of 20 participants with high KL grade (≥ 3) demonstrated static posture with posterior pelvic tilt. Fisher exact test showed that posterior pelvic tilt was significantly associated with high KL grade (≥ 3) ($p=0.045$, for $n=30$) and age ($p=0.019$), but not with KOOS and other anthropometric parameters ($p>0.05$).

Discussion and Conclusion: Posterior pelvic tilt is associated with advanced stage of knee osteoarthritis. However, causal relationship between postural changes and knee degeneration remains unclear. This study serves as a pilot to further investigate on the possible role of postural correction as an adjunct to the current conservative management strategy of knee osteoarthritis.

FP2.10**Predicting the need of knee arthroplasty for patient triage at specialist outpatient clinics: a logistic regression analysis**

Ping Keung Chan,¹ Lok Sze Lee,² Wing Chiu Fung,² Thomas Chak Ming Tang,² Angus Lok Wang Wong,² Shun Shing Yeung,³ Yan Lai Ng,⁴ Vincent Wai Kwan Chan,¹ Tak Wing Lau,¹ Kwong Yuen Chiu²

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

³*Department of Physiotherapy, MacLehose Medical Rehabilitation Centre*

⁴*Department of Occupational Therapy, MacLehose Medical Rehabilitation Centre*

No copyright transfer for abstract printing.

FP2.11

Metal-on-highly crosslinked polyethylene in total hip arthroplasty—a winning combination at 15-20 years of follow-up

Amy Cheung,¹ Henry Fu,¹ Ping Keung Chan,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Kwong Yuen Chiu²

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Highly crosslinked polyethylene (HXLPE) has been used with great success in THA since its debut in the late 1990's. However, reports regarding this bearing couple in its second decade of service are still scant. The aim of this study was to 1. Determine the long term clinical and radiological results of and 2. Investigate what factors affect wear in THA using a metal-on-HXLPE articulation.

Methods: 60 THA using a single brand of HXLPE liner. Cementless cup and 28 mm hip ball were performed in 49 patients. Age, sex, Charlson Comorbidity Index (CCI) and need for revision surgery was recorded. Linear and volumetric wear was determined using the Martell method.

Results: Mean age at operation was 51.2 ± 12.1 (range, 29-73) years. Mean duration of follow-up was 16.9 years (range 15-19.3 \pm 1.13 years). Osteolysis was not present in the latest follow-up radiographs. Revision-free survival was 95%. Mean linear and volumetric wear rate was 0.038 mm/year (0-0.09 \pm 0.0219) and 71.7 mm³/year (0.01-159.7 \pm 40), respectively. Acetabular component position was not found to be related to both linear and volumetric wear. No significant difference was found in the linear and volumetric wear rates of thinner and thicker liners (≤ 8 mm and > 8 mm) ($p=0.906$).

Discussion and Conclusion: HXLPE is associated with low linear and volumetric wear rates which has virtually obviated osteolysis and has translated to excellent survivorship even at long-term follow-up. In vivo oxidation does not appear to be a concern at this point in its service cycle.

FP2.12

Long-term results of isolated liner exchange: does fixation technique matter?

Thomas Wai Kiu Liu,¹ Amy Cheung,¹ Ping Keung Chan,¹ Henry Fu,¹ Man Hong Cheung,² Vincent Wai Kwan Chan,¹ Kwong Yuen Chiu²

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Isolated liner exchange is an option to address polyethylene wear after total hip arthroplasty (THA). The liner can be fixed with either the original locking mechanism or cemented into the acetabular cup. Whether cementation of liner has any bearing on long-term outcomes after surgery is still unclear. To our knowledge, this is the largest study with the longest follow-up period focusing on this topic.

Methods: Data of all patients who have undergone isolated liner exchange surgery in our institution between April 1995 and January 2015 were retrieved. Patients were classified according to the type of liner and locking mechanism used. Kaplan-Meier survival analysis and the Chi-square test were applied to compare the revision-free survival and the revision rate of different subgroups.

Results: 127 isolated liner exchanges were performed. Mean duration of follow-up was 12.2 years (0.1-25.3 \pm 5.3). Overall mean revision-free survival was 17.2 years (\pm 0.6). Use of HXLPE had a lower re-revision rate than conventional liner ($p<0.001$). The re-revision rate of exchanges using HXLPE was not affected by the type of locking mechanism used ($p=0.438$). Conversely, using a conventional liner with the original locking mechanism had a higher re-revision rate than cemented conventional liner ($p=0.015$). The revision-free survival distribution depended on the combination of the locking mechanisms and liners ($p=0.003$).

Discussion and Conclusion: HXLPE liners should be used in insert exchange surgery whenever possible. Cementing an insert into an acetabular component is associated with good survivorship even at long-term follow-up.

FP2.13

Understanding anteversion with robotic arm-assisted total hip arthroplasty**Henry Fu,¹ Ping Keung Chan,¹ Amy Cheung,¹ Man Hong Cheung,² Vincent Wai Kwan Chan,¹ Kwong Yuen Chiu²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Acetabular anteversion is a critical parameter in preventing postoperative dislocation after total hip arthroplasty (THA). Three definitions have been described including operative anteversion (OA), anatomical anteversion (AA) and radiographic anteversion (RA). The Mako robotic arm surgical system allows for precise preoperative templating using RA. The current study aimed to investigate the accuracy of cup placement using postoperative computer tomography (CT) scans to measure OA and AA for calculation of RA.

Methods: All Mako robotic arm-assisted THAs performed from February 2019-December 2020 in Queen Mary Hospital were analysed. All surgeries were performed using posterior approach with robotic arm guided acetabular reaming and cup impaction, followed by intraoperative verification of cup placement with software. Postoperative supine CT scans of the pelvis were used to measure OA in the sagittal plane, AA in the transverse plane. OA and AA were converted to RA using nomogram for comparison.

Results: 52 robotic-assisted THAs from 45 patients underwent postoperative pelvic CT scans. The mean planned RA was 19° (SD 5.1°). On postoperative CT measurement, mean AA was 29° (SD 5.6°) while the mean OA was 25.1° (SD-5.3°). Postoperative AA showed moderate correlation with pre-planned RA ($r=0.41$, $p=0.003$) and intraoperative verified RA ($r=0.48$, $p<0.001$). Mean RA derived using nomogram were 11° and 23.7° from AA and OA, respectively. RA derived from postoperative AA showed moderate correlation with intraoperative verified RA ($r=0.48$, $p<0.001$).

Conclusion: Robotic arm-assisted THA shows considerable accuracy from postoperative CT. Surgeons should also be mindful of operative, anatomical and radiographic anteversion while performing robotic-assisted THA.

FP2.14

The effect of surgical helmet system on intra-operative surgeon-derived contamination in total knee arthroplasty**Hongtai Chen, Kwong Yuen Chiu, Chun Hoi Yan***Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Periprosthetic joint infection (PJI) is a serious complication of total knee arthroplasty (TKA). Surgeon-derived contamination is the main reason of PJI. Surgical helmet system (SHS) was developed to reduce the risk, but many contradicting evidences indicated that SHS was not shown to reduce the risk, or even could increase it.

Methods: We launched a simulated experiment of fluorescent leakage to compare the difference between using SHS or not, and the difference between using a tape sealing at the interface between the gown and gloves or not, and further investigated the correlation between the leakage and the frequency of re-pulling gloves.

Results: The integrated density of fluorescent leakage on the sleeve was significantly higher when SHS was used ($p<0.01$) and the interface was not sealed ($p<0.01$). The frequency of re-pulling gloves showed a moderate correlation with the leakage when SHS was used ($r=0.523$, $p<0.001$), while the correlation turned weak when SHS was not used ($r=0.297$, $p<0.01$).

Discussion and Conclusion: The positive pressure caused by SHS could increase the risk of surgeon-derived contamination from the interface between gown and gloves, and that re-pulling gloves could exacerbate the risk, while a tape sealing at the interface could reduce the risk.

FP2.15

Early experience of one-stage revision for the management of PJI

Tao Li,¹ Ping Keung Chan,¹ Henry Fu,¹ Amy Cheung,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Kwong Yuen Chiu²

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP2.16

Synovial fluid alpha defensin lateral flow assay—specific but not sensitive for periprosthetic joint infection

Michael Yu,¹ Henry Fu,² Constance Wong,¹ Amy Cheung,² Man Hong Cheung,¹ Ping Keung Chan,² Kwong Yuen Chiu¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: We seek to determine the performance of synovial fluid alpha defensin lateral flow assay (AD-LFA) in diagnosing periprosthetic joint infection (PJI), using the 2018 International Consensus Meeting (ICM 2018) and 2011 Musculoskeletal Infection Society (MSIS 2011) criteria for periprosthetic joint infection.

Methods: 128 suspected cases of PJI attended at a local academic institution between April 2017 and January 2021 were reviewed. Serum erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), synovial white cell count and polymorph percentage are measured quantitatively, alongside qualitative testing of synovial AD-LFA and leukocyte esterase (LE). Under the ICM 2018 criteria, there were 41 positive PJI cases, 53 negative and 34 excluded for missing data. Under the MSIS 2011 criteria, there were 26 positive cases, 42 negative and 60 cases excluded.

Results: Under the ICM 2018 criteria, the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of AD-LFA were 68% (95% CI=54%-83%), 100% (95% CI=100%-100%), 100% (95% CI=100%-100%) and 80% (95% CI=71%-90%) respectively. Meanwhile, under the MSIS 2011 criteria, the sensitivity, specificity, PPV and NPV of AD-LFA were 81% (95% CI=66%-96%), 90% (95% CI=82%-99%), 84% (95% CI=70%-98%) and 88% (95% CI=79%-98%) respectively. Overall, AD-LFA had a lower sensitivity but higher specificity using ICM 2018 compared with MSIS 2011.

Discussion and Conclusion: AD-LFA in this study had a lower sensitivity but comparable specificity with reference to previous studies using AD immunoassay. The high specificity and PPV combined with the ease of performing the test makes AD-LFA a useful confirmatory adjunct for PJI.

FP2.17

Lower synovial white blood cell count and prior antibiotic use is associated with culture-negative periprosthetic joint infection**Constance Wong,¹ Henry Fu,² Michael Yu,¹ Amy Cheung,² Man Hong Cheung,¹ Ping Keung Chan,² Kwong Yuen Chiu¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: A positive joint fluid culture is vital for diagnosis in prosthetic joint infection (PJI) criteria. A negative culture poses diagnostic and treatment challenges. This study aimed to identify the clinical and laboratory features of culture-negative PJI.

Methods: A retrospective review of all PJI cases involving total hip arthroplasty (THA) or total knee arthroplasty (TKA) at an academic institution diagnosed between April 2017 and January 2021 was conducted. Synovial and serum white cell count, serum inflammatory markers (CRP, ESR) and polymorph percentage were measured; means were calculated for culture-negative and culture-positive groups. A non-parametric t test was used to detect a significant difference between means. Rate of prior antibiotic use was compared.

Results: 33 cases of PJI were diagnosed using the 2018 International Consensus Meeting criteria. 30 had TKA and 3 had THA. 18 were culture-negative, while 15 had positive cultures. The mean synovial white cell count was significantly lower in the culture-negative group than the culture-positive group by 49.6% ($p=0.0304$). 77.8% of culture-negative cases had prior antibiotic use, while only 7.14% of culture-positive group did, showing that cases with prior antibiotic use had a significantly higher odds of being culture-negative (odds ratio=49). There were no statistically significant differences between the means of serum CRP, ESR, white cell count and synovial polymorph percentage.

Discussion and Conclusion: A low synovial WBC count and prior antibiotic use were associated with culture-negative PJI. Empirical antibiotics should be withheld before synovial fluid investigation in suspected PJI cases. With prior antibiotic treatment, clinicians should have a high index of suspicion for culture negative PJI.

FP2.18

To screen or not to screen? A 10-year retrospective analysis of preoperative methicillin-resistant *Staphylococcus aureus* screening in primary knee and hip replacement

Thomas Ka Chun Leung,¹ Ping Keung Chan,¹ Wing Chiu Fung,² Vincent Wai Kwan Chan,¹ Amy Cheung,¹ Man Hong Cheung,² Henry Fu,¹ Chun Hoi Yan,³ Kwong Yuen Chiu²

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Orthopaedics and Traumatology, The University of Hong Kong

³Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital

Introduction: Preoperative methicillin-resistant *Staphylococcus aureus* (MRSA) screening followed by selective decolonisation prior to primary joint replacement has been our standard practice for the past decade, in an attempt to prevent postoperative MRSA-induced infection. We aimed to investigate the local prevalence of MRSA colonisation and its impact on clinical outcomes.

Methods: We searched CDARDS for operations performed in the Hong Kong West Cluster from 1 January 2011 to 31 December 2020. The criteria were 'MRSA screening' and 'primary knee or hip replacement'. To trace MRSA-induced periprosthetic joint infection (PJI), we searched 'MRSA culture' and 'revision knee or hip replacement'. All retrieved records were screened for inclusion. Patients' demographics, operations and any PJI or surgical site infection were recorded.

Results: A total of 15 MRSA carriers (8 females and 7 males, mean age 74.5) were identified, with MRSA carrier rate estimated to be 0.4% (15 out of 3390, which was the total number of screened primary cases). The mean follow-up duration was 27 months. Only 1 out of the 15 developed PJI by MSSA, requiring revision. There were 4 MRSA-induced PJI as defined by the Musculoskeletal Infection Society definition. There was otherwise no surgical site infection. Further analysis was precluded by the small sample sizes.

Discussion and Conclusion: The local prevalence of MRSA carrier status is low. Compounded by the rare occurrence of MRSA-induced PJI, we cannot conclude whether preoperative MRSA screening is efficacious in reducing infection. Further multicentre long-term studies are needed to verify its local efficacy and cost-effectiveness.

FP2.19

Retrospective study on effectiveness of continuous passive motion after total knee replacement

Kim Ming Hong Chau,¹ Qunn Jid Lee²

¹Department of Orthopaedics and Traumatology, Princess Margaret Hospital

²Department of Orthopaedics and Traumatology, Yan Chai Hospital

Introduction: Continuous passive motion (CPM) is used to prevent joint immobilisation after TKR. Some studies showed that the effect of CPM is controversial. Current evidence does not advocate routine use of CPM. However, whether it is indicated to use CPM in some selected cases is still debatable.

Methods: This is a retrospective study. 73 patients who could not reach 45 degrees of active knee flexion at postoperative day 3 were selected. They will be randomly assigned into to study group and control group. The patients were blinded to the clinical outcome and study design. Primary outcomes are length of hospital stay and the active knee flexion range upon discharge. Secondary outcomes are the knee flexion range and pain score on postoperative day 4 and quadriceps power.

Results: Patients had matched demographic. The mean length of stay is 7.3 for study group and 5.9 for control group ($p=0.02$). The mean flexion range upon discharge is 75.7 for study group and 66.8 for the control group ($p=0.005$). There is no significant difference on pain score, quadriceps power and flexion range on postoperation day 4.

Discussion and Conclusion: This study demonstrated an increase of length of stay after the use of CPM even in selected patients. They could not have faster rehabilitation progress. The improvement of flexion range may be come from more inpatient rehabilitation. There are no other additional benefits from using CPM. CPM is not indicated in Post-TKR with limited range of movement.

FP2.20**Improvement in activities of daily living and quality of life following total joint replacement rehabilitation**

Hoi Yi Chan,¹ Yuk Ping Wong,¹ Connie Mi Suen Lee,¹ Ting Cheung Chan,¹ Viola Siu Ping Wong,¹ Miu Lan Lee,¹ Ping Keung Chan,² Kwong Yuen Chiu³

¹*Department of Occupational Therapy, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Total joint replacement (TJ) pathway has been established in Queen Mary Hospital (QMH) for many years. Occupational therapists (OT) play an important role in both the prehabilitation and rehabilitation phase. Intense activities of daily living (ADL) training has been provided during in-patient stay to facilitate early discharge and reintegration into the community.

Methods: An observational study was conducted. All patients referred in the TJ pathway from 1 April 2020 to 31 March 2021 at QMH in Hong Kong were recruited. EQ-5D-5L was used to measure the quality of life of patients. All patients completed the questionnaire before operation, at 1 month and 3 months after operation. Repeated Measures ANOVA was used for analysis. Individual patient goals were also set before the operation.

Results: A total of 204 cases (131 females, 73 males) were recruited, mean age 69.29 ± 11.98 years (mean \pm SD). The mean postoperative length of stay (LOS) was 7.31 ± 8.67 (mean \pm SD). Mean scores of EQ-5D-5L index were 0.71, 0.75, 0.82 before operation, at 1 month and at 3 months after operation, respectively, with statically significant difference ($p < 0.005$). At 3-month follow-up, 38.7% (79) of patients fully achieved their goals, 32.3% (66) partially achieved their goals and 28.9% (59) did not achieve the goals.

Conclusion: Improvement was shown in patient's ADL and quality of life after total joint replacement and over 70% of patients either partially or fully achieved their goals.

FP2.21

Use of telecare service for preoperative occupational therapy assessment before total joint replacement during the COVID-19 pandemic

Hoi Yi Chan,¹ Yuk Ping Wong,¹ Connie Mi Suen Lee,¹ Ting Cheung Chan,¹ Viola Siu Ping Wong,¹ Miu Lan Lee,¹ Ping Keung Chan,² Kwong Yuen Chiu³

¹*Department of Occupational Therapy, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Preoperative occupational therapy (OT) assessment adopts the concept of prehabilitation, which comprises of assessment of home environment and existing social support, management of patient's expectation after operation. With preoperation classes had been cancelled due to the COVID-19 pandemic to minimise social gathering, telecare has been used as an alternative.

Methods: All patients referred from the total joint replacement preoperation clinic at Queen Mary Hospital in Hong Kong during January 2021 to July 2021 were included. Phone calls were made to patients by OT for risk identification, information provision and expectation management. Patients may return home measurement via WhatsApp.

Results: A total of 115 patients were contacted in our preoperation telecare service. As compared with face-to-face mode, it was found that: (i) shorter time was allocated for each patient by telecare (average of 15.4 minutes) than face-to-face (16 to 20 minutes); (ii) more flexible schedule arranged by therapists for telecare, that promote better utilisation of manpower; (iii) more efficient to receive home environment measurement from caregiver via telecare. However, less opportunity of sharing and discussion were available through individual telecare mode.

Conclusion: Due to the pandemic, the service mode of OT preoperation assessment was changed from "face-to-face" to "telecare" in the form of phone call and WhatsApp. We found that use of telecare not only maintained the preoperative OT services, but also brought some other benefits that may be considered as a part of regular preoperative care in the future.

FP2.22

End-stage osteoarthritis is an independent risk factor for sarcopenia: a pilot cross-sectional study

Man Hong Cheung,¹ Janus Siu Him Wong,¹ Amy Cheung,² Henry Fu,² Vincent Wai Kwan Chan,² Ping Keung Chan,² Kwong Yuen Chiu¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

No copyright transfer for abstract printing.

Free Paper Session III: Basic Science

FP3.1

Injectable hydrogels encapsulating magnesium and 3D-engineered polycaprolactone conduits for peripheral nerve regeneration

Zhi Yao,¹ Weihao Yuan,¹ Jiankun Xu,¹ Wenxue Tong,¹ Dick Ho Kiu Chow,¹ Ye Li,¹ Hao Yao,¹ Xu Li,¹ Liming Bian,² Ling Qin¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Biomedical Sciences and Engineering, South China University of Technology, Guangzhou International Campus, Guangzhou, China*

No copyright transfer for abstract printing.

FP3.2

Osteoinductive intramedullary implant accelerates bone regeneration and prevents nonunion in bone transport

Sien Lin, Gang Li

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Bone transport distraction osteogenesis (DO) represents one of the most successful surgery-driven tissue regeneration approaches for the treatment of large bone defects. However, prolonged consolidation, docking site nonunion, and pin tract infection remain challenging complications.

Here, we engineered an osteoinductive intramedullary (IM) implant by eluting bone morphogenetic protein-2 (BMP-2) from a biodegradable composite implant as an adjunctive therapy of bone transport to address the challenges. A distinct and stable surface coating technique was developed to enable BMP-2 sustain-release from the implants over 21 days. Surprisingly, 100% bony fusion could be achieved in the IM implants incorporating with 2 µg BMP-2 as early as 34 days after bone transport surgeries in the management of 8-mm femoral defect in rats. Load bearing was restored 55 days after surgeries, and without any pin tract infection. Mechanistic study showed that eluting BMP-2 from the IM implants could accelerate bone remodelling and angiogenesis at early phase, and increase mineralisation at late phase, especially at the docking sites, which resulted in early bony bridging. In contrast, DO only or additional IM implant showed high proportion of non-union and pin tract infections, with inactive bone formation at the docking sites. Furthermore, 2 µg BMP-2 delivered by collagen sponge did not induce bone regeneration effectively, resulting in some non-unions and infections. In conclusion, this osteoinductive IM implant with slow-release properties holds great promise in revolutionising bone transport DO technique in the management of bone defect by accelerating bone regeneration and preventing complications in only one operation.

FP3.3

In vitro study on the antibacterial effect of 100% medical grade manuka honey

Vincent Wai Kwan Chan,¹ Derek Ling Lung Hung,² Amy Cheung,¹ Man Hong Cheung,³ Henry Fu,¹ Ping Keung Chan,¹ Kwong Yuen Chiu³

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Microbiology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP3.4

The development of a magnesium-releasing and mechanically stable calcium phosphate bone cement possessing osteogenic and immunomodulation effects for promoting bone fracture regeneration

Jun Wu,¹ Feihong Liu,¹ Yuan Liu,² Christian Fang,³ Frankie Leung,³ Kelvin Yeung,³ Tak Man Wong³

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital*

²*Research Center for Human Tissues and Organs Degeneration, Institute of Biomedicine and Biotechnology, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP3.5

How dentin matrix protein 1 plays a role in low-magnitude high-frequency vibration accelerated osteoporotic fracture healing via regulation of mineralisation

Michelle Meng Chen Li, Simon Kwoon Ho Chow, Ronald Man Yeung Wong, Wing Hoi Cheung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: There is an increasing concern on osteoporotic fracture in ageing population. Low-magnitude high-frequency vibration (LMHFV) can significantly enhance osteoporotic fracture healing through alteration of osteocyte lacuno-canalicular network (LCN). Dentin matrix protein 1 (DMP1) in osteocytes is responsible for maintaining LCN and mineralisation. This study aimed to investigate osteocyte-specific DMP1's role in enhanced osteoporotic fracture healing in response to mechanical loading.

Methods: Bilateral ovariectomy was done on 6-month-old female SD rats to induce osteoporosis. Metaphyseal fracture was created at left distal femur. Rats were randomised to groups: (1) DMP1 KD, (2) DMP1 KD + VT, (3) scramble + VT, or (4) VT, or (5) CT where KD stands for knockdown done by injection of shRNA into marrow cavity 2 weeks before surgery. Assessments included radiopacity, microCT, dynamic histomorphometry and immunohistochemistry on osteocyte-specific markers. MLO-Y4 osteocyte-like cell culture was also done to verify the results.

Results: DMP1 KD significantly impaired vibration-enhanced fracture healing at week 6 as shown by comparing KD + VT to VT group in dynamic histomorphometry ($p=0.036$) and X-ray relative opacity ($p=0.012$). DMP1 KD also significantly altered the expression of osteocyte-specific markers during healing process.

Discussion and Conclusion: The impaired healing performance in DMP1 KD groups indicated that DMP1 knockdown led to poorer fracture healing process. Our results had confirmed that blockage of DMP1 would negate LMHFV-induced enhancement on fracture healing. These revealed the importance of DMP1 in response to the mechanical signal during osteoporotic fracture healing.

Acknowledgement: General Research Fund (Ref: 14113018) and Areas of Excellence Scheme (AoE/M-402/20)

FP3.6**The influence of synovial lymphatic drainage function in anterior cruciate ligament rupture model****Mingde Cao,¹ Bruma SC Fu,¹ Michael TY Ong,¹ Yangzi Jiang,² Patrick SH Yung¹**¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*²*Institute for Tissue Engineering and Regenerative Medicine, The University of Hong Kong*

Introduction: High levels of inflammatory factors accumulated in injured knee joints after anterior cruciate ligament (ACL) injury, which was associated with pain and swelling and increased risk of osteoarthritis. The synovial lymphatic system is proved to play a role in the clearance of inflammatory factors, but it is unknown if this function was impaired after the ACL injury. In this study, we aimed to measure the lymphatic drainage function in a non-invasive ACL rupture rodent model.

Methods: 10 male C57/BL6 mice were randomly assigned to the rupture group and control group. ACL rupture was created in right knee joints with a non-invasive manoeuvre. A 20 µl aliquot of 20 µg 70 kDa TexRed dextran was injected into the right knee joints 7 days after injury. The intra-articular signal intensity of TexRed dextran was measured by the IVIS system at 0, 1, 6, hours post-injection. The whole knee joint and draining lymph nodes were harvested and subjected to ex vivo IVIS imaging and immunofluorescence staining respectively.

Results: There was a significant decrease in dextran clearance rate at day 7 in the ACLR group; supported by a lower fluorescent signal in the upstream iliac lymph node 24 hours after injection, and a significant increase in dextran influx in the anterior portion of the synovial membrane in ACLR joints compared with the control group.

Discussion and Conclusion: We successfully established a non-invasive ACLR mice model. Impaired drainage function was found on day 7, suggest a potential early pathology of ACLR.

FP3.7**MSCx secretome enhanced proliferation, tenogenesis and inflammation resolution of inflamed human tendon-derived stem cells****Yuk Wa Lee, Shiyi Yao, Michael Tim Yun Ong, Patrick Shu Hang Yung, Pauline Po Yee Lui***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Mesenchymal stem cells (MSCs) and their secretome are emerging treatments for tendinopathy but their underlying mechanisms remains unclear. There has been no study on the effect of MSCx secretome on the functions of inflamed TDSCs. This study aimed to examine the effect of different concentrations of MSCx secretome on the functions and inflammatory response of TDSCs under an inflammatory environment in vitro. MSCx secretome was supplied by Rohto Advanced Research Hong Kong Ltd. hTDSCs were treated with different doses of MSCx secretome with/without IL-1β stimulation. The viability, proliferation and migration, expression of inflammatory markers, extracellular matrix (ECM) remodelling markers and multi-lineage differentiation markers in inflamed hTDSCs after treatment with MSCx secretome was examined. IL-1β significantly reduced the viability and migration of hTDSCs (Figure 1A-D). The addition of MSCx secretome dose-dependently increased the viability, proliferation and migration of hTDSCs with/without IL-1β stimulation. IL-1β induced the expression of pro-inflammatory markers, up-regulated the expression of adipogenic marker and reduced the expression of tenogenic markers in hTDSCs. The addition of MSCx secretome significantly reversed the effect of IL-1β. In summary, the tendon regenerative potential of TDSCs was compromised in an inflammatory environment which might explain ECM degeneration, tissue metaplasia and failed healing in tendinopathy. MSCx secretome enhanced the viability, proliferation, migration, tenogenesis and inflammation resolution of inflamed TDSCs. It might be useful as a cell-free stem cell-based therapy for the treatment of tendinopathy.

FP3.8

Cranial bone transport promotes angiogenesis, neurogenesis and modulates meningeal lymphatic function in acute ischaemic stroke

Shanshan Bai,¹ Xuan Lu,¹ Qi Pan,¹ Bin Wang,¹ Kin Pong U,² Yongkang Yang,¹ Xiaohua Jiang,² Wayne Yuk Wai Lee,¹ Gang Li¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Biomedical Sciences, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

FP3.9

The mechanism and function of nerve invasion in osteophytes during osteoarthritis progression

Wenxue Tong, Zhi Yao, Dick Ho Kiu Chow, Jiankun Xu, Ling Qin

Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Osteoarthritis (OA) is the most common form of arthritis and is characterised by cartilage degeneration, joint pain, synovitis, and osteophyte formation. It currently affects over 250 million people worldwide, and with population ageing and the increase in life span, OA is now becoming a major challenge to public health and the social economy. Pain is the main cause in patients with OA who are seeking a clinical diagnosis. However, the mechanism for joint pain of OA is still not clear. The nerve fibre distribution in various parts of the joint is the basis to sense the pain. Previous studies have disclosed the nerve fibre distribution in the synovium, subchondral bone, and osteophytes. In the current study, we aimed to explore the mechanism of nerve invasion in osteophytes and its role during osteophyte formation. We found that the nerve axon was induced by *Ihh* and IL-1 β treated chondrocytes. NGF is specifically secreted by hypertrophic chondrocytes after IL-1 β treatment. HIF-1 α , instead of HIF-1 β , is crucial for *Ihh* and IL-1 β induced NGF expression. The nerve fibre was distributed in the subchondral bone and osteophyte zone but not in the intact cartilage. RAMP1 was not expressed in the chondrocytes but expressed in hypertrophic chondrocytes, and abundantly expressed in the hypertrophic chondrocytes by the treatment of IL-1 β . These results indicate the crosstalk between the nerve system and hypertrophic chondrocytes. The hypertrophic chondrocytes in osteophytes induce nerve invasion by secreting NGF, and nerve fibre promotes osteophyte ossification via CGRP.

FP3.10

Single cell analysis of chondrosarcoma cells reveals early markers for benign to malignant transformation

Katherine Cheah,¹ Kelvin Sin Chi Cheung,² Nelson Su,² Joshua Ho,¹ Ying Lee Lam³

¹*The School of Biomedical Science, 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*

No copyright transfer for abstract printing.

FP3.11**LBX1 modulates skeletal muscle regeneration upon chemical-induced injury through polyamine pathway**

Yujia Wang,¹ Mengheng Li,² On Chan,² Tsz Ping Lam,¹ Alec LH Hung,¹ Jack CY Cheng,¹ Daniel Mok,² Wayne YW Lee¹

¹Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

²Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University

No copyright transfer for abstract printing.

FP3.12**Sirt3, a longevity gene, regulates osteocyte function and the response of bone to exercise in mice**

Qiangqiang Li,¹ Alice Pik Shan Kong,² Tsz Ping Lam,¹ Jack Chun Yiu Cheng,¹ Wayne Yuk Wai Lee¹

¹Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

²Department of Medicine, The Chinese University of Hong Kong

Introduction: Osteocytes are active bone cells playing crucial role in bone remodelling and mineral homeostasis in response to mechanical stimulation. *Sirt3* is mitochondrial deacetylase which mediates cellular adaptation to increased energy demand. How does *Sirt3* regulate osteocyte function and its clinical implication has not been investigated.

Methods: The association between *Sirt3* expression and osteocyte function was studied in a natural ageing mouse model. Murine osteocyte cell line (MLO-Y4) with *Sirt3* knockdown and mice with conditional deletion of *Sirt3* in osteocyte (cKO) were used to verify the role of *Sirt3* in osteocyte. Finally, *Sirt3* activator honokiol was administered to aged mice (20-month-old) to confirm if ageing-related bone loss could be reduced. Appropriate parametric and non-parametric tests were used for statistical analysis.

Results: Concomitant degenerative change of *Sirt3* expression in osteocyte and bone mass/strength were observed in ageing mice. *Sirt3* knockdown in MLO-Y4 cells downregulated osteocyte genes expression, inhibited formation of dendritic processes, and diminished mechanotransduction in vitro. Transgenic mice with *Sirt3* deficiency led to lower bone mass, abnormal lacunocanalicular network, and blunted bone remodelling activity upon exercise stimulation in vivo. Mechanistic study confirmed that *Sirt3* regulated E11/gp38 expression through protein kinase A (PKA)-cAMP response element-binding protein (CREB) signalling pathway. Last, *Sirt3* activator honokiol prevented ageing-related bone loss.

Discussion and Conclusion: Ageing osteocytes could be the cause of diminished benefits of exercise to aged population. Activating *Sirt3* expression and thus osteocyte sensitivity to mechanical stimulation represents a novel approach to reduce bone loss with ageing.

FP3.13**Deciphering bisphosphonates-induced delayed fracture healing and the mechanisms underlying the efficacy of magnesium at single cell resolution**

Jiankun Xu, Nianye Zheng, Liang Chang, Ling Qin

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

No copyright transfer for abstract printing.

FP3.14

Using prediction equation on muscle mass evaluation to improve the accuracy of sarcopenia diagnosis with bioimpedance analysis validated with dual-energy X-ray absorptiometry

Keith Yu Kin Cheng, Simon Kwoon Ho Chow, Wing Hoi Cheung, Ronald Man Yeung Wong

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: To cross-validate skeletal muscle mass measurements between bioimpedance analysis (BIA) and dual-energy X-ray absorptiometry (DXA) for the screening of sarcopenia in the community and to estimate the prevalence of sarcopenia in Hong Kong.

Methods: Screening of sarcopenia was provided to community dwelling older adults. Appendicular skeletal muscle mass (ASM) was evaluated by BIA (InBody 120 or 720) and DXA. Handgrip strength and/or gait speed were assessed. The Asian Working Group for Sarcopenia 2019 criteria was used for diagnosis and prevalence was estimated. Agreement analysis was performed to cross-validate ASM by BIA and DXA. Multiple regression was used to explore contribution of measured parameters in predicting DXA ASM from BIA.

Results: A total of 1587 participants (age 72 ± 12 years) were recruited. 1065 participants were screened by BIA (InBody 120) with 18 followed up by DXA, while the remaining 522 participants were assessed by the BIA (InBody 720) and DXA. The ASMI evaluated by BIA showed a mean difference of 2.89 ± 0.38 kg/m² (InBody 120) and 2.97 ± 0.45 kg/m² (InBody 720) against DXA. A significant overestimation of muscle mass was measured by BIA compared to DXA ($p < 0.005$). BIA data were adjusted using prediction equation and mean difference reduced to -0.02 ± 0.31 kg/m². Prevalence of sarcopenia in Hong Kong in older adults ≥ 65 years was 39.4% by DXA.

Discussion and Conclusion: BIA was found to overestimate skeletal muscle mass compared to DXA. With adjustments, BIA can be used as a quick and reliable tool for screening sarcopenia in community and clinical settings.

FP3.15

Preventing muscle denervation in SAMP8 sarcopenic animal model, effectiveness of mechanical stimulation in neuromuscular junction degeneration

Zheng Yuan Bao, Can Cui, Ling Qin, Simon Kwoon Ho Chow, Wing Hoi Cheung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Neuromuscular junction (NMJ) degeneration is one of the critical pathophysiology of sarcopenia. During NMJ degeneration, docking-protein-7(Dok7) plays an important role to maintain the endplate morphology. Low-magnitude high-frequency vibration (LMHFV) could enhance muscle performance in the elderly group and improve skeletal muscle function in sarcopenic SAMP8 mice. This study investigates the effects of LMHFV on NMJ degeneration and the Agrin-Lrp4-MuSK-Dok7-Rapsyn pathway.

Methods: SAMP8 mice at month 6 randomised into either control (CTL) or vibration (VIB) group. VIB group was given LMHFV. Functional and morphological assessments evaluated at month 0, 2, 4, 6 post-treatment ($n=5$ /group/time-point). Electrophysiological evaluated separately by stimulating the muscle or nerve; endplates morphology, along with mRNA/protein expressions were evaluated. One-way ANOVA and student's *t* test were used for analysis with $p < 0.05$ as significant difference.

Results: Tetanic force triggered by either muscle or nerve stimulation started to decrease significantly from 8 months ($p < 0.05$), while NMJ function started to reduce early from 6 months ($p < 0.05$). Endplate AchRs showed significant discrete and fragmented onset from 6 to 8 months ($p < 0.05$). Tetanic and specific tetanic force triggered by both muscle and nerve stimulus were significantly increased in VIB group compared with CTL group at 4 months after treatment ($p < 0.05$). NMJ function was only improved at 6 months after treatment ($p < 0.05$). Morphologically, VIB treatment could significantly alleviate AchRs discrete and fragmented onset at 4 months after treatment ($p < 0.05$).

Discussion: SAMP 8 mice demonstrated NMJ degeneration. NMJ deterioration precedes the onset of sarcopenia in SAMP8 mice. LMHFV could achieve the muscle enhancement through alleviating NMJ degeneration in sarcopenic mice during ageing.

Free Paper Session IV: Paediatric Orthopaedics and AGM of Paediatric Orthopaedics Chapter

FP4.1

Coupling of peak height velocity with decreased bone density and quality provide the link between low bone mineral density being a prognostic factor for curve progression that mostly occurs during pubertal growth spurt in adolescent idiopathic scoliosis

Kenneth Guang Pu Yang, Wayne Yuk Wai Lee, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: As part of the studies related to aetiopathogenesis of adolescent idiopathic scoliosis (AIS), we assessed bone density, bone quality and bone mechanical strength focusing at the peripubertal period and peak height velocity (PHV) in AIS patients.

Methods: This longitudinal study included AIS girls from 10 to 14 years old. Skeletal maturity was assessed using Thumb Ossification Composite Index (TOCI, 8 stages). Bone quality and bone strength were evaluated with high-resolution peripheral quantitative computed tomography (HRpQCT) and finite element analysis (FEA), respectively. Standing height and arm span were measured at the first visit and after 6-month follow-up. ANCOVA was used for hypothesis testing.

Results: 179 AIS girls were included (11.95 ± 0.95 years). Subjects at TOCI-4 had numerically the highest height velocity (0.71 ± 0.24 cm/month) and arm span velocity (0.79 ± 0.25 cm/month) corresponding to the PHV. Subjects at TOCI-4 had lower cortical volumetric BMD (672.36 ± 39.07 mg/mm³), cortical thickness (0.68 ± 0.08 mm) and apparent modulus (1601.54 ± 243.75 N/mm²) than: (a) those at TOCI-1-3 (724.99 ± 32.09 mg/mm³ ($p < 0.001$), 0.79 ± 0.11 mm ($p < 0.001$) and 1910.88 ± 374.75 N/mm² ($p < 0.001$), respectively), and (b) those at TOCI-8 (732.28 ± 53.75 mg/mm³ ($p < 0.001$), 0.84 ± 0.14 mm ($p < 0.001$), 1889.11 ± 419.37 N/mm² ($p < 0.001$), respectively).

Discussion and Conclusion: AIS girls had decreased cortical bone density, bone quality and bone mechanical strength at PHV. Coupling of PHV with decreased cortical and FEA parameters could provide the link to the previously reported observation that low BMD could contribute as one of the prognostic factors for curve progression that mostly occurs during PHV in AIS.

Funding sources: RGC of the HKSAR (No: 14174517)

FP4.2

Osteogenesis imperfecta patients with scoliosis—quality of life and surgical impact

Janus Siu Him Wong,¹ Jason Pui Yin Cheung,¹ Prudence Wing Hang Cheung,¹ Ya Peng Zhou,² Michael Kai Tsun To¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong–Shenzhen Hospital*

No copyright transfer for abstract printing.

FP4.3

The potential use of handgrip strength assessment to predict curve progression in adolescent idiopathic scoliosis girls

Rufina Wing Lum Lau,¹ Ka Yee Cheuk,² Vivian Wing Yin Hung,² Wayne Yuk Wai Lee,² Kenneth Guangpu Yang,² Alec Lik Hang Hung,² Jack Chun Yiu Cheng,² Tsz Ping Lam²

¹*School of Medical and Health Sciences, Tung Wah College*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Adolescent idiopathic scoliosis (AIS) patients have deranged muscle and bone qualities. A unique correlation pattern of handgrip strength and bone qualities was found in AIS as compared to controls. This study aimed to investigate whether baseline muscle and bone parameters in AIS could predict curve progression.

Methods: 126 AIS girls aged 12-14 were recruited, followed up until skeletal maturity and sub-grouped into progressive (pAIS) and stable (sAIS) groups according to SRS criteria. Maximum handgrip strength was measured with a standard dynamometer, lean mass at extremities and trunk was measured by bioelectrical impedance analysis, bone qualities and mechanical properties of non-dominant distal radius were measured by high-resolution peripheral quantitative computed tomography (HR-pQCT). Logistic regression model was used to determine the predictors for curve progression.

Results: 44 AIS (34.9%) had curve progression with Cobb angle $\geq 6^\circ$ before skeletal maturity. pAIS had similar age, curve severity and lifestyle but lower weight, Thumb Ossification Composite Index (TOCI), lower trunk (5.7%) and arm lean mass (8.9%), weaker dominant handgrip strength (8.8%), deranged cortical compartment (lowered vBMD by 6.5%) and lower bone mechanical properties (stiffness and estimated failure load lowered by 13.2% and 12.5%) when compared with sAIS. The best cut-off of maximum dominant handgrip strength was 19.75 kg for distinguishing pAIS from sAIS (75% sensitivity and 52.4% specificity) by receiver operating characteristic (ROC) analysis.

Discussion and Conclusion: pAIS showed poorer muscle and bone parameters than sAIS. A cut-off of 19.75 kg in dominant handgrip strength was identified which might predict AIS curve progression.

FP4.4

Local experience with anterior vertebral body tethering for scoliosis in Hong Kong

Kenny Yat Hong Kwan, Jocelyn Ip, Giselle Li, Jason Pui Yin Cheung, Kenneth Man Chee Cheung

Department of Orthopaedics and Traumatology, The University of Hong Kong

No copyright transfer for abstract printing.

FP4.5

Clinical outcomes of bracing for early-onset idiopathic scoliosis: a retrospective cohort study on 111 patients

Rufina Wing Lum Lau,¹ Alec Lik Hang Hung,² Ho Man Kee,³ Leo Chun Hei Wong,² Victor Kin Wai Chan,² Derek Wai Yin Chung,² Jerry Kwok To Chan,² Bosco Kin Pok Chau,² Stanley Ho Fung Leung,² Tsz Ping Lam²

¹*School of Medical and Health Sciences, Tung Wah College*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

³*Department of Prosthetics and Orthotics, Prince of Wales Hospital*

Introduction: Early-onset scoliosis (EOS) refers to all spinal deformities in children under the age of 10. Bracing is prescribed as first-line treatment but few studies examined the effects of bracing for EOS. This retrospective cohort study aimed to examine the clinical outcomes of bracing for EOS.

Methods: We identified and included 111 idiopathic EOS patients below the age of 10 with final follow-up past skeletal maturity and treated with bracing for intention-to-treat analysis. Demographic data (gender, age, maturity, and bracing duration) and clinical features (curve type, Cobb angles and in-brace correction) were obtained. Multiple linear regression was used to predict the variables for final curve progression.

Results: 95 of EOS were female (85.6%) in this cohort. Mean age of first diagnosis was 8.6 years old (SD 1.25) with an average 9.41 years of follow-up (SD 4.04). More EOS had a major curve at the left side (67%) and a double major curve (39.6%) at first diagnosis. Average Cobb angle at baseline major curve was 21.73° (SD 7.92) with a mean Cobb angle progression of 18.05° (SD 19.11). There was a statistically significant negative correlation between the largest Cobb angle at last follow-up and the initial in-brace correction ($r=-0.22$, $p=0.021$). Curve type, age of stopping bracing and at last follow-up were significant predictors of final Cobb angle $>55^\circ$ ($p<0.05$).

Discussion and Conclusion: EOS with greater initial in-brace correction showed a smaller final Cobb angle at last follow-up. Curve type, age when stopping bracing and at last follow-up were predictors of the final Cobb angle $>55^\circ$. Future multi-centre studies with longer follow-up after weaning are warranted.

FP4.6

Prevalence and features of metacarpal pseudoepiphysis in Hong Kong Chinese children

Aaron Wai Lun Woo,¹ Ka Wai Cheng,¹ Esther Ching San Chow,¹ Michelle Syn Yuk Lee,² Ho Nam Ho,² Bill Archie Lo,³ Sheung Yan Lo⁴

¹Department of Orthopaedics and Traumatology, United Christian Hospital

²Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital

³Department of Radiology, Tseung Kwan O Hospital

⁴Department of Radiology, United Christian Hospital

Introduction: Metacarpal (MC) epiphyses are normally found proximally for the first and distally for the second to fifth metacarpal bones. Pseudoepiphyses are infrequently found at the non-epiphyseal ends of metacarpal bones during the normal paediatric growth process. This is the first study aiming to investigate the radiological prevalence and features of metacarpal pseudoepiphyses in the Hong Kong Chinese population.

Methods: Standard bone age radiographs of children (chronological age 5 to 10) taken in two regional hospitals from January 2016 to December 2020 were analysed. Exclusion criteria included advanced bone age, non-Chinese ethnic origin, history of hand trauma and skeletal dysplasia. The effect of gender and age differences on the prevalence of pseudoepiphysis were analysed with Chi-square test using SPSS 26.

Results: A total of 421 radiographs (94 males; 327 females) were reviewed. The prevalence of pseudoepiphysis of 1st, 2nd, 3rd, 4th and 5th metacarpal bone was 25.7%, 21.1%, 0%, 0% and 23.5%, respectively. Complete pseudoepiphysis was most commonly seen in the 1st metacarpal bone (3.3%). Occurrence of pseudoepiphysis in a single bone (36.1%) is more common than occurrence in multiple bones (15.4%). Combined 2nd and 5th metacarpal pseudoepiphysis is the most common pattern (38.5%). Gender (1st MC $p=0.19$; 2nd MC $p=0.592$; 5th MC $p=0.159$) and age (1st MC $p=0.103$; 2nd MC $p=0.093$; 5th MC $p=0.211$) showed no differences on the prevalence of pseudoepiphysis.

Conclusion: Understanding about the radiological prevalence and features of metacarpal pseudoepiphyses will be useful to avoid misinterpretation as fractures in paediatric patients.

FP4.7

The impact of novel nusinersen treatment on hip stability in spinal muscular atrophy patients

Hayley Hoi Ning Ip,¹ Sophelia Hoi Shan Chan,² Janus Siu Him Wong,¹ Michael Kai Tsun To¹

¹Department of Orthopaedics and Traumatology, The University of Hong Kong

²Department of Paediatrics and Adolescent Medicine, The University of Hong Kong

Introduction: Hip instability is common in spinal muscular atrophy (SMA) patients due to muscle imbalance. Nusinersen, a novel treatment, has documented effects on improving strength and functionality. Our study aimed to evaluate the effects of nusinersen on hip subluxation.

Methods: This is a retrospective study of all SMA patients who received nusinersen at our institution from 2018 to June 2021. We included all patients with SMA who received nusinersen and had post-treatment assessments. We excluded those who received hip surgery within the study period. Baseline X-rays taken at pre-nusinersen screening were compared to the latest X-rays using Reimer's migration index (RMI). Clinically significant changes were defined as progression from reduced to subluxed/dislocated or from subluxed to dislocated and as progression of RMI from <0.5 to >0.5 or from >0.5 to >0.8 .

Results: The average follow-up period was 22 months (range, 14-36). RMI progressed in 10 out of 16 hips in type I patients, 7 out of 16 hips in type II patients, and 2 out of 4 hips in type III patients. In hips with RMI progression, 4 were clinically significant in type I, 3 were clinically significant in type II, and none were clinically significant in type III.

Discussion and Conclusion: Preliminary results show some progression in hip instability in SMA patients treated with nusinersen. More studies with longer follow-up periods are required to monitor the long-term effects. SMA patients on nusinersen require closer monitoring for hip instability and more aggressive management may be warranted.

FP4.8**Epidemiology of developmental dysplasia of the hip and selective ultrasound screening programme in New Territories West Cluster****On Ki Lee, Ching Man Yeung, Arthur King Hay Ma, Alexander Kai You Choi***Department of Orthopaedics and Traumatology, Tuen Mun Hospital*

Introduction: Developmental dysplasia of the hip (DDH) is a major paediatric musculoskeletal problem which can cause lifelong disability if untreated. This study aimed to update the epidemiology of DDH in NTWC and to evaluate the effectiveness of the current screening programme.

Methods: Records of children referred to the orthopaedics clinic in TMH for suspected DDH with ultrasound hips performed in 2017-2019 were reviewed. Diagnosis of DDH was made on clinical examination supported by static or dynamic ultrasonography results. Late presentation of DDH is defined as DDH presenting after 6 months.

Results: 929 patients were referred with ultrasound hips done. 12 of them were diagnosed with DDH. There were 2 late presentations. The female to male ratio was 13:1. Incidence of DDH in New Territories West Cluster (NTWC) in 2017-2019 was 0.89/1000 live births. Failure rate of the hip screening programme was 0.14/1000 live births. 91 patients had purely capsular laxity. 50(55%) had their first ultrasound before 6 weeks old, 41(45%) had their first ultrasound after 6 weeks old. Capsular laxity is negatively correlated to age of first ultrasound (correlation coefficient=-2.80, $p<0.001$). All patients had normal follow-up ultrasound. Success rate of Pavlik harness in the 12 patients diagnosed DDH by the selective ultrasound screening were 67% (8/12).

Discussion and Conclusion: Incidence of DDH (0.89/100 live births) in NTWC is comparable to a local study published a decade ago. The current USG screening programme could help 67% of DDH patients to avoid operative treatment. Purely capsular laxity is a benign ultrasonographic finding. 6 weeks old is an optimal time to perform the first ultrasound in DDH screening.

FP4.9**Changes in fracture incidence in the paediatric population during COVID-19: implications on their bone health****Gloria Sze Chung Leung, Pui Pui Kwok, Alexander Kai Yiu Choi***Department of Orthopaedics and Traumatology, Tuen Mun Hospital*

Introduction: Since the beginning of the COVID-19 pandemic, schools in Hong Kong have been suspended intermittently. This study aimed to investigate the impact of COVID-19 outbreak on the epidemiology of paediatric fractures and bone health of children through their serum calcium levels.

Methods: We recruited patients aged 3 to 17 years admitted for fractures from 1 February 2020 till 4 March 2021 (study group) and compared with the period 1 February 2019 till 31 January 2020 (control group) in our cluster of hospitals. Fractures without a clear history of trauma, NAI, pathological fracture, tuft/toe crush injury, and those without serum calcium results were excluded.

Results: Total number of admissions due to fracture were reduced (2019-2020: 420, 2020-2021: 213). After applying exclusion criteria, 98 and 63 patients were included as study group and control group respectively. Demographic data were comparable. Sports (31.6%, $n=31$) was the commonest injury mechanism in the control group while road accidents (41.5%, $n=27$) were the leading cause in the study group. The proportion of patients with hypocalcaemia was significantly higher in the study group (study group: 50.8%, control group: 28.6%, $p=0.007$ (Chi-square test), $OR=2.563$, 95% $CI=1.272=5.225$).

Discussion and Conclusion: This study reflects potential paediatric bone health issues during the COVID-19 pandemic. We postulate reduced fracture incidence and change in the distribution of injury mechanisms can be due to a sedentary lifestyle. Hypocalcaemia during the pandemic year can be associated with reduced sunlight exposure, obesity and lack of physical activities. Promoting home exercise, supplementation of dietary vitamin D and calcium can be considered as prophylactic measures.

Free Paper Session V: Trauma

FP5.1

Sarcopenia and associations with quality of life measures among patients with atypical femoral fractures

Victor Hin Ting Yick,¹ Christian Xinshuo Fang,² Tun Hing Lui,³ Terence Cheuk Ting Pun,² Tak Man Wong,² Frankie Ka Li Leung,² Janus Siu Him Wong²

¹*The University of Hong Kong*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

³*Department of Orthopaedics and Traumatology, North District Hospital*

No copyright transfer for abstract printing.

FP5.2

Open fractures for open doctors—does time of presentation affect mortality?

Ching Yau Wong,¹ Christian Xinshuo Fang,² Colin Shing Yat Yung,³ Terence Cheuk Ting Pun,² Tak Man Wong,² Frankie Ka Li Leung,² Janus Siu Him Wong²

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*

No copyright transfer for abstract printing.

FP5.3

Fracture-related infections—a retrospective single centre study from 2003 to 2020

Ryan Chun Kiu So,¹ Sanchal Sanchayyan,² Alicia Hoi Ying Liu,¹ Henry Chun Hin Leung,¹ Alfred Lok Hang Lee,³ Christian Xinshuo Fang,⁴ Frankie Ka Li Leung,⁴ Janus Siu Him Wong⁴

¹*The University of Hong Kong*

²*School of Biomedical Sciences, The University of Hong Kong*

³*Department of Microbiology, Prince of Wales Hospital*

⁴*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP5.4

Predictors of mortality in fracture-related infections—survival analysis with a mean follow-up of 5.8 years

Henry Chun Hin Leung,¹ Yat Fan Lau,¹ Ryan Chun Kiu So,¹ Alicia Hoi Ying Liu,¹ Alfred Lok Hang Lee,² Christian Xinshuo Fang,³ Frankie Ka Li Leung,³ Janus Siu Him Wong³

¹*The University of Hong Kong*

²*Department of Microbiology, Prince of Wales Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP5.5**Antimicrobial susceptibility among Staphylococcal fracture-related infections**

Alicia Hoi Ying Liu,¹ Henry Chun Hin Leung,¹ Ryan Chun Kiu So,¹ Alfred Lok Hang Lee,² Christian Xinshuo Fang,³ Frankie Ka Li Leung,³ Janus Siu Him Wong³

¹*The University of Hong Kong*

²*Department of Microbiology, Prince of Wales Hospital*

³*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP5.6**Femoral neck system versus multiple cannulated screws for the treatment of intracapsular femoral neck fractures—a propensity score matched cohort study**

Hiu Yan Leung,¹ Xinshuo Christian Fang,² Calvin Tsoi,¹ Shing Hing Choi,¹ Lo Ramon Yiu,³ Dennis King Hang Yee,⁴ Janus Siu Him Wong,² Colin Shing Yat Yung²

¹*Department of Orthopaedics and Traumatology, Princess Margaret Hospital*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital*

⁴*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

Introduction: We investigate the outcomes of the recently launched angle-stable femoral neck system (FNS) against conventional multiple cannulated screws (MCS) for the treatment of intracapsular fracture neck of femur using a retrospective propensity score matched cohort study design.

Methods: Consecutive adult patients receiving either MCS or FNS for intracapsular neck of femur fractures from Jan 2018 to March 2021 in five hospitals (QMH, PMH, AHNH, TKOH, GHK) were reviewed. Propensity score matching was performed using baseline confounders including age, sex, garden classification, Charlson comorbidity score and pre-morbid walking status, with nearest neighbour matching and a caliber value of 0.2.

Results: Of 221 patients, 76 patients with FNS were matched against 76 patients with MCS and reviewed. The mean age was 74.6 and 79.6% were females. After matching the two groups, the confounding factors were controlled within a standardised difference in means of <0.07. At latest follow-up, FNS treated patients had significantly fewer femoral head penetrations (0% vs 7.4%, $p=0.028$), fewer avascular necrosis (1.6% vs 10.3%, $p=0.038$). There is no significant difference in the extent of collapse, implant migration, reoperations, functional walking status and mortality.

Discussion and Conclusion: Our observations support the use of FNS as a promising alternative to MCS for intracapsular neck of femur fractures.

FP5.7

Hiking-related orthopaedic injuries: another epidemic during the COVID-19 pandemic

Claudia Wing Yiu Chu, Wing Yuk Mok, Yau Chun Chong

Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital

Introduction: Social distancing restrictions, such as gathering ban and prohibiting leisure activities have been implemented by the government to fight against the COVID-19. These policies have changed people's habits in recreational activities significantly. It is observed that outdoor activities, especially hiking, became popular during the COVID-19 outbreak in Hong Kong. The purpose of this study is to assess the impact of COVID-19 on the demand of orthopaedics care for hiking-related injuries.

Methods: We performed a retrospective review of the patient data admitted to the Pamela Youde Nethersole Eastern Hospital, a hospital with helipads and air ambulance service to rescue injured hikers. Patient records of hiking-related injuries were reviewed for the COVID-19 pandemic period from 2 February to 2 May 2020. This was compared with the corresponding dates of the 2019. Analysis was also performed on data of hiking-related tibia and/or fibular fracture in the past 5 years.

Results: There was an overall increase in the number of hiking-related orthopaedics admission from 14 in 2019 to 48 in 2020 (2.4 times increase). Furthermore, a larger portion of patients required operative treatment (35.7% in 2019 vs 54.2% in 2020). There was a significant increase in the number of hiking-related tibia and/or fibular fracture patients in 2020 as compared to the past 5 years (23 vs average 5.8, $p=0.0001$).

Discussion and Conclusion: An increase in number of hiking-related injuries requiring in-patient orthopaedics care was observed during the COVID-19 pandemic. Efforts should be made to raise public awareness about hiking safety.

FP5.8

Femoral neck system for the treatment of intracapsular femoral neck fractures in patients <65 years

Calvin Tsoi,¹ Xinshuo Christian Fang,² Magdalene Hiu Yan Leung,¹ Shing Hing Choi,¹ Lo Ramon Yiu,³ Dennis King Hang Yee,⁴ Janus Siu Him Wong,² Colin Shing Yat Yung²

¹*Department of Orthopaedics and Traumatology, Princess Margaret Hospital*

²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

³*Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital*

⁴*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

Introduction: The femoral neck system (FNS) (DePuy Synthes) for intracapsular femoral neck fractures is designed with superior angular and rotational stability incorporated into a single system. Our objective is to qualitatively review and describe the technical details and outcomes regarding use of this implant in young hip fracture patients.

Methods: In a review of consecutive FNS surgeries in five local hospitals (QMH, PMH, AHNH, TKOA, GHK) from June 2020 to March 2021, 19 patients under the age of 65 (28-64) with intracapsular neck fractures (9 un-displaced, 10 displaced) were identified. Reduction techniques (open vs closed), surgical quality (TAD, reduction and implant positioning), clinical and radiological outcomes are qualitatively reported and discussed.

Results: One patient (GHK case) required open reduction and 9 were reduced closed. Cortical stepping of >4 mm and retroversion >5 degrees were observed in 4 and 2, respectively. 14 achieved definite healing with cortical remodelling at an average of 18.9 weeks follow-up. Remaining 3 patients had no cortical remodelling between 7 and 39 weeks. One had failure of fixation requiring conversion to a total hip arthroplasty. The average collapse is 3.8 mm (range -2.5 to 14.8). Of the 19 patients, 8 regained unaided outdoor functional walking status before 13 weeks. The technical advantages and difficulties are to be discussed.

Discussion and Conclusion: The early results of the FNS are promising in young hip fractures. Larger studies with longer observation periods are needed.

FP5.9**Neurolysis did not reduce 1-year mortality in fragility hip fracture patients unfit for operative treatment****Siu Kei Kam, Alexander Kai Yiu Choi***Department of Orthopaedics and Traumatology, Tuen Mun Hospital*

Background: Neurolysis has emerged as an alternative treatment option for fragility hip fracture patients with high operative risks in recent years, aiming to improve pain control and aid patient care. This retrospective study aimed to investigate on the clinical outcomes of hip fracture patients unfit for surgical treatment receiving neurolysis when compared with previous practice of conservative management.

Methods: All patients with fragility hip fractures who received neurolysis in NTWC in Hong Kong from January 2015 to December 2019 were included. One-year mortality was compared with fragility hip fracture patients who received conservative treatment from January 2010 to December 2014. Patients with pathological fractures were excluded. Other clinical outcomes such as length of stay were compared, with risk factors such as age, gender, fracture pattern and comorbidities investigated.

Results: A total of 227 patients were included, 123 in neurolysis group and 104 in conservative group respectively. One-year mortality was 59.3% in neurolysis group and 57.7% in conservative group respectively, with no significant difference ($p=0.8$). Median length of stay for neurolysis patients after excluding in-patient mortality cases was longer than conservative group, especially for intracapsular hip fracture cases, while no significant difference was noted in extracapsular hip fracture cases. Chronic kidney disease was associated with higher 1-year mortality among both groups of patients, while intracapsular fracture was associated with lower 1-year mortality.

Conclusion: Neurolysis for fragility hip fracture did not reduce 1-year mortality nor hospital stay, while further study may be warranted for efficacy of pain control and functional restoration.

FP5.10**Preoperative leukocytosis and postoperative outcome in geriatric hip fracture patients: a retrospective cohort study****Stephen Pui Kit Tang, Keith Hay Man Wan, Lok Tin Moy, Kevin Kwun Hung Wong, Kam Kwong Wong***Department of Orthopaedics and Traumatology, Kwong Wah Hospital*

Introduction: Studies have suggested an association between preoperative leukocytosis and postoperative infectious complications across a variety of surgeries. The aim of this study was to evaluate the impact of preoperative leukocytosis on the prognosis after treatment for geriatric hip fracture.

Methods: 1007 consecutive patients aged ≥ 65 years who underwent surgery for hip fracture between 1 January 2016 and 31 December 2019 at Kwong Wah Hospital were included in the retrospective cohort. Assessed outcomes included surgical site infection, mortality within 30 days and 1 year. A multivariate logistic regression model was constructed in order to test whether leukocytosis was an independent predictor of morbidity and mortality in fracture hip patients.

Results: After adjustment for covariates, leukocytosis was found not to be a significant independent predictor of poor outcome after hip fracture surgery. Delay of surgery >48 hours was found to be the only independent variable associated with increased risk of surgical site infection. The predictors of 30-day mortality were male gender, history of congestive heart failure (CHF) and use of anticoagulant; whereas male gender, age ≥ 85 years, history of CHF, dementia and hypoalbuminemia were associated with increased risk of 1-year mortality.

Conclusions: Preoperative leukocytosis is not associated with adverse postoperative outcome after geriatric hip fracture surgery. The most important variables for prediction of outcome, based on the current study, are delay in surgery >48 hours, gender, age and congestive heart failure. These results support the current guidelines, which recommend early surgery for geriatric hip fractures patients.

FP5.11

A retrospective propensity scores matched case-control study comparing cemented and cementless modular hemiarthroplasty for patients with displaced intracapsular neck of femur fractures >65 years of age

Samuel Yan Jin Fang,¹ Christian Xinshuo Fang,¹ Kelly Ka Yee Lo,² Janus Siu Him Wong,¹ Timmy Chi Wing Chan,³ Frankie Ka Li Leung¹

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Surgery, Queen Mary Hospital*

³*Department of Anaesthesiology, Queen Mary Hospital*

No copyright transfer for abstract printing.

FP5.12

Randomised controlled trial on analgesic effect of preoperative fascia iliaca compartment block in geriatric patients with hip fracture

Kelvin Tze Kit Wan, Albert Yung Chak Hsu

Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Geriatric hip fracture is one of the major health problems in Hong Kong's ageing population. While operation is the mainstay of treatment, preoperative pain control is often overlooked. Conventional oral analgesics may only provide suboptimal pain control, which may result in poor morbidity outcome. Fascia iliaca compartment block (FICB) is of increasing popularity and may provide more consistent analgesic effect. There is a lack of local data to support the procedure as a routine practice.

Methods: Total 80 geriatric patients with acute fracture hip admitted to United Christian Hospital, requiring preoperative analgesia, were recruited and randomised into intervention group (0.25% levobupivacaine) and control group (normal saline). The procedure was carried out by landmark approach in addition with USG guidance. NRS pain score at different time intervals, timing of injection, systemic analgesic use, complications, and demographics were compared.

Results: Pain score upon gentle movement was improved in intervention group, while pain score at rest was similar in both groups. There was no complication from the procedure documented.

Discussion and Conclusion: FICB is an effective choice of analgesia for geriatric hip fracture patients with good safety profile. It shall be considered as a routine practice for suitable patients.

FP5.13**Computed tomography analysis of axial glenoid bone stock in Hong Kong's local population and its clinical implications to reverse shoulder arthroplasty****Wing Sum Li, Ma Chun Man, Yuk Chuen Siu***Department of Orthopaedics and Traumatology, North District Hospital*

Introduction: Optimal implant placement is important to prevent complications in reverse shoulder arthroplasty (RSA). In patients with bilateral significant cuff arthropathy, the abnormal glenoid anatomy and bone loss may be challenging for surgery. This study aimed to find out the normal value of axial glenoid bone stock in the local population and its clinical implications.

Methods: This is a retrospective, cross-sectional study. Patients admitted to our hospital from 2016 to 2019 with computed tomography of shoulder performed were included. Data were analysed by independent-samples t test using SPSS.

Results: Five out of 167 patients identified were excluded due to glenoid pathology. The mean age was 65.4, 65.4% were females. The mean axial glenoid bone stock was 2.45 ± 0.33 cm. The mean axial glenoid bone stock was significantly lower in females (2.35 cm vs 2.65 cm) and the geriatric group (age ≥ 65) (2.37 cm vs 2.56 cm). 3.7% anatomical variant was found.

Discussion and Conclusion: This is the first study to suggest the normal axial glenoid bone stock value in local population, and its relationship to RSA. In conclusion, axial glenoid bone stock is lower in female and geriatric patients. This can serve as a surgical reference for RSA, especially for patients with pre-existing glenoid bone loss to avoid over-medialisation of glenosphere causing impingement and dislocation; and provide a surgical guide for replenishing the glenoid bone stock. The anatomical variant where the coracoid base connects to the glenoid vault is also first reported, which may allow longer central peg insertion for better fixation.

FP5.14

Optimising the treatment choice of midshaft clavicular fracture: a systematic review and meta-analysis of randomised controlled trials

Zhipeng Yan, Wing Sze Yuen, Sung Ching Yeung, Christie Wing Yin Wong, Choi Ying Wong, Walter Si Qi Wang, Elaine Tian, Shireen Rashed, Colin Shing Yat Yung, Christian Xinshuo Fang

Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Conservative treatment and surgical intervention are viable choices for midshaft clavicular fractures management. Previous studies compared the clinical differences between them, but the clinical improvements after treatment at different time points are lacking. This meta-analysis focuses on the comparison of early (3 months), intermediate (6-12 months), and late (2 years) clinical outcomes.

Methods: A systematic search was done on databases (PubMed, Embase, Medline, Cochrane) on 11 June 2021. Search keywords were: midshaft clavicular fracture and clinical trials. Clinical trials fulfilling the inclusion criteria were selected to compare the clinical difference between surgical and conservative treatments in terms of improvement in the Disabilities of the Arm, Shoulder and Hand Score (DASH), Constant-Murley Score (CMS), time-to-union and treatment-related complications.

Results: Of the 3079 patients of mean age 37.3 years in the 31 selected studies, surgical intervention was associated with improved DASH (mean difference (MD) -1.72, 95% CI=-2.93 to -0.51, p=0.005), CMS (MD 3.64, 95% CI=1.09-6.19, p=0.005), time to union (standard mean difference SMD -0.69, 95% CI=-0.97 to -0.41, p<0.00001) and risk ratio of bone-related complications including bone non-union, malunion and implant failure (0.22, 95% CI=0.11-0.43; p<0.00001). Better long-term DASH (24-month MD -4.24, 95% CI=-7.03 to -1.45, p=0.003) and CMS (24-month MD 5.77, 95% CI=1.63-9.91, p=0.006) were observed. Surgical outcome is independent of plate or nail fixations.

Discussion and Conclusion: Surgical interventions provide better improvements in DASH, CMS, time-to-union, and treatment-related complications, despite without reaching minimal clinically significant difference.

FP5.15

Does osteoporosis cause more severe infection and delayed healing in osteosynthesis-associated infection?

Ronald Man Yeung Wong,¹ Jie Li,¹ Yik Lok Chung,¹ Sharon Shui Yee Leung,² Simon Kwoon Ho Chow,¹ Margaret Ip,³ Ning Tang,⁴ Chi Yin Tso,⁴ Wing Hoi Cheung¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Pharmacy, The Chinese University of Hong Kong*

³*Department of Microbiology, The Chinese University of Hong Kong*

⁴*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

No copyright transfer for abstract printing.

FP5.16

Defining the fit and ideal entry site of the Fibula Rod System—a computed tomography-based study

Yan Chun Cheung,¹ Dennie King Hang Yee,¹ Christian Xinshuo Fang²

¹*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP5.17

Which patients should we perform direct arthroplasty in neck of femur fracture patients? 1-Year results from 233 patients in a tertiary hospital

Linus Chee Yeen Lee, Yao Zu, Wai Wang Chau, Chi Yin Tso, Raymond Wai Kit Ng, Simon Kwoon Ho Chow, Wing Hoi Cheung, Ning Tang, Kevin Ki Wai Ho, Ronald Man Yeung Wong

Department of Orthopaedics and Traumatology, Prince of Wales Hospital

No copyright transfer for abstract printing.

FP5.18

Genetic risk factors for atypical femoral fractures—a multi-centre genome-wide association study of 2539 patients with the Hong Kong Osteoporosis Study cohort

Janus Siu Him Wong,¹ Christian Xinshuo Fang,¹ Ching Lung Cheung,² Gloria Hoi Yee Li,³ Terence Cheuk Ting Pun,¹ Tak Man Wong,¹ Tun Hing Lui,⁴ Frankie Ka Li Leung¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Pharmacology and Pharmacy, The University of Hong Kong*

³*Department of Health Technology and Informatics, The Hong Kong Polytechnic University*

⁴*Department of Orthopaedics and Traumatology, North District Hospital*

No copyright transfer for abstract printing.

FP5.19

Sterilised 3D PRINTed bone models versus conventional computed tomography imaging for operative visualisation for complex fracture repair surgery—a single-blinded randomised multicentre study (The SPRINT study): interim data

Christian Fang,¹ Colin Shing Yat Yung,² Sana Law,¹ Michelle Lam,¹ Yuk Chuen Siu,³ Kevin Wong,⁴ SH Choi,⁵ Dennis Yee,⁶ Matthew Leung,¹ Frankie Leung¹

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, North District Hospital*

⁴*Department of Orthopaedics and Traumatology, Kwong Wah Hospital*

⁵*Department of Orthopaedics and Traumatology, Princess Margaret Hospital*

⁶*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

Introduction: Applications of 3D printing (3DP) in orthopaedics and traumatology is rapidly evolving. The use of 3DP fracture models provide intra-operative on-table visualisation and tactile representation of fractures compared to that of multi-planar computed tomography (CT) reconstruction scans. Here we postulate that the use of 3DP fracture models improves efficiency and surgical outcomes for intra-articular fracture repair surgery.

Methods: Multicentre prospective study for intra-articular fracture surgery involving the distal humerus, proximal tibia and pilon fractures. Patients were randomised to 3DP or CT scan group for aiding fracture repair surgery. Baseline characteristics were measured including demographics, injury mechanism, fracture location, fracture complexity and soft tissue grading. Primary outcome measured are total fluoroscopy time and radiation dosage. Secondary outcomes included quality of articular reduction, intra-operative blood loss, surgical duration, skin incision, complications and functional scores.

Results: Interim data with 36 patients include 7 distal humerus fractures, 10 pilon and 19 tibia plateau fractures randomised to two groups. Baseline characteristics were similar. Total fluoroscopy (159.8 seconds vs 250.5 seconds) and radiation dosage (734.6 cGy/cm² vs 1439.6 cGy/cm²) were both reduced in the 3DP group compared to the CT scan group however not statistically significant (p=0.13 and p=0.52 respectively). Surgical time, total length of incision was similar in both groups without statistical significance. No increase in complications were noted with the 3DP models including infection.

Discussion: 3DP usage for intra-articular fracture repair surgery has a trend towards less fluoroscopy time and radiation dosage inflicted upon the operating surgeon. Further patient recruitment and sample size required.

FP5.20**S2-alar-iliac screw insertion without continuous fluoroscopy—cadaver study comparing conventional versus targeting jig versus robotic assistance****Colin Shing Yat Yung,¹ Lorraine Cheung,² Evan Fang,² Kenny Kwan,² Kenneth MC Cheung,² Kathine Ching,² Grace Ho,² Christian Fang,² Frankie Leung²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: S2-alar-iliac (S2AI) screw insertion relies heavily on fluoroscopy. Here, we compare the accuracy of conventional instrumentation by experienced surgeons, a novel design S2AI screw insertion tool by inexperienced and experienced surgeons and Brainlab Cirq®, a new robotic assistive navigation device.

Methodology: Cadaveric randomised trial with 54 hemi-pelvises. Specimen baseline characteristics were recorded and prepared with standardised surgical dissection. S2AI screws were inserted by either conventional free hand or with the aid of a novel instrumentation tool or by robotic arm-assisted navigation. Post insertion CT scans of all pelvises were performed. Primary outcome measures included length of screw tract, incidence of hazard zone penetration. Secondary outcomes included time of S2AI screw insertion procedure, oblique and caudal tilt angles, deviations of entry site and false tracking.

Results: Screw depth was significantly longer for robotic-assisted navigation with 108.4 mm (SD 20.5) compared to instrumentation tool by experienced surgeon (101.9 mm, SD 20.8), inexperienced surgeon (77.4 mm, SD 40.8) and conventional instrumentation (83.5 mm, SD 35.2; ANOVA $p=0.009$). Paired sample t test comparing left and right hemipelvis with different intervention groups showed statistically significant differences ($p=0.04$). Robotic-assisted screw insertion took the longest time (16 minutes 30 seconds) while experienced surgeons using instrumentation tool was the fastest (3 minutes 30 seconds; ANOVA $p<0.01$). Inner cortical perforation was significantly higher in the inexperienced surgeon group utilising instrumentation tool (56%, with 1 partial perforation, $p<0.01$).

Discussion: Novel instrumentation tool may help experienced surgeons reduce screw insertion time with a high degree of accuracy. Robotic-assisted screw insertion remains the most accurate.

FP5.21

Evaluation of a prototype wireless head-mounted display system in knee arthroscopy—a randomised cross-over study

Christian Fang,¹ Pinky Mo,² Holy MH Chan,² Yan Kit Mak,³ Kai Chung Poon,¹ Janus Wong,¹ Colin Yung,⁴ Grace PY Ho,⁴ Tak Man Wong,¹ Frankie Leung¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*The University of Hong Kong*

³*Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital*

⁴*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: Our wireless full-HD augmented reality head-mounted display (AR-HMD) aimed to eliminate surgeon head-turning and reduce theatre clutter. Learning and performance using AR-HMD versus TV monitors (TVM) was evaluated.

Methods: 19 Surgeons and 19 novices were randomised into groups A and B and tasked to retrieve four loose-bodies from a bench-top knee arthroscopy simulator. They each performed 5 trials using (1) AR-HMD and (2) TVM following a specified sequence (Group A: 1-2-1-1-1 and Group B: 2-1-2-2-2). Trials 1-3 were cross-over sequences to evaluate “unfamiliar” performance with the user switching between devices. Trials 4-5 were “familiarised” performances using the same device. The outcomes are time-to-completion and the incidence of loose-body drops.

Results: In the first 114 “unfamiliar” simulated surgeries, users had 67% longer mean time-to-completion using AR-HMD than TVM users (195s vs 117s, log-rank $p < 0.001$) and same number of loose-body drops (57 vs 57). In the following 76 “familiarised” surgeries, mean time-to-completion was 47% longer for AR-HMD users (134s vs 91s, $p = 0.036$) with equal number of drops (38 vs 38). With AR-HMD, surgeons were 32% quicker than novices in the “unfamiliar” phase (158s vs 233s, $p = 0.025$) but they performed similarly in the “familiarised” phase (139s vs 129s, $p = 0.874$). When familiarised, the 95% CI inferiority margin was 4.4% for the AR-HMD.

Discussion and Conclusion: In terms of speed, AR-HMD users cannot beat conventional TVM users. The difference is smaller when familiarised. Novices improved faster than surgeons with the AR-HMD. We will further optimise and evaluate the system.

FP5.22

Effect of axial dynamisation on time-to-union and mechanical failures in displaced atypical femoral fractures—A multicentre cohort analysis of 223 cases

Christian Fang,¹ Wan Yiu Shen,² Janus Siu Him Wong,¹ Dennis King Hang Yee,³ Colin Yung,⁴ Tak Wing Lau,⁴ Kathine Ching,¹ Tun Hing Lui,⁵ Frankie Leung¹

¹Department of Orthopaedics and Traumatology, The University of Hong Kong

²Department of Orthopaedics and Traumatology, Queen Elizabeth Hospital

³Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

⁴Department of Orthopaedics and Traumatology, Queen Mary Hospital

⁵Department of Orthopaedics and Traumatology, North District Hospital

Introduction: Atypical femoral fractures (AFFs) have slow union and high reoperations rates. Axial dynamisation augments fracture opposition and micro-motion, may benefit healing.

Methods: A consecutive multi-centre cohort (QEH, QMH, KWH, NDH) of 224 displaced AFFs in 207 patients (mean age 73.2 years, SD 9.5) (10 males) since 2007 fulfilling the ASBMR criteria treated with IM nailing were reviewed. Mean radiological follow-up was 4.02 years. The status of axial dynamisation was classed Dynamic or Static under two conditions (1): "By intention" at initial surgery, (2): "By effect" at latest radiological follow-up. Fracture reduction quality was assessed. Union was considered complete by RUST score >13 criteria. Time-to-event (TTE) analysis was carried out using the segmented Kaplan-Meier method.

Results: Mean TTE for union was the same for "by intention" dynamic and static locking in the first 180 days. (176 d vs 176 d, log rank $p=0.413$) Following the first 180 days, initially dynamised femurs healed significantly faster (422 d vs 528 d, $p=0.048$). "By effect" dynamisation, with elective removal of distal locking bolts under LA, further yielded significantly faster healing rate after 180 days (418 d vs 548 d, $p=0.17$). The incidence of revision for mechanical failures are the same for dynamised or statically locked femurs (7 vs 6, χ^2 $p=0.6$, overall 5.72%). Multivariate Cox regression showed that dynamisation "by effect" independently predicted faster union but not fracture reduction quality (OR=0.320, $p=0.31$).

Conclusion: Routine axial dynamisation at primary fixation and elective removal of static locking bolt under enhanced healing of displaced AFFs with no noticeable detrimental effect apart from the additional minor operation.

FP5.23

Lower mortality following surgical management for distal femur fractures: a cohort study

Benedict Yan Yui Cheung, Chun Fung Chan, Wai Ming Chan, Alexander Kai Yiu Choi, Yiu Chung Wun

Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Background: While uncommon, distal femur fractures are the second most frequent fracture type of the femur in the geriatric population. The mortality rate for this patient population is not well established and outcomes after surgical management have not been well studied. We present the first large-scale retrospective cohort study to compare the management outcomes in the geriatric population with distal femur fractures.

Methods: We included 169 patients >60 years with distal femur fractures for patients admitted into the New Territories West Cluster from 2012 to 2020 in this retrospective cohort study. Patient, fracture and management characteristics were examined and analysed. Survival analysis was done to delineate any differences in mortality rates between surgical and conservative management.

Results: The average age in this cohort was 84 years with 86.4% female and 13.6% male patients respectively. Overall mortality at 30 days, 6 months, 1 year and 3 years were 5.3%, 17.1%, 21.8% and 38.4%, respectively. Conservative management including external bandaging or bracing were done in 53.3% of the patients while 46.7% underwent surgical management. Between these two groups, the estimated survival time in days was longer ($p=0.001$) in those who underwent surgical management (2382.1 days) as opposed to conservative management (1499.0 days). There was no statistically significant difference in the mean Charlson Comorbidity Index between the two groups ($p=0.226$).

Conclusion: Compared to conservative management, surgical management resulted in a longer estimated survival time in geriatric patients with distal femur fractures.

FP5.24

Computational simulation of a novel surgical screw guide system to determine the optimal trajectory for S2-alar-iliac screw fixation in minimally invasive pelvic and spine surgery

Christian Fang,¹ Lorraine HY Cheung,² Evan Fang,¹ Kenny Yat Hong Kwan,¹ Felix Lau,³ Matthew Man Fai Leung,¹ Kenneth MC Cheung,¹ Frankie Leung¹

¹Department of Orthopaedics and Traumatology, The University of Hong Kong

²The University of Hong Kong

³The Chinese University of Hong Kong

Introduction: The ideal trajectory for S2-alar-iliac (S2AI) screw insertion remains difficult to determine intraoperatively. Using a novel surgical guide which references the greater sciatic notch and outer pelvic surface, in conjunction with computational simulation, we identified a point through which an S2AI screw may be passed that optimises screw length, while minimising perforation hazards.

Methodology: Computed tomography scans of 87 adult hemipelvises were segmented and imported for 3D manipulation. A simulated array of screws was passed from the sacral entry point through nine target points with distances from the greater sciatic notch (Y) and outer pelvic surface (X) varying in 1-cm intervals. At each point, the maximum allowable screw length and incidence of critical perforations of the hip joint and inner pelvic cortex were recorded.

Results: Target points (X,Y) = (1,1) (1,2) and (2,1) allowed for the longest screw lengths, with mean 104.5 mm (95% CI=101.1-107.9) vs 101.84 mm (95% CI=97.7-106) vs 105.71 mm (95% CI=99.4-112.1). (1,1) has significantly lower risk for complete inner cortex perforation versus (1,2) and (2,1), 1% vs 8% vs 31% ($p<0.001$) and partial inner cortex perforation, 2% vs 8% vs 28% ($p<0.001$). However (1,1) has higher risk of hip perforation than (1,2) 18% vs 2% ($p<0.001$).

Conclusion: We determined that target point (1,1) is optimal for S2AI screw insertion. The surgeon should use fluoroscopy to monitor for potential hip perforation.

FP5.25**Our experience of fixing distal femur fracture with double plating****Tsang Yeung, Hang Cheong Cheng***Department of Orthopaedics and Traumatology, United Christian Hospital*

Introduction: Distal femur fracture is sometimes quite challenging to treat, especially in the elderly people and cases of comminuted fracture. Double plating to distal femur is an option to achieve a more stable construct.

Methods: It is a retrospective case series study. 33 cases with distal femur fracture (AO type 33) underwent open reduction internal fixation by plating in United Christian Hospital in year 2019-2021 were identified and their data of demographics, fracture patterns, operation details, clinical outcome, and surgical complications were retrieved.

Results: Of 33 cases, 13 (39%) with a mean age of 81 years were fixed with double plating configuration. 3 out of the 13 cases were total knee replacement (TKR) periprosthetic fractures. Distal femur locking plates were applied to the lateral side in all cases. Medial sides were plated with either a distal femur locking plate or a PHILOS plate. All cases were instructed for non-weight bearing walking after operation. There was no case of non-union but 2 cases (15%) of wound or soft tissue complication and 1 case (8%) of periprosthetic fracture.

Discussion and Conclusion: Double plating is an effective option for distal femur fracture fixation in the elderly people with osteoporotic bone and periprosthetic fracture with TKR. PHILOS plate is a possible option for medial plating as it is of a similar shape to the contour of the medial condyle and its size does not interfere with the femoral component of TKA.

FP5.26**Development and initial evaluation of a novel (VRU) implant prominence rating scale for predicting outcome and the need for implant removal in distal radius volar plating****Thomas Ka Chun Leung,¹ Christian Fang,² Jake Cheung,² Tak Wing Lau,¹ Frankie Leung²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Poor positioning of distal radius volar plate is reported to correlate with inferior outcome and need for removal. Nerve and tendon irritation may occur when the implant is offset towards volar, radial or ulna directions. Current literature provides little guidance on optimal plate positioning.

Methods: Adult distal radius fractures treated with volar plates between 2013-2019, with minimum 6 months of follow-up, were retrospectively analysed using a newly designed classification system to grade volar V (0-4), radial R (0-2) and ulna U (0-2) prominences from postoperative anteroposterior and lateral radiographs. The dependent outcomes were qDASH scores and incidence of plate removal. Sample size estimation was calculated from a priori MCID values of qDASH scores using an effect size of 0.2.

Results: 201 Females and 125 males were reviewed (mean age 61.7 years). 6-, 12- and 24-month qDASH scores were respectively available in 194, 179 and 98 patients. 66 had implant removals. R and U scales did not correlate with qDASH scores nor implant removal. Soong score correlated with 6-month qDASH (Kendall's $\tau_b=0.103$, $p=0.041$) but not implant removal. V scale weakly correlated with 6-month qDASH ($\tau_b=0.114$, $p=0.027$) but significantly predicted the need for removal. At V=0-2, 17.7% had removals and at V=3-4, 35.4% had removals (χ^2 $p=0.005$), RR=2.00 (95% CI=1.27-3.17) and NNT=5.64 (95% CI=3.3-18).

Discussion and Conclusion: The VRU system is more useful than the Soong score in predicting implant removal. Patients with 'overhanging' volar implants (V scale ≥ 3) are twice as likely to require removal. Meticulous positioning of volar plate is needed to prevent impingement.

Free Paper Session VI: Adult Joint Reconstruction II

FP6.1

Proximal tibial bone loss in the first two years after unicondylar knee arthroplasty: anatomical pattern, predictors and clinical correlation

Qunn Jid Lee, Daneil Wai Yip Wong, Yee Ling Yau, Esther Wai Yee Tsang, Yiu Chung Wong

Department of Orthopaedics and Traumatology, Yan Chai Hospital

No copyright transfer for abstract printing.

FP6.2

Mid-term survival analysis of fixed bearing unicondylar knee arthroplasty using conventional cutting guide and no anterior cruciate ligament screening: 5-year results

Qunn Jid Lee, Esther Wai Yee Tsang, Yiu Chung Wong

Department of Orthopaedics and Traumatology, Yan Chai Hospital

Introduction: Unicondylar knee arthroplasty (UKA) is gaining popularity in the last decade. Despite the recent interest in mobile-bearing UKA, registry data suggest fixed bearing design still has the longest survivorship. While robotic-guided surgery set a new standard for surgery precision, the conventional cutting guide is still most popular and practical in daily practice. The aim of this study is to analyse the medium-term survivorship of a fixed bearing UKA using the block technique.

Methods: This is a retrospective study. Patients with fixed bearing UKA (ZUK) performed in 2011-17 by the author as surgeon or supervisor were reviewed. Cases were selected according to modified Kozinn and Scotts criteria. Survivorship in terms of revision and predictors for failure were analysed.

Results: There were 97 UKA with follow-up time of 66 ± 18 months (27-98). 52.6% had >5 years of follow-up. The mean age was 70 ± 9 years; body weight was 64.5 ± 10 kg and BMI was 25.8 ± 2.6 kg/m². Preoperative mechanical alignment was varus 9 ± 4 degrees, postoperative alignment was varus 3 ± 3 degrees. There were 4 revisions (4.1%) and 4 deaths (4.1%) during the study period. Reasons for revisions were loosening (1), persistent pain (2) and lateral compartment disease (1). Estimated survival at 8.3 years was 94.7 % (95 CI=91.6-97.7). BMI ≥ 30 was found to be significant predictor for failure.

Discussion and Conclusion: Even without ACL integrity screening, fixed bearing UKA using conventional cutting guide is reliable with satisfactory medium-term survivorship.

FP6.3**Robotic arm–assisted unicondylar knee arthroplasty resulted in superior radiological accuracy: a case control study****Matthew Hei Yu Yeung,¹ Kwong Yuen Chiu,¹ Ping Keung Chan,² Henry Fu,² Man Hong Cheung,¹ Amy Cheung,² Vincent Wai Kwan Chan,² Chun Hoi Yan¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: Unicompartmental knee arthroplasty (UKA) is an effective surgical treatment for medial knee osteoarthritis. This study aimed to explore the difference in the radiological and clinical outcomes between manual instrumentation (Oxford) and robot arm-assisted (MAKO) approach in medial UKA.

Methods: A prospective cohort study using 59 Mako and 34 Oxford UKA patients was conducted. Radiological outcomes included postoperative mechanical axis, tibial slope, tibial alignment, femoral alignment, change in joint line and joint line congruence angle. Clinical parameters included Knee Society knee Score, Knee Society functional assessment, range of motion (ROM) taken in 3 separate time frames before operation, 6 months and 12 months after operation.

Results: MAKO had a shorter operation time (OT) than Oxford UKA. MAKO has higher radiological accuracy demonstrated in post-op tibial slope ($p=0.02$), tibial alignment ($p=0.00$), femoral alignment ($p=0.043$), change in joint line ($p=0.00$). For clinical parameters, MAKO did not display show a clinically significant difference compared to Oxford UKA. There is no difference in range of motion before operation, 6 months after operation, and 12 months after operation.

Discussion and Conclusion: Robotic arm–assisted UKA demonstrated a higher radiological accuracy compared to conventional UKA. Short-term follow-up did not demonstrate a clinical superiority in either technique

FP6.4**Radiographic comparative analysis on medial tibial bone loss for fixed bearing unicompartmental knee arthroplasty and total knee arthroplasty—retrospective cohort study from local experience****Arthur Kwok Hei Wong***Department of Orthopaedics, Princess Margaret Hospital*

Introduction: Unicompartmental knee replacements (UKR) have showed superior clinical outcome than total knee replacements (TKR) in terms of hospital stay and knee scores. Yet, studies showed cases of early revisions and aseptic tibial loosening (2-8%) is a common cause. Some proposed tibial bone loss can cause loosening. Tibial bone loss has been observed in both TKR and UKR. This study aimed to compare the tibial bone loss in both replacements.

Methods: 48 cases of UKR (Zimmer® Unicompartmental High Flex Knee (ZUK) system) and 66 cases of TKR (Triathlon Total Knee System) were recruited in the study. Postoperative X-rays over 3 years were studied and used to estimate the medial tibial bone loss. Bone loss was measured by the method of digital radiological densitometry. Secondary clinical outcomes including postoperative range of motion and Knee Society Scores were collected for comparisons. Means were calculated and *t* tests were performed to look for any significant difference.

Results: Both groups showed significant drop in medial tibial bone density over 3 years after the index operation. The cumulative drop in 3 years were $33.7\% \pm 12.9$ in TKR and $23.3\% \pm 13.1$ in UKR respectively. The cumulative drop between two groups at 12 months and 36 months were significantly different ($p<0.001$).

Discussion and Conclusion: Stress shielding is a postulated pathophysiology for medial tibial bone loss. TKR has been shown to cause more medial bone loss than UKR. Long-term data are required to observe any correlation of medial tibial bone loss with tibial implant aseptic loosening.

FP6.5

Surgical accuracy and clinical outcomes of image-free robotic-assisted total knee arthroplasty

Cyrus Lau,¹ Michael Tim Yun Ong,² Wai Wang Chau,² Kevin Ki Wai Ho²

¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Development of robotic arm-assisted unicondylar knee arthroplasty (UKA) and total knee arthroplasty (TKA) for knee osteoarthritis (OA) has received well reputations associated with low morbidity and mortality, and its effectiveness in reducing joint pain and improving range of motion. We aimed to review our early results using the image-free robotic-assisted technology in knee arthroplasty.

Methods: Patients suffering from end-stage osteoarthritis of the knee (Kellgren and Lawrence grade 3-4) receiving UKA or TKA operated by robotic arm-assisted surgery between year 2018 and early 2021 were recruited. Baseline characteristics, peri-operative details, and surgical outcomes in terms of angles and outcome scores. Knee scores before and after surgery were compared.

Results: A total of 134 robotic arm-assisted operated patients were recruited, of which 85.8% were TKA and 66.7% were female. Mean age was 69.4 years and 71.6% were obese. 4.5% were smokers. Mean tourniquet time was 105.16 minutes and mean operating time was 137.88 ± 22.82 minutes (86-185). Mean days of hospital stay was 4.57 ± 1.75 (2-8). Complications included 2 partial MCL cuts treated with repair in TKA and none in UKA. Hip-knee-ankle angle (HKA), mechanical lateral distal femoral angle (mLDFA), and anatomical lateral distal femoral angle (aLDFA) were much improved (all $p < 0.01$). Function capabilities in terms of Knee Society Score (KSS) (44.96 vs 94.48) and Knee Society Function Score (KFS) (55.23 vs 83.41) were significantly increased after surgery (both $p < 0.01$).

Discussion and Conclusion: The surgical accuracy and clinical outcomes in patients underwent UKA and TKA were promising after treating by robotic arm-assisted surgery. Further research on long-term post-surgery follow-up and comparing with conventional approach are recommended.

FP6.6**Reducing edge loading and alignment outliers with image-free robotic-assisted unicompartmental knee arthroplasty****Wai Hong Lau,¹ Henry Fu,¹ Man Hong Cheung,² Amy Cheung,¹ Ping Keung Chan,¹ Kwong Yuen Chiu²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Survivorship of medial unicompartmental knee arthroplasty (UKA) is technique dependent. Achieving undercorrection and femoral-tibial implant congruency (without edge loading) associates with improved survivorship. Image-free robotic-assisted unicompartmental knee arthroplasty (R-UKA) enables intraoperative planning of alignment and assessment of congruency prior to execution. We aimed to compare the radiological outcomes between R-UKA and C-UKA.

Methods: This retrospective case-control study involved 140 UKA (82 C-UKA and 58 R-UKA) performed at an academic institution between March 2016 to November 2020, with a mean follow-up of 3 years. Long alignment films were evaluated for postoperative mechanical axis and femoral-tibial implant congruency. Implant congruency was measured by two methods: (1) femoral-tibial contact point with reference to medial-to-lateral quadrants of the tibial tray and (2) femoral-tibial contact point deviation from the centre of the tibial tray as percentage of tibial tray width. Baseline demographics and complications were recorded.

Results: R-UKA showed fewer overcorrections into valgus than C-UKA (3.4% vs 11%) despite no difference in mean mechanical alignment (C-UKA 5.5° vs R-UKA 4.9°, $p=0.34$). There was higher tendency for edge loading in C-UKA compared with R-UKA using method 1 (4.9% vs 1.7% in most medial quadrant) but no difference using method 2 (11.1% vs 10.4%, $p=0.49$). Two-year survivorship was 99% for C-UKA and 97% for R-UKA. Operative time was 19 minutes longer for R-UKA ($p<0.001$).

Discussion and Conclusion: Image-free robotic-assisted UKA shows marginal benefit of reducing alignment outliers and preventing edge loading compared with conventional technique at the cost of operative time.

FP6.7

Radiological analysis of the horizontal distance between mobile-bearing insert and lateral wall of tibial tray in Oxford unicompartmental knee arthroplasties

Gloria Yan Ting Lam, Tsz Lung Choi, King Hang Yee, Jason Chi Ho Fan

Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

Introduction: Bearing dislocation is a serious complication of the mobile-bearing unicompartmental knee arthroplasties with lateral wall impingement being one of the major causes. This study aimed to report the safe range of the bearing position with respect to the lateral wall of the tibial tray (LWT).

Methodology: Fluoroscopic screening was conducted for patients who received Oxford unicompartmental knee arthroplasties (OUKA) in Alice Ho Miu Ling Nethersole Hospital during the period of May 2019 to October 2020. True anteroposterior knee X-rays were obtained. The distance between the radiological markers within the insert and the LWT at 0 and 60 degrees of knee flexion were measured.

Results and Analysis: 36 patients with 47 knees were included. None of the cases had postoperative dislocation. The mean distance between the anterolateral marker and the LWT was 6.20 mm (standard deviation 2.65 mm, range 2.2-17.2 mm) at 0 degree of knee flexion and 5.50 mm (standard deviation 2.42 mm, range 1.8-14.2 mm) at 60 degrees of knee flexion. The mean distance between the posterolateral marker and the LWT ranged from 4.95 mm (standard deviation 2.84 mm, range 0.8-10.0 mm) at 0 degree of knee flexion and 4.21 mm (standard deviation 3.05 mm, range 0.3-15.9 mm) at 60 degrees of knee flexion.

Discussion and Conclusion: At 60 degrees of knee flexion, the bearing moved towards the LWT in 39 (83%) knees. Pure translational motion was observed in 25 knees, whereas rotational motion was observed in 14 knees, 9 of which were external rotation. There was low correlation between the bearing-to-LWT distance, the knee society score and the oxford knee score.

FP6.8

Are patients' demographics helpful in predicting the size of implants for Oxford unicompartmental knee arthroplasty? A 2-year retrospective review

Karen Ka Man Ng, Tsz Lung Choi, Yan Ting Lam, King Hang Yee, Jason Chi Ho Fan

Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

No copyright transfer for abstract printing.

FP6.9**Role of pharmacological thromboprophylaxis in total knee arthroplasty rehabilitation for obese patient****Chun Kiu Ng, Chi Kin Lo, Qunn Jid Lee***Department of Orthopaedics and Traumatology, Yan Chai Hospital*

Introduction: Obesity is now a worldwide epidemic and obese patients account for 25% of patient load in our locality. There is a suggested association between obesity and venous thromboembolism (VTE). It was also shown that obesity is a risk factor of having VTE after TKA. It is our belief that pharmacological prophylaxis reduces risk of VTE after total knee arthroplasty (TKA). However, there was no concrete guideline in prophylaxis of VTE after TKA and the pharmacological prophylaxis is controversial. The aim of this study was to assess the incidence of VTE after TKA among obese patients (BMI >30) who receive pharmacological thromboprophylaxis (Enoxaparin), on top of mechanical prophylaxis to patient receiving mechanical prophylaxis only.

Methods: Patients who performed primary TKA from 10.2011 to 5.2019 in Yan Chai Hospital Joint Replacement Centre with BMI >30 are included. The enoxaparin group consisted of 221 patients (n=221) and non-enoxaparin group consisted of 552 patients (n=552). Duplex ultrasonography of both lower limbs was performed between the fourth day and seventh day after the operation to determine the incidence of DVT.

Results: The incidences of DVT in enoxaparin group and non-enoxaparin group were 0.9% and 0.7%, respectively (p=0.979). The incidence of pulmonary embolism in enoxaparin group and non-enoxaparin group is 0% and 0.2% respectively (p=0.527).

Discussion and Conclusion: There is no statistically significant difference in DVT or PE rate despite the use of enoxaparin in obese patients, provided that mechanical prophylaxis is used.

FP6.10**Changes in biochemical markers of nutrition before and after total knee arthroplasty****Vincent Wai Kwan Chan,¹ Ping Keung Chan,¹ Henry Fu,¹ Man Hong Cheung,² Amy Cheung,¹ Kwong Yuen Chiu²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP6.11

What factors lead to adverse outcome after joint replacement surgery? A study of 1963 patients

Amy Cheung,¹ Janus Siu Him Wong,² Ping Keung Chan,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Henry Fu,¹ Kwong Yuen Chiu²

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: With the ageing population, it is important that orthopaedic surgeons can accurately assess the risk of joint replacement surgery in elderly patients. This study sought to determine: (1) what factors are related to adverse outcome after joint replacement surgery and (2) to quantify the degree of frailty among such patients.

Methods: All patients who had been put on waiting list for primary joint replacements in our cluster of hospitals from November 2009 till March 2020 were included. Age, sex, Charlson Comorbidity Index (CCI) and Frailty Index Lab (FI Lab) was recorded. Length of stay (LOS), 30 and 90- day mortality and 28-day emergency readmission were recorded.

Results: 1963 patients were analysed. 30- and 90- day mortality was 0.2% and 0.3% respectively. Incidence of 28-day emergency readmission was 4%. Median FI Lab and CCI were 0.22 (0-0.53) and 0 (0-9) respectively. A significant association was found between age >80 years and 30- and 90- day mortality and 28-day emergency readmission ($p<0.05$, $p<0.05$ and $p=0.047$ respectively). Age on list was higher in those with 30- and 90-day mortality (mean 80 vs 68, $p=0.029$ and median 80.3 vs 68, $p=0.002$ respectively) compared to those that survived. CCI was higher in those with 90-day mortality (median 1 vs 0, $p=0.009$). LOS was positively, significantly related to age ($p<0.05$), CCI ($p<0.05$) and FI lab ($p<0.05$).

Discussion and Conclusion: Increasing age was a significant factor predisposing to all adverse outcomes examined. Measures to optimise medical comorbidities and frailty in the elderly people are of paramount importance.

FP6.12

Hong Kong Teaching Hospital Joint Registry: a journey of 30 plus years

Kevin Ki Wai Ho,¹ Wai Wang Chau,¹ Michael Tim Yun Ong,¹ Kwok Hing Chiu²

¹Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

²Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: The purpose of the registry is to record patient information and provide data on the performance and longevity of replacement joint implants and surgery outcomes. Our centre has maintained a Joint Registry (JR) since 1985. This ongoing project will provide an overview of adult joint reconstruction (AJR) service in a Teaching Hospital.

Methods: This is a review of our AJR Registry spanning the last 36 years. We have categorised the case into unicompartmental knee arthroplasty (UKA), total knee arthroplasty (TKA) and total hip arthroplasty (THA). Demographic characteristics, surgical details, surgical outcomes, and functional scores were analysed. Cumulative revision rates and survivorships were carried out using Kaplan-Meier method. Knee and hip function capabilities were evaluated using respective scoring tools.

Results: A total of 2889 knees and 879 hips were analysed. Mean age was 63.39 years (range=21-94), of which 55% were female. Cumulative revision rates for UKA at 5, 10, 20 and 30 years were 2.8%, 5.6%, 12.1% and 17.3%, respectively. Cumulative revision rates for TKA were 2.8%, 4.6%, 12.8%, and 15.3% and cumulative revision rates for THA were 2.6%, 5.2%, 9.9% and 14.4%, respectively. Advancing age and long follow-up resulted in a progressive decreased in cumulative survival rates. Knee Society Knee Score (31.51 vs 90.76), Function Score (46.43 vs 59.35), and range of motion (91.59 vs 102.01) were all significantly improved ($p<0.01$). Harris Hip Score was significantly improved (38.78 vs 80.19).

Discussion and Conclusion: Maintaining a JR is a labour-intensive and arduous task. Compared to other NJR, our unit has better survivorship. Data collection and analysis work provide evidences to drive the continuous development and implementation of measures to ensure implant safety and patient outcome.

FP6.13**A local survey on tranexamic acid use in arthroplasty in Hong Kong****Chi Kin Lau,¹ Kin Wai Lam,¹ Tsz Lung Choi,² Kenneth Ng,³ YK Yeung⁴**¹*Department of Orthopaedics and Traumatology, United Christian Hospital*²*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*³*Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital*⁴*Department of Orthopaedics and Traumatology, Caritas Medical Centre***Introduction:** A local survey on tranexamic acid use in arthroplasty in Hong Kong.**Methods:** The survey was designed by the Arthroplasty chapter of the Hong Kong Orthopaedic Association (HKOA) and was sent to all members of HKOA through email.**Results:** 43 responses had been received, most respondents are Arthroplasty specialist serving in public hospital in Hong Kong. The majority of them (97.5%) are regularly using TXA in arthroplasty surgery (unicompartmental knee replacement, total knee replacement or total hip replacement). 97% have been following a tranexamic acid protocol in their practice with 80 % screening for contraindication in its use. The majority prescribe 1g intraarticular TXA and in total hip 60 % also add in preoperative IV 1g TXA. 50% of respondents would not adjust the dose of TXA and only 23% and 13% would adjust dose according to patient's body weight and renal function respectively.

All surgeons had encounter complication in TXA and 91% is allergy. As for the efficacy of TXA, 87% of respondents believe that it will decrease blood loss. 95% of surgeons will continue to use TXA with 78% believe in TXA as more effective compared to other treatment. As for factors that would make surgeons decide not to continue TXA use, 59% doubt the effectiveness and 50% is due to no protocol or guideline.

Discussion and Conclusion: TXA arthroplasty protocol or guideline should be established in order to facilitate TXA use in arthroplasty in Hong Kong.**FP6.14****Tranexamic acid in primary total hip arthroplasty: a randomised controlled trial of intravenous versus combined intravenous and intra-articular administration****Ping Keung Chan,¹ Thomas Chak Ming Tang,² Wing Chiu Fung,² Henry Fu,¹ Amy Cheung,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Kwong Yuen Chiu²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP6.15

Thromboprophylaxis should be considered in primary total knee arthroplasty—a 17-year comparative study in the incidence of pulmonary embolism

Ping Keung Chan,¹ Wing Chiu Fung,² Fu Yuen Ng,³ Vincent Wai Kwan Chan,¹ Amy Cheung,¹ Man Hong Cheung,² Henry Fu,¹ Chun Hoi Yan,⁴ Kwong Yuen Chiu²

¹Department of Orthopaedics and Traumatology, Queen Mary Hospital

²Department of Orthopaedics and Traumatology, The University of Hong Kong

³Orthopaedic Centre, Canossa Hospital

⁴Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital

No copyright transfer for abstract printing.

FP6.16

Intra-articular injection of platelet-rich plasma in patients with knee osteoarthritis, a randomised controlled clinical trial

Li Li,¹ Ping Keung Chan,² Wing Chiu Fung,¹ Thomas Chak Ming Tang,¹ Vincent Wai Kwan Chan,² Chun Hoi Yan,³ William Wei Jia Lu,¹ Peter Kwong Yuen Chiu¹

¹Department of Orthopaedics and Traumatology, The University of Hong Kong

²Department of Orthopaedics and Traumatology, Queen Mary Hospital

³Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital

Introduction: Randomised controlled trials (RCTs) about the effects of platelet-rich plasma (PRP) injection in patients with knee osteoarthritis (OA) have been studied without a consistent verdict. We conducted a RCT to investigate the difference between PRP and placebo treatment for knee OA in Hong Kong.

Methods: Patients having bilateral knee OA of similar severity clinically and radiologically were recruited and their knees were randomised into two groups. PRP group received intra-articular PRP injection, and placebo group received saline injection in contralateral knee of the same patient. The primary outcomes were Numeric Rating Scale (NRS) of rest and walking pain in each knee, and secondary outcomes were intermittent and constant osteoarthritis pain (ICOAP) and Western Ontario and McMaster's Universities Osteoarthritis Index (WOMAC) at baseline and 4 to 6 weeks after the first injection.

Results: 10 patients were included in the analysis. The results at 4 to 6 weeks showed that ICOAP scores decreased statistical significantly from 43.9 to 23.3 ($p=0.043$). WOMAC scores decreased from 39.6 to 29.3 ($p=0.061$). PRP and saline groups showed mean reduction of NRS rest pain scores in 1.7 and 1.3 respectively, as well as NRS walking pain scores in 1.6 and 1.2 respectively, however, between-group differences were not statistically significant ($p=0.662$ and 0.680).

Discussion and Conclusion: All patients showed statistically significant pain improvement but not functional improvement. Between-group statistical differences between PRP and saline treatments were not found at this stage. Longer follow-up and more subjects should be investigated in the future.

FP6.17

**Alarming high incidence of hypovitaminosis D in patients undergoing joint replacement surgery—
risk factor analysis in a multivariable logistic regression model**

**Ping Keung Chan,¹ Wing Chiu Fung,² Amy Cheung,¹ Vincent Wai Kwan Chan,¹ Henry Fu,¹ Man Hong Cheung,²
Chun Hoi Yan,³ Kwong Yuen Chiu²**

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

³*Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital*

No copyright transfer for abstract printing.

FP6.18

**Oral supplementation of vitamin D deficiency to reduce postoperative complications after knee
arthroplasty: a randomised controlled trial**

**Ping Keung Chan,¹ Wing Chiu Fung,² Amy Cheung,¹ Vincent Wai Kwan Chan,¹ Man Hong Cheung,² Henry Fu,¹
Chun Hoi Yan,³ Kwong Yuen Chiu²**

¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

³*Department of Orthopaedics and Traumatology, Gleneagles Hong Kong Hospital*

No copyright transfer for abstract printing.

Free Paper Session VII: Spine

FP7.1

Cross-cultural adaptation of Cantonese (Hong Kong) Oswestry Disability Index Version-2.1b

Karlen Ka Pui Law,¹ Pui Lai Lee,¹ Wing Wang Kwan,¹ Kin Cheung Mak,² Keith Dip Kei Luk³

¹*Department of Occupational Therapy, The Duchess of Kent Children's Hospital at Sandy Bay*

²*Department of Orthopaedics and Traumatology, Spine Central*

³*Department of Orthopaedics and Traumatology, The Orthopaedic and Sports Medicine Centre, The Hong Kong Sanatorium and Hospitals*

Introduction: Oswestry Disability Index was established by Fairbank in 1989 to assess functional disabilities in low back pain (LBP). It was last updated in 2019 as ODI Version-2.1b (ODI AU_2.1b), first translated into Simplified-Chinese Oswestry Disability Index (CODI) in 2008 by Lue. The construct validity, internal consistency, level of agreement and the floor-and-ceiling effects of CODI were found unclear by Yao in 2016. This study will verify how well this adapted Cantonese-Hongkong Oswestry Disability Index Version-2.1b (HKCODI) aligns with ODI AU_2.1b in the Southern-Chinese population.

Methods: The translation of ODI AU_2.1b was performed according to guidelines from MAPI Research Trust and the American Association of Orthopaedic Surgeons. Psychometric properties of HKCODI were tested statistically by Pearson's correlation, Cronbach's alpha and intraclass correlation coefficient (ICC).

Results: 200 subjects (109 males, 91 females) aged from 15 to 85 years (mean age=58.91 years) with LBP scored from 3/10 to 10/10 in the visual analogue scale (VAS); were recruited in the Occupational Therapy Department of a tertiary referral centre. HKCODI demonstrated strong construct validity in comparing with Hongkong version of Roland-Morris Disability Questionnaire (HKRMDQ) ($r=0.666$, $p=0.000$), Short-Form Health Survey SF-36 (physical composite summary) (-0.700 , $p=0.000$) and VAS (0.487 , $p=0.000$). Excellent internal consistency and test-retest reliability were confirmed with Cronbach's alpha of 0.997 and ICC of 0.993 at 95% confidence level.

Discussion and Conclusion: Cross-cultural adaptation of ODI AU_2.1b has been translated and validated as HKCODI and Item-8 (Sex-Life) was suggested to skip for patients older than 60. HKCODI is a fully self-administered and highly reliable tool in assessing the functional disability of patients with LBP in the Southern-Chinese population.

FP7.2**Comparison on the muscle and bone parameters in women with and without vertebral compression fractures****Tsun Kit Lau, Gene Chi Wai Man, Koko Shaau Yiu Ko, Leo Tsz Ching Chau, Hiu Wun Wong, Zongshan Hu, Jack Chun Yiu Cheng, Sheung Wai Law***Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Vertebral compression fractures (VCFs) are the most common among all osteoporotic fractures. However, the detailed changes of muscle and bone parameters in VCF patients remains uncertain. Herein, the aim of this study was to investigate the relationship of skeletal muscle mass and bone density in women with vertebral compression fracture (VCF) and its effect on physical function and quality of life.

Methods: 21 female patients with VCFs aged over 60 years old and 20 age-matched women were prospectively recruited. Muscle and bone density were assessed using dual-energy X-ray absorptiometry (DEXA) and body impedance analysis (BIA), respectively. Grip strength was used as functional assessment. The quality of life was assessed using Short-form 12 (SF-12) and Oswestry Disability Index (ODI).

Results: Women with vertebral fractures had significantly lower skeletal muscle mass (SMM) ($p < 0.01$), lower grip strength ($p < 0.01$), and lower bone density (BMD) ($p < 0.01$) when compared with women without fractures. These women with VCF demonstrated higher disability and back pain. Multivariate regression analysis showed that lower SMM and lower BMD at femoral neck were correlated with the occurrence of VCF. Further analysis showed VCF patients with multiple fractures have significantly worsen bone-muscle parameters and more disability than patients with single VCF.

Conclusion: Low BMD and low skeletal muscle mass were found in patients with VCFs which were resulted to the decrease in quality of life. The presence of multiple VCFs has a negative influence on muscle mass and bone density, which can lead to increase in disability and worsening on the quality of life.

FP7.3**Combined use of diaphragm pacing and exoskeleton in the rehabilitation of a patient with high cervical cord injury—a case report****Thomas Wai Kiu Liu, Paul A Koljonen***Department of Orthopaedics and Traumatology, Queen Mary Hospital*

Introduction: In addition to tetraplegia, patients with high cervical cord injury often suffer from impairment in diaphragm function leading to ventilator-dependence, as well as severe autonomic disturbances causing problematic vasomotor imbalances during mobilisation. Technologies such as implantable diaphragm pacing and powered robotic exoskeletons have dramatically changed the way these patients can be rehabilitated. We present a case of C2 spinal cord injury rehabilitated by a combination of diaphragm pacing and robotic exoskeleton.

Case presentation: Our patient is a 33-year-old lady with C2 fracture and spinal cord injury. The patient presented with acute tetraplegia and respiratory arrest, and was treated with combined anterior/posterior spinal fusion and tracheostomy, and remained tetraplegic and ventilator-dependent postoperatively. At 2 months post-injury the patient received implantation of a NeuRx diaphragmatic pacing system (DPS). Utilising DPS, the patient was completely weaned from mechanical ventilation which enabled transfer to the physiotherapy centre for rehabilitation. A dramatic improvement in her severe orthostatic hypotension was noted with exoskeleton training, and despite having C2 spinal cord injury, the patient gradually weaned off corticosteroids and vasopressors over a period of 6 months of exoskeleton training. No adverse effects were observed.

Conclusion: The combined use of exoskeleton and diaphragm pacing is a solution for the rehabilitation of patients with high cervical cord injury. This specific training regimen allowed our patient to be independent of mechanical ventilation and to be upright for a higher intensity and dosage of ambulation exercises, allowing effective retraining of vasomotor responses over time.

FP7.4

Does local application of vancomycin powder reduce postoperative infection in cervical laminoplasty? A retrospective review

Andrew Lok Yin Wong, Kam Lung Tung, Michael Siu Hei Tse, Ho Ming Li, Tik Koon Kwok, Kam Kwong Wong
Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Introduction: Cervical laminoplasty is a common surgery performed for cervical myelopathy. However, posterior cervical spine surgery is associated with a higher rate of wound infection, quoted to be 2% to 13% in the literature, comparing to anterior cervical spine surgery. Local application of powdered intrawound vancomycin had been shown to reduce postoperative infection in posterior cervical and thoracolumbar fusion. This retrospective study aimed to study its efficacy in reducing infection in cervical laminoplasty.

Methods: Routine local application of 1gram of vancomycin powder in epidural and subcutaneous space before wound closure has been adopted by our department since 2019. Patients undergoing cervical laminoplasty without local application of vancomycin powder from 2014 to 2019 act as control group. Rates of deep space infection requiring irrigation were compared between the two groups of patients.

Results: In the vancomycin group, the rate of deep space infection requiring irrigation was 2.6 % (2/77). In the non-vancomycin group, the rate of deep space infection requiring irrigation was 5.8% (5/86). There were no adverse events associated with the use of vancomycin powder.

Discussion and Conclusion: Local application of vancomycin powder before wound closure appears to reduce infection rate in cervical laminoplasty without adverse effects.

FP7.5

Surgical outcome of interlaminar endoscopic lateral recess decompression of lumbar spine—a retrospective review

Cho Yau Lo, Yuk Chuen Siu, Ho Lam Chai, Chun Man Ma
Department of Orthopaedics and Traumatology, North District Hospital

Introduction: The purpose of this retrospective study is to investigate the clinical outcome of interlaminar endoscopic lateral recess decompression (IE-LRD) in the treatment of lumbar disc herniation and spinal stenosis.

Materials and Methods: A total of 30 (19 male and 11 female) patients who underwent IE-LRD at our hospital from December 2019 to May 2021 were reviewed. All patients were assessed with Numeric Pain Rating Scale (NPRS), Oswestry Disability Index (ODI) and Modified Macnab Criteria.

Results: The mean age was 49.72 (range 18-83). The mean operating time was 121 minutes (range 52-198). The mean duration of postoperative hospital stay was 1.77 (range 0-8). The mean NPRS for back pain and leg pain improved from 4.11 to 1.31 and 6.89 to 1.24 respectively. The mean ODI improved from 55.6 to 12.3. 93.3% (28/30) of the patients had either excellent or good outcome according to Modified Macnab Criteria. There was no incidence of dural tear or neurological injury. No patient required additional decompression or fusion operation in the study period.

Discussion and Conclusion: IE-LRD is a safe and effective method for spinal decompression in patients with lumbar disc herniation and spinal stenosis.

FP7.6**Radiological outcome of titanium vertical expandable cage in transforaminal lumbar interbody fusion****Cho Yau Lo,¹ Yuk Chuen Siu,¹ Ho Lam Chai,¹ Siu Man Leung,² Jason Chi Ho Fan,² Chun Man Ma¹**¹*Department of Orthopaedics and Traumatology, North District Hospital*²*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

Introduction: Expandable cages are designed to allow optimal implant sizing while minimising nerve root retraction during insertion. However, evidence supporting its use in transforaminal lumbar interbody fusion (TLIF) is still limited. This retrospective study aimed to evaluate the radiological outcome of titanium vertical expandable cage in TLIF.

Methods: We measured the preoperative and postoperative segmental lordosis (SL), lumbar lordosis (LL), anterior disc height (ADH), posterior disc height (PDH) in standing lateral X-ray of lumbosacral spine in patients who underwent open TLIF or minimal invasive TLIF (MIS-TLIF) at North District Hospital (NDH) and Alice Ho Miu Ling Nethersole Hospital (AHNH) from June 2019 to May 2021. Complications such as cage migration and cage subsidence were also recorded.

Results: 96 levels of TLIF in 78 patients with a mean age of 65.7 were included in the study. Postoperatively there were significant improvement in SL ($p<0.01$), LL ($p<0.01$), ADH ($p<0.01$) and PDH ($p<0.01$). Curvilinear cages showed a significantly greater improvement in SL than straight cages ($p=0.02$). Straight cages showed a significantly greater improvement in PDH than curvilinear cages ($p<0.01$). There is no significant difference in SL, LL, ADH and PDH when different cage lengths and cage angles were compared. Cage subsidence was noted in 14 levels (14.5%). None of the patients had cage migration.

Discussion and Conclusion: The use of titanium vertical expandable cage in TLIF or MIS TLIF is effective in restoring disc height, segmental and lumbar lordosis.

FP7.7**Mid- to long-term neurological survivorship in patients receiving surgery for cervical myelopathy****Victor Hin Ting Yick, Samuel Yan Lik Ng, Nicolas San Tung Wong, Graham Ka Hon Shea***Department of Orthopaedics and Traumatology, The University of Hong Kong*

No copyright transfer for abstract printing.

FP7.8

Long-term outcomes of early-onset scoliosis with neurofibromatosis treated by magnetically controlled growing rod: retrospective case series long-term outcomes

Giselle Tung Kat Li, Kenneth Man Chee Cheung, Jason Pui Yin Cheung, Kenny Yat Hong Kwan
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Neurofibromatosis (NF) is a genetic disorder of the nervous system. It can cause dystrophic or non-dystrophic scoliosis. Surgical treatment for scoliosis patients with NF is challenging and the long-term outcomes have rarely been reported. Especially, the long-term outcome of magnetically controlled growing rods (MCGR) treatment on scoliosis patients with NF is missing.

Methods: Retrospective data review and radiographic parameters measurement and calculation.

Results: There were 4 subjects in this study, whose follow-up period is between 3.5 and 10.6 years. All subjects have a high correction rate of main curve Cobb angle from 12.1% to 67.9% and high correction index from 26.4% to 1092.9%. Their MCGR yearly lengthening is 16.3 ± 3.5 mm (average \pm 1 SD). The adverse event (AE) rate is 100% among these patients, including wound infection, pain proximal junctional kyphosis (PJK) and instrument related complication (IRC). And IRC/AE is 53%, all patients suffered from PJK, 3 of them suffered from at least 1 IRC (s). 3.5-year and 8.9-year follow-up subjects have long-term EOSQ-24 records, which show that subjects' pulmonary function, fatigues and mobility improve in the short-term after surgery; and their general health, physical function improve and parental burden reduction in their follow-up period.

Conclusion: Early-onset scoliosis patients with neurofibromatosis are worth treating with MCGR. Although all subjects in this study suffered from PJK and IRC is still high, their perception improved and their spine growth capacity was preserved; MCGR can be lengthened. Subjects' Cobb angle correction rate and correction index are high.

FP7.9

Deep learning-based fully automated vertebral endplates irregularity prediction using lumbar magnetic resonance imaging

Xihe Kuang, Jason Pui Yin Cheung, Teng Zhang
Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Currently, the clinical analysis of lumbar MRI heavily relies on the manual and subjective assessment process. It is inefficient and inconsistent and unable to predict the longitudinal pathology progression. Therefore, we aimed to establish a deep learning-based system for automated analysis of lumbar MRI.

Methods: The dataset was developed on 1152 volunteers (40.17% male) from the southern Chinese population, who had a mean age of 41.43 years, and the main age-group was 40 to 50 years (42.82%). For each volunteer, two MRI scans (baseline and follow-up) were collected. Three different pathologies of vertebral endplates irregularity, including Schmorl's node, high intensity zones (HIZs), and marrow change, were assessed by two spine specialists with over ten years of clinical experience. Our deep learning-based system integrated the published MRI-SegFlow to segment spinal tissues and a convolutional neural network to predict follow-up pathologies based on the baseline MRI and segmentation results. The 5-fold cross-validation was conducted for the quantitative validation of our system.

Results: Validation results showed that our system achieved remarkable performance on the pathology prediction of Schmorl's node (mean accuracy: $89.46 \pm 3.71\%$), HIZ (mean accuracy: $91.75 \pm 2.48\%$), and marrow change (mean accuracy: $87.51 \pm 2.23\%$).

Discussion and Conclusion: A deep learning-based system for fully automated lumbar MRI analysis is implemented and tested. The validation results show that the system can achieve remarkable performance on the prediction of multiple vertebral endplates irregularity pathologies. Our system has significant potential for clinical implementation.

FP7.10**Screw malalignment explains tether failure in vertebral body tethering: a clinical and finite element analysis****Wanis Nafo, Kenneth Man Chee Cheung***Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Vertebral body tethering (VBT) is a new minimally invasive, non-fusion technique for the correction of adolescent idiopathic scoliosis. However, tether breakage can occur leading to loss of correction. Recently, a patient in our cohort experienced a breakage at L2 level (in <1 year postoperation). Despite the high strength of the tether, frequent breakages were reported at this location, which indicates that damage is occurring due to contact stresses associated with malalignment.

Methods: Finite element simulations of malalignments were performed using a 3D model included a tether and a screw head. Their geometry was defined according to a commercial scoliosis correction system. Three simulations were performed, each consisted of two subsequent loading steps; axial tensioning with a 450N force followed by an orthogonal malalignment of 1 mm, 2 mm, or 4 mm. The resulted stresses were analysed to estimate the damage on the tether's cross-section.

Results: The simulations showed that while tension force's effect was negligible, the contact stresses caused radial ruptures equivalent to 0.65 mm (16.5%), 1.42 mm (35.5%), and 2 mm (50%), respectively, of the tether body between 1 to 3 years.

Discussion and Conclusion: The malalignment associated with the clinical tether breakage was 6.5 mm. Based on our simulations, it can reflect significant damage on the tether body within a short time after the surgery. In conclusion, the malalignment of screws can cause significant contact stresses. The higher the stresses the further the damage reflected on the tether's body, which prompts the premature breakage of the tether.

FP7.11**A simple and effective method to assess sagittal alignment of the spine: a pilot study****Ogulcan Guldeniz, Jack Wei, Kenneth Man Chee Cheung***Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Sagittal alignment of the spine is a common measure for assessing the prognosis and various spinal interventions in adolescent idiopathic scoliosis (AIS). The implementation of 3D sensors (inertial measurement units, IMUs) in medical applications as a non-invasive measurement method such as gait and posture analysis has seen rapid growth. This pilot study evaluates the accuracy of IMUs in assessing the sagittal spinal alignment in AIS subjects.

Methods: AIS patients were recruited in a specialist clinic. Each patients' back was measured from suboccipital region to the buttock by using the IMU of a smartphone, and lateral standing whole spine radiographs were taken. Sagittal inflection point (SIP) angles in thoracolumbar (TL) and lumbosacral (LS) regions were calculated by processing the IMU measurements, and lumbar lordosis (LL) were calculated based on SIPs. These results were compared with the radiographic measurements and analysed. Data were processed using MATLAB R2020b.

Results: Five female patients were recruited. Our comparative analysis between IMU data and radiographic measurements demonstrated that the mean differences were 3.1 ± 3.4 and 9.3 ± 8.8 degrees for SIP angles in TL and LS regions, and 7.1 ± 7.2 degrees for LL, respectively.

Discussion and Conclusion: This study suggests the potential of smartphone-based IMUs for assessing the sagittal alignment of the spine. The possibility to use a simple hand-held device to measure sagittal parameters opens the possibility for large-scale population-based studies and screening for sagittal malalignment which was not previously possible due to the need for expensive radiographs.

FP7.12

Distribution of proprioceptive deficit in adolescent idiopathic scoliosis in Hong Kong: a preliminary analysis

Kenney Ki Lee Lau,¹ Kenny Kwan,¹ Jason Cheung,¹ Ogulcan Guldeniz,¹ Arnold Wong,² Daniel Chow³, Kenneth Man Chee Cheung¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Department of Rehabilitation Sciences, The Hong Kong Polytechnic University*

³*Department of Health and Physical Education, The Education University of Hong Kong*

No copyright transfer for abstract printing.

FP7.13

The “asymmetric screw sign” for magnetically controlled growing rods: a novel predictive factor for success of distraction

Douglas Wong, Wanis Nafo, Kenny YH Kwan, Jason PY Cheung, Kenneth MC Cheung

Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Ability to achieve magnetically controlled growing rod (MCGR) lengthening is vital for gradual spine distraction. However, both technical and mechanical factors are known to inhibit MCGR lengthening. Thus, this study aimed to identify radiological factors in the sagittal plane predicting the ability of MCGR to lengthen.

Methods: 34 patients were included, with standard and offset MCGRs assessed separately. Association of kyphosis, C7 plumb line, and ratio of screw asymmetry (RSA) with distraction rate (DR) were studied. Patients with DR above and below the median were classified as ‘lower’ and ‘higher’ DR, respectively.

Results: Magnitude of screw asymmetry was expressed as RSA, which when measured after initial distraction, was significantly correlated with DR among both standard ($r=0.563$, $p<0.001$) and offset MCGR ($r=0.523$, $p<0.001$). For prediction of lower DR using RSA, the area under curve of the receiver operating characteristic curve was 0.793 and 0.841 for standard and offset MCGRs, respectively. Using RSA cut-off of 0.9547, sensitivity and specificity were 72.7% for standard MCGRs; and 73.7% and 83.3%, respectively in offset MCGRs using a 0.9599 RSA cut-off.

Discussion and Conclusion: We are the first to identify the asymmetric screw sign, a novel radiological sign for the prediction of MCGR lengthening ability. By classification of patients into higher and lower DR groups, RSA can guide decision making in choosing the aggressiveness of distraction regimens, while informing patient expectations on the predicted spine distraction achieved. Moreover, a prospective longitudinal study is planned to evaluate the utility of the asymmetric screw sign.

FP7.14**A validated capsule network to predict curve progression in adolescent idiopathic scoliosis based on posteroanterior X-rays at first visit****Hongfei Wang, Teng Zhang, Kenneth Man Chee Cheung, Graham Ka Hon Shea***Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Early curve progression risk prediction is essential for the management of adolescent idiopathic scoliosis (AIS). Prior studies have revealed potential predictive value of 3D morphological parameters for curve progression, but acquisition of parameters rely on specialised biplanar imaging equipment and time-consuming reconstruction. This study aimed to formulate a deep learning model with standing posteroanterior (PA) X-rays as input in the distinguishment of progressive group (P) and non-progressive group (NP) at first clinical visit.

Methods: This is a retrospective study consisting of a training cross-validation cohort (328 AIS patients), an independent testing cohort (110 AIS patients) utilising EOS images and a cross-platform validation cohort (52 AIS patients) upon standard standing PA X-ray projections.

Results: The predictive model achieved an accuracy of 76.4%, a sensitivity of 74.5% and a specificity of 80% on independent testing cohort (110 cases, 55 P and 55 NP). The model cross-platform validation (52 cases, 24 P and 28 NP) upon standard standing PA X-ray projections achieved an accuracy of 76.9%, a sensitivity of 70.8% and a specificity of 82.1%.

Discussion and Conclusion: This is the first attempt at automated prediction of AIS curve progression based on radiomics and deep learning, towards directing treatment strategy at first visit. The model takes PA X-rays as input at AIS patients first visit and classifies patients as P or NP subjects. It could help to recommend timely clinical decisions on bracing treatment for the potential progressive group and to avoid over treatment of the likely non-progressive patients.

FP7.15**Is spinal proprioception altered in adolescent idiopathic scoliosis?****Kenney Ki Lee Lau,¹ Kenny Kwan,¹ Jason Cheung,¹ Ogulcan Guldeniz,¹ Arnold Wong,² Daniel Chow,³ Kenneth Man Chee Cheung¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Department of Rehabilitation Sciences, The Hong Kong Polytechnic University*³*Department of Health and Physical Education, The Education University of Hong Kong*

No copyright transfer for abstract printing.

FP7.16

Validity of a handheld spine scanner for measuring adolescent idiopathic scoliosis: a cross-sectional study

Jack Zijian Wei,¹ Berry KC Cheung,² Sunny LH Chu,² Parker YL Tsang,² Johnson YL Lau,² Kenneth MC Cheung¹

¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*

²*Avalon SpineCare (HK) Ltd, Hong Kong*

Introduction: Radiographic assessment is the gold standard for the diagnosis and prognosis of adolescent idiopathic scoliosis (AIS), while radiation exposure remains a major concern. SpineScan3D is a handheld smartphone-based surface profiling tool proven as a reliable tool for assessing back topography. This study aimed to evaluate the validity of SpineScan3D measurement compared with radiographic Cobb measurement.

Methods: AIS patients were recruited at a specialist clinic. Routine bi-planar standing spine radiographs were taken with coronal Cobb angle (CA), thoracic kyphosis (TK) and lumbar lordosis (LL) measured on digitised films. Patients' back was measured at upright standing posture using SpineScan3D with changes in back shape recorded as a "tilt" angle (TA).

Results: 208 patients were recruited (mean age: 14 years, female: 149, male: 59, mean BMI: 18 kg/m²). Overall, axial TA were found to significantly correlate with CA ($r=0.35$, $p<0.05$). Multivariate analysis showed a stronger correlation in female, older, normal-weight subjects with major thoracic curves ($r=0.68$, $p<0.05$). Sagittal analysis showed a good correlation between SpineScan3D and radiographic measurements in subjects with major thoracolumbar/lumbar curves (TK: $r=0.40$, $p<0.05$; LL: $r=0.25$, $p<0.05$).

Discussion and Conclusion: SpineScan3D is a portable device with a low manufacturing cost and thus a potential for widespread adoption within the community. This study demonstrated the validity of SpineScan3D for assessing scoliosis in axial and sagittal planes compared with radiographic measurement. Further studies are needed to refine the accuracy in a larger sample.

FP7.17

Proprioceptive deficit in degenerative cervical myelopathy

Karlen Ka Pui Law, Kenney Ki Lee Lau, Kenneth Man Chee Cheung

Department of Orthopaedics and Traumatology, The University of Hong Kong

Introduction: Degenerative cervical myelopathy (DCM) may alter the transmission of "proprioception" sense in the dorsal column of spinal cord. Proprioceptive deficit (PD) upsets motor coordination, with hand clumsiness and gait disturbance as characteristic features in DCM. This study is aimed to identify the clinical effects of sagittal cord compression on PD in DCM.

Methods: DCM older than 45, Nurick Scale ≤ 3 were recruited in 2 clustered hospitals. Cervical cord compression was confirmed with magnetic resonance imaging by orthopaedic surgeons. Controls should be free from myelopathic signs, abnormal reflexes and Modified Japanese Orthopaedic Association Score for Cervical myelopathy (mJOA) at 17/17. Subjects with extrapyramidal disorders and active lumbar disorder were excluded. The repositioning error (RE) in range of motion (ROM) of the neck, trunk, elbow, wrist, knee, and ankle were assessed by the 3-dimensional motion capture analysis system (VICON Nexus-1.8 Motion Analysis).

Results: Twenty-one DCM (15 male, 6 female) and four healthy controls (2 male, 2 female) were recruited. DCM and controls had mean ages of 57.90 years (SD 12.21) and 48.75 years (SD 9.18), respectively. The mean mJOA was 12.03 (SD 2.40). RE in DCM was ranged from 2.28 degrees (SD 2.48) to 8.85 degrees (SD 7.48). In the ANCOVA, significant differences in RE were found between DCM and controls in the core ($p=0.003$) and peripheral joints (upper extremity $p=0.033$; lower extremity $p=0.028$) confounding with the first symptom.

Discussion and Conclusion: DCM has a significant PD in both core and peripheral joints, which may contribute to the motor incoordination in activities of daily living.

FP7.18**Long segment versus short segment stabilisation in thoracolumbar spine fracture: a retrospective clinical and radiological analysis****Suk Ying Mak,¹ Yuk Chuen Siu,² Wai Wang Chau,¹ Cho Yau Lo,² Chun Man Ma²**¹*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*²*Department of Orthopaedics and Traumatology, North District Hospital*

Introduction: Surgical treatment of choice for thoracolumbar fracture is still controversial. This is a retrospective analysis of clinical and radiological outcome of long and short segment stabilisation.

Methods: Inclusion criteria included single level of thoracolumbar fracture, no pre-existing deformity and those treated with surgical stabilisation using posterior pedicle screw-based system. Clinical parameters to measure include operative time, intra-operative blood loss, postoperative length of stay and back pain using visual analogue scale. Radiological parameters were measured before and after the operation. They included wedge angle, anterior vertebral height ratio and posterior vertebral height ratio.

Results: From June 2007 to May 2020, 43 patients (male=28, female=15) were recruited. No statistical differences were found in the demographics between the two groups. For the clinical parameters, significantly less mean blood loss, shorter postoperative length of stay, and better VAS at 6 months were found in the short segment group. For radiographic measurements, both groups showed statistically significant improvement in all parameters across the time. Short segment group showed significantly better wedge angle at immediate and 3 months postoperative and better postoperative anterior vertebral height ratios. No significant differences were observed for the posterior vertebral height ratio. MIS in short segment group showed a significantly less blood loss than the open group. No statistically significant differences were seen in other parameters.

Discussion and Conclusion: Short segment group showed significantly superior results in both clinical and radiological parameters and could be the treatment of choice for thoracolumbar spine fractures.

Free Paper Session VIII: Foot and Ankle

FP8.1

Can 3-dimensional printed anatomical models assist in surgical treatment for trimalleolar fracture? A case cohort comparison on early postoperative outcomes

Ka Ming Ng,¹ Alex Ching Lik Hui,² Kevin Ki Wai Ho³

¹*Department of Prosthetics and Orthotics, United Christian Hospital*

²*Department of Orthopaedics and Traumatology, United Christian Hospital*

³*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: The objective of the present research was to evaluate the effectiveness of 3-dimensional (3D) printed anatomical models in surgical treatment for trimalleolar fracture.

Methods: A retrospective case cohort comparison was conducted. 40 patients who were admitted to United Christian Hospital between November 2019 and January 2021 with surgical treatment for trimalleolar fracture were selected. Patients were divided into 2 groups based on the application of anatomical model (3D printing group; n=14) or conventional treatment (conventional group; n=26). 3D printed anatomical model of fracture side and mirrored non-fracture side distal ankle were utilised for surgical planning, including fracture morphology visualisation, surgical rehearsal and pre-contouring of implant, in 3D printing group. Early postoperative outcomes, including operation time, blood loss volume, fixation methods, drainage volume, quality of reduction (Teeny and Wiss Score), functional outcome (Olerud and Molander Score), total length of stay, preoperative length of stay, and complication rate were compared between groups.

Results: Characteristics between groups were comparable. No significant difference in mean follow-up duration was found. Significantly lower drainage volume (37.27 ± 34.96 vs 65.67 ± 33.75 ml; $p=0.027$), higher posterior malleolus fixation rate (85.7% vs 30.8%; $p=0.003$), higher "anatomic" reduction rate (71.4% vs 34.6%; $p=0.026$) and lower complication rate (0.0% vs 26.9%; $p=0.035$) were observed in 3D printing group.

Conclusion: Based on the data found, 3D printing group demonstrated higher posterior malleolus fixation rate, higher "anatomic" reduction rate and lower complication rate. 3D printed anatomical model potentially associated with more efficient surgical treatment for trimalleolar fracture.

FP8.2

Radiological and clinical effectiveness of a Mini TightRope system in hallux valgus surgery

Oliver Ting See Ho,¹ Patrick Shu Hang Yung,² Samuel Ka Kin Ling²

¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

FP8.3**Cross-cultural adaptation, reliability and validity of the Cantonese-Chinese version of the Cumberland Ankle Instability Tool (CAIT-HK)**

Jasmine Yat Ning Hui,¹ Vivian Wai Ting Chui,¹ Anson Hei Ka Tong,¹ Daniel Tik Pui Fong,² Wai Wang Chau,¹ Patrick Shu Hang Yung,¹ Samuel Ka Kin Ling¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Sport, Exercise and Health Sciences, National Centre for Sport and Exercise Medicine, Loughborough University, United Kingdom*

Introduction: This study aimed to translate, cross-culturally adapt and validate the Cumberland Ankle Instability Tool (CAIT) to Cantonese-Chinese for the Hong Kong population to identify chronic ankle instability (CAI).

Methods: The CAIT was cross-culturally adapted into Cantonese-Chinese following internationally accepted guidelines. It was renamed the Cumberland Ankle Instability Tool-Hong Kong (CAIT-HK). 46 dancers who were native Cantonese speakers completed the CAIT-HK. The questionnaire was assessed for internal consistency, test-retest reliability and validity. It was validated against the Foot and Ankle Outcome score (FAOS). A cut-off score was determined.

Results: For internal consistency, CAIT-HK showed a Cronbach's α value of 0.726. For test-retest reliability, intraclass correlation coefficient was 0.874. Construct validity against the FAOS was significant. A cut-off score of 20.5 (sensitivity: 0.90, specificity: 0.86, Youden's index: 76.1) was determined to differentiate stable from unstable ankle.

Discussion and Conclusion: The original English CAIT was successfully translated, cross-culturally adapted and validated into Cantonese-Chinese. CAIT-HK may be a useful tool for assessing CAI in individuals in Hong Kong.

FP8.4**Prevalence of ankle instability in performers of Chinese dance**

Vivian Wai Ting Chui,¹ Anson Hei Ka Tong,¹ Jasmine Yat Ning Hui,¹ Heidi Hiu Tung Yu,² Patrick Shu Hang Yung,¹ Samuel Ka Kin Ling¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*School of Dance, Hong Kong Academy of Performing Arts*

Introduction: Chinese dance is a major genre of dance, rich in history and culture. Foot and ankle injuries are commonly seen in dancers, yet limited studies exist on the injury prevalence of performers of Chinese dance. This study aimed to determine and assess the prevalence of chronic ankle instability (CAI) in Chinese dancers in Hong Kong, using self-reported assessment tools.

Methods: This was a cross-sectional study of 105 Chinese dancers. Chronic ankle instability was assessed using the Cumberland Ankle Instability Tool (CAIT-HK) and foot function via the Foot and Ankle Outcome Score (FAOS). Both self-reported assessment tools were included in an online questionnaire that was distributed between January and February 2021. Descriptive statistical analysis was then conducted for subjects with and without CAI.

Results: CAI was seen in 29/105 of Chinese dancers, with most being unilateral instability. The number of training hours, level of expertise, occupation, gender and age showed no statistically significant relationships with ankle instability. FAOS showed that for subjects with CAI, quality of life and pain subscales were the most impacted compared to their healthy counterparts.

Discussion and Conclusion: Chronic ankle instability is a major problem affecting 28% of performers of Chinese dance. Future research should investigate the specific risk factors for CAI to formulate strategies to prevent ankle injuries in Chinese dancers.

FP8.5

Anthropologic computed tomography investigation on the site and severity of the rotational deformity in hallux valgus

Rachel Xiao Yu Wei, Elvis Chui, Patrick Shu Hang Yung, Samuel Ka Kin Ling

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Solely looking at the transverse plane deformity in hallux valgus fails to account for the entire deformity as the evidence supports a multiplanar deformity. It remains unknown whether the rotation occurs in the tarsal-metatarsal joint, within the metatarsal bone as bony torsion or distally at the metatarsal-phalangeal joint. Additionally, it is important to know whether the severity of coronal rotation directly correlates with transverse deformities and whether the coronal deformity affects foot-related function.

Methods: The scans were performed using Xtreme CT II and data were imported into Mimics and 3-Matic for analysis. The landmarks were determined on the medium cuneiform and first MT. Lines were connected accordingly and angles between them presented the rotation at TMTJ and torsion within first MT. FAOS questionnaire was used to evaluate the foot-related functions.

Results: The current study recruited 17 patients (23 feet) with HV and 16 control subjects. TMT joint rotation was found significantly different between two groups, while no difference was found in the first MT torsion. Neither TMT joint rotation nor MT torsion of HV patients exhibited significant relation with IMA or HVA. Only TMT joint rotation angle was found significantly correlated with quality of life.

Discussion and Conclusion: The coronal deformity in HV originates from TMT joint rotation. TMT joint procedures may be more appropriate. It also shows that TMT joint rotation develops independently to the transverse plane deformity, and severity of TMT joint rotation correlates with worse quality of life, regardless of IMA or HVA.

FP8.6

Case series on the efficacy of a synthetic cartilage implant for the treatment of hallux rigidus

Ashley Ying Ying Wong, Patrick Shu Hang Yung, Samuel Ka Kin Ling

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Hallux rigidus is the degeneration of the first metatarsalphalangeal joint resulting in pain and stiffness. After failed conservative management, the mainstay is operative management for pain management. Joint-sacrificing arthrodesis was considered the gold standard. Joint-sparing operations have shown success lately; including cheilectomy, osteotomy, and newer options like implants. There is a lack of studies in the use of artificial implants, especially in our locality.

Methods: Patients who underwent synthetic cartilage implant in Prince of Wales Hospital between January 2019 and June 2021 were retrospectively recruited. They completed the Foot and Ankle Outcome Score (FAOS), before and 3 months after the operation. The Hattrup and Johnson (H&J) Classification was used to classify the hallux rigidus.

Results: Four patients were recruited, three with H&J grade 2 and one grade 1. There was an increase in the mean of the FAOS in all five domains, however not statistically significant. The mean score of the pain domain increased from 56.9 to 64.6 ($p=0.269$), symptoms from 47.3 to 58.0 ($p=0.273$), ADL from 70.53 to 77.95 ($p=0.273$), sports from 38.8 to 52.5 ($p=0.197$), and QoL from 37.5 to 57.8 ($p=0.066$).

Discussion and Conclusion: The increase in the scores over all five domains is promising, although not statistically significant. In view of our small sample size, the strength will be limited. Thus, this small-scale study provides an encouraging pathway for further studies as the use of artificial implants is still rapidly developing.

FP8.7**The morphological differences of intrinsic foot muscles in runners with plantar fasciitis—a pilot study**

Fannie On Yue Lau, Daniel Tik Pui Fong, Patrick Shu Hang Yung, Samuel Ka Kin Ling
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

No copyright transfer for abstract printing.

FP8.8**Cross-cultural adaptation of Chinese Victorian Institute of Sports Assessment—Achilles questionnaire for Achilles tendinopathy**

Violet Man Chi Ko, Ngo Nam Lau, Rachel Xiao Yu Wei, Ji Hong Qiu, Daniel Tik Pui Fong, Sai Chuen Fu, Patrick Shu Hang Yung, Samuel Ka Kin Ling
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Achilles tendinopathy is a common overuse musculoskeletal condition. The Victorian Institute of Sports Assessment (VISA-A) is a patient-reported outcome for assessing symptom severity in patients with Achilles tendinopathy. It is a valid and reliable tool that has been used widely for measuring and monitoring treatment outcomes for Achilles tendinopathy. The results of VISA-A range between 0 and 100 points. The overall study objective is to adapt the VISA-A questionnaire cross-culturally and assess its reliability for Chinese-speaking individuals.

Methods: VISA-A was translated and adapted cross-culturally according to international guidelines for self-reported questionnaires. The orthopaedic surgeon, physiotherapist, and professional translator performed the five steps in creating Chinese VISA-A, including translation, synthesis, reverse translation, review, and pretesting. Healthy individuals (n=16), recreational athletes (n=14), and patients with Achilles tendinopathy (n=3) were recruited to assess the psychometric properties of Chinese VISA-A. All participants completed Chinese VISA-A twice.

Results: The mean Chinese VISA-A score in patients with Achilles tendinopathy was 69 (95% confidence interval (95% CI)=52-86). It was significantly lower than the healthy control score of 96 (95% CI=93-99). The overall test-retest reliability of Chinese VISA-A was good (ICC=0.90).

Discussion and Conclusion: Chinese VISA-A demonstrates good reliability for measuring symptom severity in patients with Achilles tendinopathy. Chinese VISA-A can assess Chinese-speaking patients with Achilles tendinopathy, both in research and clinical setting.

FP8.9

Foot pronation is not associated with the radiographic severity of knee degeneration and knee function in an elderly population from the MusFit Cohort

Cheuk Kin Kwan,¹ Sai Chuen Fu,¹ Michael Tim Yun Ong,¹ Samuel Ka Kin Ling,¹ Kevin Ki Wai Ho,¹ Jojo Jiao Jiao,² Bik Chu Chow,² Lobo Hung Tak Louie,² Sally Siu Yin Cheung,² Patrick Shu Hang Yung¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Sports, Physical Education and Health, Hong Kong Baptist University*

Introduction: Foot posture have been proposed to be associated with knee osteoarthritis, as altered lower limb alignment could lead to uneven distribution of force. Previous studies have documented attempts to include foot posture correction in the conservative management plan for knee osteoarthritis. However, results were controversial. In this study, the association between foot posture and knee osteoarthritis was investigated.

Methods: Forty-six elderly participants with mean age of 69.2 years were invited from a health-promotion programme (MusFit cohort) for assessment. Foot posture index (FPI) was calculated for both feet, which a cut-off of >5 either foot was adapted for classification of foot pronation. Kellgren and Lawrence (KL) grading was used to assess radiographic severity of degeneration, while Knee injury and Osteoarthritis Outcome Score (KOOS) was performed to assess for function. Fisher exact test was performed to investigate the association between presence of foot pronation with radiological severity of knee degeneration and function.

Results: Thirty out of 46 participants presented with foot pronation. Foot pronation was not associated with high KL grade of 3 or 4 ($p=0.789$). There was no significance difference between functional score of pain ($p=0.916$), symptoms ($p=0.895$), ADL ($p=0.531$), sports ($p=0.292$), and QOL ($p=0.124$) between participants with and without foot pronation.

Discussion and Conclusion: Foot pronation was commonly observed. However, existence of foot pronation was not associated with radiological severity, nor functional condition of knee osteoarthritis. This study supports that correction of foot pronation may not be an effective method in the conservative management strategy of knee osteoarthritis.

Free Paper Session IX: Hand and Microsurgery

FP9.1

Ambulatory upper limb tendon surgery by wide-awake local anaesthesia no tourniquet technique under COVID-19 pandemic

Wing Tak Yung, Emily Ka Yan Yip

Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Many orthopaedic surgeries were suspended under the COVID-19 pandemic. In particular, patients with upper limb tendon problems were often placed at lower priority in the waiting list. Traditionally tendon surgeries were performed under general anaesthesia or regional nerve blocks. In recent years, avocation of wide-awake local anaesthesia no tourniquet (WALANT) technique was made at terminal digits has been proven safe. Limiting the need of aerosol generating procedure during intubation under general anaesthesia, reducing the length of hospital stay by performing under ambulatory setting made WALANT technique particularly valuable under this pandemic. The aim of this study was to evaluate the applicability and benefits of upper limb tendon surgeries using WALANT technique in our locality.

Methods: This was a retrospective case series on upper limb tendon surgeries using WALANT technique from September 2020 to June 2021 in NTWC. Operation details, patients' pain perception, satisfaction and surgeons' evaluation were recorded.

Results: Sixteen patients underwent upper limb tendon operations using WALANT technique. The average operation time was 91.2 minutes. The average amount of local anaesthesia required was 9.1 ml (range 3.6-20). The average numeric rating scale of pain by patients during local anaesthesia injection was 3.2, there was no pain during the procedures. Surgeons reported superiority about WALANT technique including secure tendon repair, adequate tenolysis, and titration for additional tendon procedures.

Discussion and Conclusion: These cases demonstrated upper limb tendon surgeries could be done

FP9.2

Arthroscopic partial trapeziectomy with suture button suspensionplasty (Mini TightRope) for thumb carpometacarpal osteoarthritis: a retrospective review of intermediate term outcomes

Karen Ka Man Ng,¹ Lawrence Chun Man Lau,² Pak Cheong Ho,² Jeffrey Justin Siu Cheong Koo,¹ Wing Lim Tse,² Michael Chu Kay Mak,² Fiona Wai Ping Yu³

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*

Introduction: Arthroscopic partial trapeziectomy with suture button suspensionplasty (Mini TightRope) is an emerging minimally invasive option to manage thumb carpometacarpal osteoarthritis (CMCJ OA). In this study we describe its intermediate-term outcomes in a series of Hong Kong patients.

Methods: Patients with symptomatic thumb CMCJ OA who failed conservative management and subsequently operated from 2015 to 2019 were reviewed. Functional outcomes, including VAS pain score, grip strength, pinch strength, QuickDASH score and radiological subsidence were evaluated.

Results: 23 operations were performed in 8 male and 13 female patients, with median age at 64 years old (range 47-75). 52.2% involved the dominant hand. Median symptom duration was 34.5 months. Majority were of Eaton stage III (II: 4, III: 18, IV: 1). Operation was performed under local anaesthesia in 11 cases (48%) and regional anaesthesia in 8 cases without tourniquet. Arthroscopic partial trapeziectomy of 3-4 mm was performed at the 1R and 1U portals. Mini TightRope was inserted from base of 1st metacarpal to proximal third of second metacarpal. K wire was used in 9 cases. Mean operation time was 141.3 minutes. Median follow-up duration was 39.6 months. All patients had no resting pain. Mean improvement in grip strength, pinch strength and QuickDASH score were 57.5%, 66.3% and 54.5%, respectively. However, radiological outcomes were not significant. Two complications occurred requiring operation for nerve repair and removal of endobutton due to impingement.

Conclusion: Arthroscopic partial trapeziectomy with Mini TightRope resulted in intermediate-term improvement in functional outcomes and served as a reliable treatment for thumb CMCJ OA.

FP9.3

Clinical and radiological outcome of osteoscopic-assisted treatment of enchondroma in hand with artificial bone substitute or bone graft: a 7-year case series and literature review

Bernard Wai Tat Yung,¹ Jeffrey Justin Siu Cheong Koo,¹ Michael Chu Kay Mak,² Fiona Wai Ping Yu,³ Wing Lim Tse,² Pak Cheong Ho²

¹Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital

²Department of Orthopaedics and Traumatology, Prince of Wales Hospital

³Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: The addition of osteoscopy to the surgery can allow direct visualisation of the bone cavity during and after curettage of the tumour without excessive damage to the bone cortex, which could potentially lead to a better clearance of tumour tissue and a lower rate of recurrence.

Methods: The study data were retrieved retrospectively from the Clinical Management System of Hospital Authority. Eleven patients who received surgery from December 2013 to November 2020 in either PWH or AHNH were included in this study. The duration of follow-up ranged from 3 to 65 months, with a mean of 20.9 months.

Results: The total active motion (TAM) of patients ranged from 220 to 280, with a mean of 257. The percentage of TAM compared to the contralateral side ranged from 81.5% to 100%, with a mean of 94.4%. The percentage of grip strength compared with the contralateral side ranged from 62% to 100%, with a mean of 86.2%. The QuickDASH score of patients ranged from 0 to 46.9, with a mean of 7.7. For the wound aesthetic rating, nine out of eleven patients reported as excellent. For the radiological outcome, the postoperative X-ray of all patients showed bone filling defect <3 mm, which belonged to Group 1 in the evaluation system proposed by Tordai et al (1990). None of the patients showed any radiological signs of recurrence.

Discussion and Conclusion: Our study showed that patients with enchondromas in hand treated with this minimal invasive method demonstrated good functional and radiological outcome.

FP9.4

Outcome of cement-less self-locking replacement arthroplasty of proximal interphalangeal joint for treatment of osteoarthritis, inflammatory arthritis, and posttraumatic arthritis

Gloria Sze Chung Leung, Emily Ka Yan Yip

Department of Orthopaedics and Traumatology, Tuen Mun Hospital

Introduction: Proximal interphalangeal joint (PIPJ) arthritis results in pain and functional limitation in daily life. Surface replacement implants have gained popularity in the past decade but there is a lack of local data. This study aimed to evaluate the outcome of cement-less self-locking surface replacement arthroplasty for PIPJ arthritis using the Nakashima implant (Self Locking Finger Joint, Nakashima Propeller Inc., Okayama, Japan) in our cluster.

Methods: This is a mid-term retrospective analysis on the outcome of 9 patients who received PIPJ arthroplasty with Nakashima implant from 2016 to 2020. Subjective results including DASH score, VAS of pain, and satisfaction were based upon a questionnaire. Objective results including range of motion, pinch and grip power were measured. Radiological result was also assessed.

Results: The average follow-up time was 27 months. 5 patients underwent arthroplasty by volar approach and 4 by dorsal approach. 67% of patients reported improvement in pain of affected PIPJ after arthroplasty. The average PIP joint arc of motion (AOM) improved from 34° before surgery to 46° after surgery. The median of gain in AOM at the latest follow-up is 5° (IQR: -35 to 20) for the volar approach and 40° (IQR: -30 to 75) for the dorsal approach (p=0.221). None exhibited loosening on X-ray. Postoperative complications including subluxation and wound infection occurred in 2 patients. 3 patients required a second operation of tenolysis.

Discussion and Conclusion: Cement-less self-locking surface replacement arthroplasty is a feasible option that improves pain and preserves range of motion for patients with PIPJ arthritis.

FP9.5

Functional outcome of heterodigital neurovascular island flap for reconstruction of finger and thumb defects

Ka Wai Cheng, Esther Ching San Chow

Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Soft tissue defects in fingers and thumbs can be challenging. It is crucial to achieve a stable, mobile and sensate digits with adequate soft tissue coverage. The purpose of this study was to investigate the functional outcome of heterodigital neurovascular island flap in the reconstruction of finger and thumb defects.

Methods: From 2014 to 2020, heterodigital neurovascular flap was performed in 9 patients with thumb or finger defects. The patient history, surgical details, functional outcomes and complications were retrieved from case notes.

Results: There were 8 male and 1 female patients. The causes of wound defects included 6 trauma, 2 infection and 1 burn. The affected sites included four thumbs, one index finger, two middle fingers, one ring finger and one little finger. Donor sites included six middle fingers and three ring fingers. The average flap size was 6 cm². The average operation time was 222 minutes. Complete flap survival was achieved in all cases. The sensation of the flap was satisfactory with average monofilament score of 3.67, with no cold intolerance but one case of mild hypersensitivity. The donor fingers had no cold intolerance or hypersensitivity. There were 2 donor fingers with mild fixed flexion contracture at the proximal interphalangeal joint (15 degrees). The patients return to work at an average of 24.75 weeks.

Discussion and Conclusion: Use of heterodigital neurovascular island flap in the reconstruction of finger and thumb defects can be considered as a useful and reliable method to restore normal hand function.

FP9.6

Mid- to long-term radiological outcome of self-locking finger joint in proximal interphalangeal joint arthroplasty using a novel radiological classification system

Cham Kit Wong,¹ Pak Cheong Ho,¹ Wai Wang Chau,² Wing Lim Tse,¹ Michael Chu Kay Mak,¹ Fiona Wai Ping Yu²

¹Department of Orthopaedics and Traumatology, Prince of Wales Hospital

²Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Self-locking finger joint (SLFJ) implant is a relatively new metal implant for proximal interphalangeal joint (PIPJ) arthroplasty with unique surface replacement and double-locking mechanism design developed since 1999. Unlike knee and hip arthroplasties, radiological grading system is lacking. Our study aimed to develop a new radiological classification system for SLFJ PIPJ arthroplasty and to evaluate the mid-to-long term outcomes.

Methods: Patients with PIPJ mono- or oligo-arthritis without tendon reconstruction were recruited. A total of 15 SLFJ PIPJ arthroplasties on 14 patients with mean age of 48.9 years (range 37-70) performed between 2008 and 2018 were reviewed. Subsidence is measured as the difference of radiological distance from implant tips to articular surfaces at early and latest follow-up. Bone resorption pattern was observed over 5 zones around the implant at both coronal (namely CP1-5 and CM1-5) and sagittal planes (namely SP1-5 and SM1-5). Bone resorption index from 0-3 is assigned to grade the severity.

Results: Mean follow-up was 80.7 months (range 18-151). Intra-observer reliability (ICC) was 0.791 and inter-observer reliability (Cronbach's alpha) was 0.668. Mean subsidence of PP and MP were both 0.1 mm (-0.5 to 0.8 and -0.5 to 0.9 respectively). Lateral approach is correlated with least subsidence. Most resorptions were noted at the peripheral zones (CP5, SP5, CM1&5, SM1&5). There was no loosening in central pegs. One case with two finger PIPJ arthroplasties had implant breakage and migration requiring revision PIPJ fusion.

Discussion and Conclusion: This novel radiological classification has good inter- and intra-observer reliability which enhances communication and documentation. SLFJ implant provides good mid-to-long term radiological outcome on implant durability and stability.

FP9.7**Properly addressing the volar lunate facet rim fragment in distal radius fracture can significantly minimise the complication rate and improve the outcome****Jeffrey Justin Siu Cheong Koo,¹ Wai Wang Chau,² Pak Cheong Ho²**¹*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*²*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Distal radius fracture with volar lunate facet involvement is challenging to treat as volar carpal subluxation can occur if the volar lunate facet rim fragment is not properly addressed. This study aimed to review the clinical and radiological outcome after surgical treatment for distal radius volar lunate facet rim fracture.

Methods: Between October 2018 and November 2020, 13 wrists in 12 patients (average age: 47.8 years, range 18-71) who had distal radius volar lunate facet rim fracture were recruited into the retrospective study. Open reduction and internal fixation using specially designed volar distal radius locking plates were performed in all cases. Clinical and radiological outcomes were evaluated.

Results: There were six B3 fractures and three C2 fractures and four C3 fractures. The mean follow-up time was 14.5 months (range 6-29). We observed wrist flexion range restoration was not as good as other ranges of motion. Grip strength could achieve 94.2% of contralateral side. Mean Modified Mayo Wrist score and mean Quick DASH score were 80.4 and 6.72, respectively. There was no loss of fixation for the critical volar lunate facet rim fragment and no volar carpal subluxation. There was no iatrogenic tendon rupture and no symptoms of flexor tendon irritation in our patients. Only 1 symptom-free patient had implant removal because of his own request.

Conclusions: With properly assessing the presence of volar rim fragment and addressing it during operative treatment, risk of reduction loss and subsequent disabling volar carpal subluxation can be minimised.

FP9.8**Hypoplastic thumb reconstruction with free longitudinal hemi-metatarsal graft: long-term outcome of minimal 10 years of follow-up****Michael Chu Kay Mak,¹ Pak Cheong Ho,¹ Kar Wai Wong,² Wing Lim Tse,¹ Leung Kim Hung²**¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Treatment of Blauth's type IIIb and IV hypoplastic thumb by pollicisation is culturally unfavourable in Chinese population. Digit preservation is often preferred. We presented the long-term outcome of an original technique of free longitudinal hemi-metatarsal transfer with minimal 10 years of follow-up.

Methods: Between 1997 and 2010, 11 patients with 13 Blauth IIIb, C or IV hypoplastic thumbs received hemi-metatarsal graft transfer including distal hemi-epiphysis at mean age of 18 months (range 10-23). Seven were isolated anomalies and 6 with radial deficiency. Graft was harvested from second or third metatarsal by splitting into longitudinal halves and transferred to the recipient hand to bridge the hypoplastic metacarpal and carpal bone. First web reconstruction utilised local skin flap, and motor reconstruction by Huber opponenplasty and extensor indicis transfer at same surgery (7) or in stage (6).

Results: Mean follow-up was 16.5 years (range 10.2-24.2). Thumb CMCJ was stable and mobile in all. Opposition was effective in 10 (76.9%). Grip and pinch power were 65.8% and 23.8% of opposite side, respectively. Seven patients used their thumb in daily life (53.8%). All patients had normal walking and toe motion. Toe shortening was nil in 7, mild in 3 and obvious in 3. Radiologically mean first to second metacarpal ratio was 69.6%. One CMCJ was fused and no subluxation was noted.

Discussion and Conclusion: At 16.5 years of mean follow-up, free hemi-metatarsal transfer achieved growth & function in most cases with minimal donor site morbidity. However daily use of thumb was limited likely due to concomitant conditions.

FP9.9

Change of functional task kinematics after first carpometacarpal joint arthrodesis

Pui Man Chung,¹ Esther Ching San Chow,¹ Shu Kei Cheng²

¹*Department of Orthopaedics and Traumatology, United Christian Hospital*

²*Department of Rehabilitation Sciences, The Hong Kong Polytechnic University*

Introduction: The complex motion of the first carpometacarpal joint (CMCJ) makes conventional 2-dimensional range of motion measurements suboptimal and difficult to interpret. It is also commonly believed that first CMCJ arthrodesis will result in impairment of functional performance of the thumb. Our study aimed to provide further insight on post-arthrodesis 3-dimensional first CMCJ motion and outcome in terms of functional performance and pinch strength.

Methods: Ten patients (11 thumbs) who received arthroscopic first CMCJ arthrodesis and 11 control subjects were recruited for assessment. The first CMCJ motion was assessed using a marker-based VICON motion capture system. Maximal workspace of the first CMCJ was generated from a combination of thumb movements. Six functional tasks that simulated daily activities were performed and the maximal radial and palmar abduction of the first CMCJ were captured. The pinch strength of the two groups was assessed.

Results: A new dome-like model has been developed and utilised to measure the first CMCJ motion. Statistically significant reductions were found in both volume and area in the arthrodesis group and control group. The maximal palmar abduction and maximal radial abduction in performing six functional tasks showed no difference between the two groups. Lateral Pinch strength showed no statistically significant difference between the two groups ($p=0.583$).

Conclusion: The new dome-like model provides a more accurate illustration of the first CMCJ motion. Patients who underwent first CMCJ arthroscopic arthrodesis showed no difference in performing functional tasks when compared to the control group. Pinch strength was also similar between two groups.

FP9.10**Relative motion splint can improve the proximal interphalangeal joint extension range in finger proximal phalangeal fracture****Charles Cheuk Sang Lam,¹ Jeffrey Justin Siu Cheong Koo,² Adrian Kam Yiu Leung,¹ Wai Wang Chau,³ Pak Cheong Ho³**¹*Department of Occupational Therapy, Alice Ho Miu Ling Nethersole Hospital*²*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*³*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Proximal interphalangeal joint (PIPJ) extension lag is a common complication after treatment for proximal phalanx fracture. Relative motion splint has been widely used in extensor tendon laceration especially in Boutonniere deformity. However, this splint has never been used in proximal phalanx fracture management to improve extension lag. This is the first study comparing the clinical outcome of finger phalangeal fracture treated by open reduction and internal fixation with or without using relative motion splint.

Methods: From April 2016 to November 2020, retrospective cohort study was performed in 13 fingers using the splint and 10 fingers without. They received same rehabilitation regime except relative motion splint usage. Range of motion and grip strength were measured at 3 weeks, 6 weeks, 6 months and 1 year. Upon last follow-up, Belsky score together with contralateral side grip strength and corresponding finger's range of motion were also measured to assess the overall recovery.

Results: Patients were followed up for 18.8 months on average (range 6-52). The demographic data showed no statistical difference between two groups. The relative motion splint group had statistically significant improvement in PIPJ extension lag. The effect appeared from sixth week of treatment and long-lasting even after discontinuing splint usage. Patients in younger age-groups (<50 years), dominant hand injury in non-job-related accidents as well as treatment with lateral plating had better outcomes in our study.

Conclusions: Relative motion splint is a potential solution in finger proximal phalanx fracture PIPJ extension lag complication.

FP9.11

Use of modified Masquelet technique for staged reconstruction in hand injury and infection: a case series

Douglas See Lok Ho, Esther Ching San Chow

Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Management and reconstruction of bone loss due to injury and infection in the hand region is always a challenge. The use of modified Masquelet technique to induce a pseudo-membrane can enhance bone graft survival and provide a neo-capsule for joint reconstruction. Nonetheless, there are limited published studies regarding this topic. The aim of this study is to review the results of such technique.

Methods: From 2018 to 2020, cases with hand injury or infection associated with bone defects that were treated by modified Masquelet technique were reviewed. The clinical details were retrieved from case notes. The objective outcomes including range of motion and grip strength were assessed. The subjective outcomes were assessed by pain score and Michigan hand questionnaire. The radiological outcomes were assessed.

Results: Four cases received modified Masquelet technique for staged reconstruction were reviewed. The location of bone defects included: distal phalanx (n=2); proximal phalanx (n=1) and metacarpal (n=1). The bone defect volume ranged from 100 to 400 mm³. All cases achieved bone union with average bone graft healing at 11.33 weeks. There was no bone graft resorption. There was no case of recurrent infection. The functional outcome was good to excellent for all cases.

Discussion and Conclusion: The modified Masquelet technique is an innovative option for treating bone defects in hand. Yet, it is a simple and feasible option. It could provide immediate stability for facilitating early mobilisation, as well as achieving high success bony union rate and good functional outcome in the long-term.

FP9.12

A radiographic index of radial bowing for predicting loss of forearm rotation

Michael Chu Kay Mak, Lucci Liyeung, Alec Lik Hang Hung, Roseanne Huang, Pak Cheong Ho

Department of Orthopaedics and Traumatology, Prince of Wales Hospital

Introduction: Loss of the anatomical bowing of the radius can lead to reduced forearm rotation. The traditional method of measuring bowing only accounts for coronal malalignment on an AP radiograph; however, changes in the lateral plane can also lead to rotational restriction despite an apparently normal AP view. A radiographic index of radial bowing is needed to ensure adequate reduction in forearm fractures and malunions.

Methods: Radiographs of all patients ≥ 6 years with forearm fractures in our hospital in 2018-2020 were reviewed. On AP and lateral radiographs of the forearm, the maximal perpendicular distance between the forearm axis (a line from the ulna fovea to the joint centre of the radial head) and the radius was measured and divided by the axial length to yield an index of radial bowing. Radiographs of patients with a reduced pronation-supination motion were compared with those with full motion to detect any difference in the radial bow index. The lower limit of this index before pronation is reduced is determined by a 3D computer model established from normal CT scans. The curvatures of the radii were reduced until osseous impingement occurred, correlated with. Corresponding radial bow index in orthogonal views was determined.

Results: Among the 42 patients who completed follow-up, 4 had decreased pronation. There was a significant difference in radial bow index (3.2% vs 9.1%), and all of the malunited radii showed a reversed relationship with the forearm axis. A bow index of <5% causes decreased pronation.

Free Paper Session X: Sports Medicine

FP10.1

Comparison of clinical results in patients undergoing mini-open subpectoral biceps tenodesis versus tenotomy in arthroscopic shoulder surgery

Nga Ping Tang, Sammy Nin Tai Mak

Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Biceps tenotomy and tenodesis are two common options in managing biceps pathology. We aim at comparing clinical results in biceps tenotomy patients and mini-open subpectoral biceps tenodesis patients in our centre.

Methods: Patients underwent either biceps tenotomy or tenodesis from February 2019 to October 2020 were reviewed. The clinical outcomes at postoperative 3 months, 6 months and 1 year were reviewed. The parameters were American Shoulder and Elbow Surgeons (ASES) score, pain visual analogue score (VAS) and presence of Popeye sign.

Results: A total of 43 patients were included in this study. 22 Patients, 17 males and 5 females underwent tenodesis. The mean age (\pm SD) of tenodesis group was 60.1 ± 7.63 years old. 21 Patients, 5 males and 16 females underwent tenotomy. The mean age (\pm SD) of tenotomy group was 70.7 ± 9 . VAS pain and ASES scores improved significantly ($p < 0.00001$) from pre- to post-operative time points for both groups, with a mean difference of 70% and 35%, respectively at 12 months for tenodesis group; and a mean difference of 76.5% and 45.8%, respectively at 12 months for tenotomy group. However, there was no significant difference in VAS or ASES between two groups. There was no Popeye deformity in tenodesis group, while there was one Popeye deformity in tenotomy group.

Discussion and Conclusion: In our centre, tenotomy and tenodesis for long head of biceps tendon pathology both result in good clinical outcomes but there is a higher rate of Popeye deformity in the tenotomy group.

FP10.2

The use of five-strand hamstring autograft to increase the graft size in anterior cruciate ligament reconstruction—an early experience in Kwong Wah Hospital

Keith Hay Man Wan, Christine Yuen Shan Lai, Stephen Pui Kit Tang, Richard Hin Lun Lee, Kevin Kwun Hung Wong, Kam Kwong Wong

Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Introduction: The conventional way of hamstring autograft for anterior cruciate ligament reconstruction involves doubling both the semitendinosus and gracilis tendons to create a 4-strand graft. Studies have shown that graft diameter of < 8 mm is associated with a higher risk of graft failure. Several techniques have been described to increase the size of the graft. 5-strand hamstring graft involves tripling the semitendinosus tendon and doubling the gracilis tendon. We hypothesised that the 5-strand hamstring graft would provide a graft with significantly larger diameter than the conventional 4-strand graft.

Methods: A retrospective review of all patients in our department with arthroscopic-assisted single bundle anterior cruciate ligament reconstruction using hamstring autograft from 1 July 2020 to 31 March 2021. Intra-operatively after graft preparation, if the diameter of the 4-strand graft was < 8 mm, it would be prepared into a 5-strand graft, with subsequent 'all-inside' reconstruction technique using suspensory fixations on both the femoral and tibial tunnels to make up for the shorter graft length.

Results: 22 Patients were included into the study. The mean graft diameter of the 5-strand graft was 8.9 ± 0.6 mm. The mean increase in graft size from a 4-strand graft was 1.6 ± 0.4 mm. Quadrupled graft diameter was significantly correlated with patient's weight and BMI.

Discussion and Conclusion: The 5-strand hamstring autograft provides a significant larger graft diameter compared with 4-strand graft in anterior cruciate ligament reconstruction.

FP10.3

Clinical outcomes of subacromial balloon spacer implantation for massive and irreparable rotator cuff tear

Chun Kwong Lo,¹ Michael Tim Yun Ong,² Patrick Shu Hang Yung²

¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: This prospective study was to assess the effect of pain relief and functional outcomes in patients with massive irreparable rotator cuff tear treated with implantation of a biodegradable subacromial spacer.

Methods: From June 2017 to August 2020, 8 patients with symptomatic massive irreparable cuff tears were managed with arthroscopic debridement and implantation of a biodegradable subacromial spacer and were followed up for at least 1 year (12-30 months). Outcome measures included pre and postoperative shoulder range of motion, VAS pain score, UCLA and Constant scores.

Results: Eight patients, five males and three females were included in the study. The average age of the patients was 72.5 years. At the last follow-up, the mean shoulder range of motion was increased with forward flexion from 100 to 160 degrees and abduction from 90 to 150 degrees. The mean VAS pain score improved from 7.4 to 1.2. The mean UCLA score improved from 20.5 preoperatively to 30.6 postoperatively. The Constant score also improved significantly from 40.5 (35-50) preoperatively to 80.4 (70-85) postoperatively. One revision case had migration of spacer that need another operation to remove. There were no other complications like infection, synovitis, neurovascular injury etc.

Discussion and Conclusion: Arthroscopic implantation of subacromial balloon spacer in patients with massive irreparable cuff tear is a simple, quick and safe procedure with favourable pain relief and clinical outcome at a short-term follow-up.

FP10.4

The effect of supervised exercise programme and home-based exercise programme on shoulder function in older adults

Karen Ka Man Ng,¹ Ben Chi Yin Choi,² Michael Tim Yun Ong,² Bruma Sai Chuen Fu,² Annie Hio Teng Leong,² Patrick Shu Hang Yung²

¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Ageing is a risk factor for poor shoulder function. More than 30% of people older than 65 years old reported poor shoulder function. Although Alsubheen et al (2020) reported that exercises that improve shoulder muscle strength and flexibility are effective in enhancing shoulder function, older adults often show low adherence to exercise. In this study, we investigate the effect of supervised exercise programme and home-based exercise programme on shoulder function in older adults.

Methods: Subjects were recruited from three local elderly centres. Participants from two centres were allocated to supervised exercise group conducted by a qualified sports trainer and the participants from another centre were assigned to home-based exercise group. Ultrasound measurement of subacromial space (SAS), range of motion (ROM), the peak isometric shoulder strength and SPADI were compared before and after the exercise programme.

Results: 31 subjects were recruited and 23 subjects were allocated to the supervised exercise group (mean age \pm SD: supervised group: 74.7 \pm 7.7; home-based group: 74 \pm 5.7). There were no significant differences in baseline measurement between groups. Both groups showed the significant improvement of SAS, ROM and the peak isometric strength after the intervention excepting in SPADI score ($p < 0.05$). Moreover, there were no significant differences of the group changes in all the measurements after intervention.

Discussion and Conclusion: Both supervised exercise programme and home-based exercise programme can enhance shoulder function, but had no effect on shoulder pain relief. And the effect of exercise on shoulder function did not differ between the mode of delivering the intervention.

FP10.5**The effect of whole-body vibration on dynamic knee stability at early stage after anterior cruciate ligament reconstruction****Xin He, Natalie Cheuk Lam Hung, Jihong Qiu, Ben Chi Yin Choi, Bruma Sai Chuen Fu, Michael Tim Yun Ong, Patrick Shu Hang Yung***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Muscle deficits of quadriceps of hamstring contribute to poor dynamic knee stability after ACLR. The whole-body vibration (WBV) training has been considered as an effective and safe method to improve muscle function after ACLR. However, its effect on dynamic knee stability is still not clear. Therefore, this study is to determine the short-term effect of an 8-week early WBV training on dynamic knee stability during single leg squats.

Methods: Eight patients with unilateral ACLR were included in this pilot study. They were randomly assigned to either the WBV or control group. Patients in the control group received conventional ACL rehabilitation, while patients in the WBV received 8 weeks of WBV training in addition to conventional rehabilitation, starting from 1 month after ACLR. Dynamic knee stability was evaluated by knee kinematics using three-dimensional knee movements (VICON) during single leg single squat tests.

Results: At 3 months after ACLR, the WBV group showed significant improvement in reducing the maximum knee valgus angle of the ACLR involved limb during single leg squat test (-7.03 ± 7.48 vs 3.73 ± 4.04 , $p=0.029$) and frequency of varus-valgus movements during the holding phase of single leg squat and hold test (-2.00 ± 0.90 vs 0.00 ± 0.54 , $p=0.029$).

Discussion and Conclusion: An 8-week WBV training starting at one month after ACLR may be effective in improving dynamic knee stability by reducing dynamic knee valgus and knee wobbling during single leg squats. We suggest incorporating the early WBV training into current post-ACLR rehabilitation programmes in order to facilitate recovery of dynamic knee stability.

FP10.6**The role of vitamin D deficiency on quadriceps muscle atrophy after anterior cruciate ligament reconstruction****Michael Tim Yun Ong, Lok Sze Yam, Bruma Sai Chuen Fu, Tsz Ping Lam, Patrick Shu Hang Yung***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Quadriceps muscle atrophy after anterior cruciate ligament reconstruction (ACLR) is well documented. Athletes are one of the high-risk groups for vitamin D deficiency. Vitamin D deficiency can potentially result in decreased hypertrophy in response to rehabilitation, leading to a poorer outcome. Vitamin D has been recognised for its effect on musculoskeletal health. The aim of the study is to determine the role of vitamin D deficiencies on quadriceps muscle atrophy in ACLR patients.

Methods: Vitamin D levels were measured in patients after ACLR. Patients undergoing a unilateral ACLR with hamstring graft were recruited for the study. Quadriceps thicknesses and isokinetic strengths were recorded. Blood samples for the 25-OH vitamin D serum concentrations were measured by ELISA. Knee function questionnaires were recorded.

Results: Sixteen participants were recruited for the study. Cluster analysis resulted in 9 non-atrophic and 7 atrophic patients, 30% strength deficits were observed in the atrophy group and 20% strength deficits were observed in the non-atrophy group. 68% of the patients were found to have vitamin D insufficiencies with levels below 30 ng/ml, 56% had deficiencies with levels below 20 ng/ml. Patients with vitamin D deficiency showed to have a lower quadriceps muscle thickness and lower IKDC. Regression analysis suggested that quadriceps strength in involved side and vitamin D deficiency status accounted for variations in IKDC.

Discussion and Conclusion: We demonstrated an association between vitamin D deficiencies and quadriceps muscle atrophy with lower IKDC in ACLR patients. These data may support the role vitamin D supplementation to enhance functional recovery in ACLR.

FP10.7

Surgical management of unstable distal clavicle fracture: arthroscopic suture button fixation versus open fixation

Ying Kan Law,¹ Michael Tim Yun Ong,² Chun Kwong Lo,³ Patrick Shu Hang Yung²

¹*Department of Orthopaedics and Traumatology, Alice Ho Miu Ling Nethersole Hospital*

²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

³*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Most unstable distal clavicle fractures are treated surgically because of high non-union rate when treated non-operatively. Traditionally the fracture is fixed in open manner by various means including locking plate, hook plate, suture fixation, etc. Arthroscopic-assisted suture button fixation is gaining popularity with the advantage of smaller incision and less implant related complication.

Methods: From 2011 to 2020, there were 26 cases of distal clavicle fractures treated surgically in our institution. 13 patients were treated with open fixation while 13 patients were treated with arthroscopic-assisted suture button fixation. Background demographic, functional and radiological outcomes were assessed.

Results: Mean follow-up period was 17.2 months in open group and 9.8 months in arthroscopic suture button group. There were no statistically significant differences in patient's demographic data, Constant Murley score (97.3 ± 3.0 vs 95 ± 4.2), UCLA score (34.2 ± 1.3 vs 34.5 ± 0.8) and timing of radiological healing (21.7 ± 3.0 vs 18.5 ± 4.6 months). Arthroscopic suture button fixation yields a statistically significant smaller final coracoclavicular distance (7.9 ± 1.0 vs 9.7 ± 1.2 cm, $p=0.049$) than open fixation. There were 3 cases of delay union and 1 case of infection required surgical debridement in open group. While there was only 1 case of delay union in arthroscopic suture button group.

Discussion and Conclusion: Arthroscopic-assisted suture button fixation is safe and effective in managing unstable distal clavicle fracture functionally and radiologically.

FP10.8**Lower psychological readiness to return to sports is associated with poor dynamic knee stability on both injured and uninjured limbs after anterior cruciate ligament reconstruction****Matthew Chun Sing Chow,¹ Xin He,¹ Jihong Qiu,¹ Daniel Tik Pui Fong,² Michael Tim Yun Ong,¹ Patrick Shu Hang Yung¹**¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*²*National Centre for Sport and Exercise Medicine, School of Sport, Exercise and Health Sciences, Loughborough University, United Kingdom*

Introduction: Psychological readiness to return to sport (RTS) measured by Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) scale is a predictor for RTS after ACL reconstruction. However, it has not been investigated in relation to dynamic knee. This study aimed to: (1) investigate the association between the psychological readiness to RTS and dynamic knee stability and (2) compare dynamic knee stability between patients with higher ACL-RSI scores and those with lower scores.

Methods: Twenty-nine male pivoting sports players (mean age: 25.34 ± 4.16 years) with unilateral ACL reconstruction were included. Each patient completed the ACL-RSI scale to measure the psychological readiness to RTS. During the landing phase of the single leg hop test, dynamic knee stability was evaluated by the knee biomechanics using the three-dimensional motion analysis system (VICON).

Results: ACL-RSI scores showed a moderate correlation with flexion angle at initial contact on both injured ($r=0.465$; $p=0.013$) and uninjured limb ($r=0.486$; $p=0.009$). Comparing patients with lower ACL-RSI scores (≤ 75) ($n=13$) versus patients with higher ACL-RSI scores (≥ 90) ($n=10$) showed a significant reduction in flexion angle at initial contact on both limbs in the former group (injured limb: median= 10.6 (7.85-17.1) vs 20.6 (15.3-25.3); $p=0.003$; uninjured limb: median= 11.1 (8.25-19.3) vs 19.4 (14.9-27.7); $p=0.018$).

Discussion and Conclusion: Our study showed that patients with lower psychological readiness for RTS have poorer dynamic knee stability on both injured and uninjured limbs during single-leg hop landing. The findings suggest psychological intervention in parallel with physical rehabilitation may be necessary to improve dynamic knee stability and reduce ACL re-injury risk after ACL reconstruction.

FP10.9**Quadriceps inhibition negatively affects quadriceps strength in patients with anterior cruciate ligament injuries****Jihong Qiu, Michael Tim Yun Ong, Ben Chi Yin Choi, Xin He, Bruma Sai Chuen Fu, Patrick Shu Hang Yung***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

FP10.10

Effect of shoulder rehabilitation exercise programme on shoulder function in older adults with diabetes

Naomi Pui Yan Fung, Ben Chi Yin Choi, Michael Tim Yun Ong, Bruma Sai Chuen Fu, Annie Hio Teng Leong, Patrick Shu Hang Yung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Around 30% of people in Hong Kong >65 years old suffered from shoulder conditions leading to functional deficits including rotator cuff pathology and arthritis. Diabetes is a risk factor for rotator cuff tendinopathy. Alsubheen et al (2020) reported that shoulder rehabilitation exercise can improve diabetic shoulder pain, but its effect on shoulder function remains unknown. In this study, we investigate the effect of shoulder exercise programmes on shoulder function in diabetic older adults.

Methods: Participants were recruited from the local elderly centre. People older than 50 years old with and without type 2 diabetes were recruited. They were invited to attend the 8-week exercise programme supervised by qualified sports trainer twice per week. Ultrasound measurement of the subacromial space (SAS), range of motion (ROM), the peak isometric shoulder strength and SPADI were compared before and after the exercise intervention.

Results: 23 subjects were recruited and 11 subjects were type 2 diabetic (mean age \pm SD: diabetics: 73.1 ± 6.1 years; non-diabetics: 76.2 ± 8.9 years). There were no significant differences in baseline measurement between groups. Both groups showed significant improvement of SAS, ROM and the peak isometric strength after intervention ($p < 0.05$) but no significant change in SPADI score. And no significant group differences were observed in all the measurements.

Discussion and Conclusion: Both diabetic and non-diabetic older adults can enhance their shoulder function after the exercise intervention, but there was no effect on pain relief. And the effect of this exercise programme did not differ between groups.

FP10.11

A randomised control trial to evaluate the effect of geko device (neuromuscular electrical stimulation device) on postoperative lower limb oedema in anterior cruciate ligament reconstruction patients

Ronald Wing Hei Siu, Naomi Pui Yan Fung, Jeremy Ho Pak Liu, Leo Wong, Michael Tim Yun Ong, Patrick Shu Hang Yung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Postoperative lower limb oedema is a common sequelae of ACL reconstruction surgery and it can negatively affect patient outcome. A key aim for early postoperative period is to reduce swelling, allowing for effective rehabilitation. geko device is a neuromuscular electrical stimulation device that stimulates venous clearance. In this randomised controlled trial, the effect of geko device in reducing lower limb oedema postoperatively is evaluated by comparing to those undergoing conventional postoperative care.

Methods: 20 ACLR patients were recruited. Patients were split into two cohorts, with leg circumference measured preoperatively and on postoperation day 0, 1, 2, 5 and 15. Leg circumference is measured at 3 landmarks: "Top" (2 cm distal to the level of fibular head), "Bottom" (2 cm proximal to level of both malleoli) and "Middle" (mid-point of the two points). Knee range of motion, numeric pain rating scale and patient related outcome survey were also recorded.

Results: geko device significantly reduced lower limb oedema at "Middle" on postoperation day 1 ($p = 0.043$) and at "Top" on postoperation day 2 ($p = 0.047$) and day 5 ($p = 0.023$), suggesting that geko device predominantly reduces early-stage postoperative lower limb oedema. Reduction in leg circumference was most evident at "Top" as compared to the other two landmarks after use of geko device.

Discussion and Conclusion: geko device was shown to reduce postoperative swelling significantly and safely in early postoperative stages (Day 1-5). Reduced lower limb oedema in early postoperative stages can potentially allow for early, more effective rehabilitation exercises.

FP10.12

Community-based muscle strengthening programme may promote active lifestyle and improve sarcopenic state in community dwellers—the MusFit Cohort**Cheuk Kin Kwan,¹ Bruma Sai Chuen Fu,¹ Yuen Man Wu,¹ Ben Chi Yin Choi,¹ Michael Tim Yun Ong,¹ Jojo Jiao Jiao,² Bik Chu Chow,² Lobo Hung Tak Louie,² Sally Siu Yin Cheung,² Patrick Shu Hang Yung¹**¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*²*Department of Sports, Physical Education and Health, Hong Kong Baptist University*

Introduction: Sarcopenia is an increasingly recognised problem in the ageing population of Hong Kong. Our team have launched the MusFit programme in 2019, which has recruited over 300 elderly Hong Kong citizens to attend muscle strengthening exercise classes. This study aimed to evaluate the effect of the MusFit programme on the sarcopenic status of participants after 2 years.

Methods: The MusFit programme provided 6 sessions of elastic band training class over 3 months in 2019. Twenty-five female participants of a mean age of 67.2 were invited for follow-up, which 18 were diagnosed as sarcopenic before training. McNemar test was performed to assess the change in sarcopenic state of participants, while a paired *t* test or non-parametric Wilcoxon's signed rank test was performed to compare hand grip strength, gait speed, and muscle mass, quality-of life by SF-36 questionnaire, and physical activity by IPAQ questionnaire before the class and at 2 years of follow-up.

Results: One of the participants became newly sarcopenic. Seven out of 18 previously sarcopenic participants became non-sarcopenic upon follow-up. There is a significant change in sarcopenic status before training and at 2 years follow-up ($p=0.007$). Significant improvements in physical activity level were observed as increased metabolic equivalent of task per week ($p=0.03$). Significant decrease in quality of life was observed in fatigue ($p=0.007$).

Discussion and Conclusion: The MusFit programme may promote active lifestyle and improve sarcopenic state in the ageing population of Hong Kong. Community-based exercise programmes could be an effective method in tackling sarcopenia.

Electronic Poster Presentations

P01

Predictive factors for hamstring graft diameter in anterior cruciate ligament reconstruction: a study in our local patients

Keith Hay Man Wan, Christine Yuen Shan Lai, Richard Hin Lun Lee, Kevin Kwun Hung Wong, Kam Kwong Wong
Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Introduction: To investigate if anthropometric parameters are useful in predicting hamstring graft diameter.

Methods: 94 consecutive ethnic Chinese patients undergoing primary anterior cruciate ligament (ACL) reconstruction from January 2017 to December 2019 were retrospectively reviewed. Correlation coefficient (Pearson r) and stepwise, multiple linear regression were used to determine the relationship between the outcome variable (hamstring graft diameter) and predictor variables (anthropometric data).

Results: Hamstring graft diameter was related to body weight ($r=0.48$, $p<0.0001$), body height ($r=0.38$, $p=0.0001$), BMI ($r=0.40$, $p=0.0001$) and gender ($r=-0.38$, $p=0.0002$) but was not related to age ($r=0.08$, $p=0.43$). Body weight was a statistically significant prediction variable ($R^2=0.23$, $p<0.0001$). A regression equation was calculated which suggested that a patient with less than 40 kg of body weight is likely to have a quadrupled hamstring graft diameter of <7 mm (graft size= $0.0217 \times$ body weight + 6.1297). Women had statistically smaller hamstring graft diameters (7.21 ± 0.65 mm) than men (7.87 ± 0.65 mm) ($p=0.0002$).

Discussion and Conclusion: Body weight was the best predictor of hamstring graft diameter, particularly in women.

P02

Biomaterials developed for facilitating healing outcome after anterior cruciate ligament reconstruction: efficacy, surgical protocols, and assessments using preclinical animal models

Xuan He, Ye Li, Jiabin Guo, Jiankun Xu, Haiyue Zu, Le Huang, Michael Tim Yun Ong, Patrick Shu Hang Yung, Ling Qin
Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

No copyright transfer for abstract printing.

P03

Clinical efficacy of nonsurgical treatments for insertional Achilles tendinopathy: a systematic review and network meta-analysis**Violet Man Chi Ko, Mingde Cao, Bruma Sai Chuen Fu, Daniel Tik Pui Fong, Patrick Shu Hang Yung, Samuel Ka Kin Ling***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Achilles tendinopathy (AT) is a common overuse injury characterised by pain, swelling, and impaired functional performance. In general medical practice, the incidence of AT is around 2.5 per 1000 patients. In specific active populations, the cumulative lifetime incidence of AT is 50%. The study objective is to evaluate the clinical efficacy of nonsurgical treatments for insertional AT.

Methods: An electronic database search of AMED EBSCOhost, CINAHL EBSCOhost, EMBASE, PEDro, PubMed, Web of Science, and Clinicaltrials.gov was conducted in April 2021. Randomised controlled trials investigating the effects of nonsurgical treatments for insertional AT using the Visual Analog Scale (VAS) as an outcome measure were eligible for inclusion. The primary outcome was the mean change in VAS score at 6 months of follow-up.

Results: A total of four studies with 191 patients met the inclusion criteria and were included. Sample sizes ranged from 15 to 32 per treatment arm (median 48 patients, IQR 33.5-62). Follow-up duration ranged from 2 to 24 weeks (median 24 weeks, IQR 18-24). Five treatment arms were included in the trials, and three of these included extracorporeal shockwave therapy. Four treatment comparisons were made in the network meta-analysis.

Discussion and Conclusion: All studies demonstrated favourable outcomes after short-term treatments for insertional AT. Dietary supplements plus extracorporeal shockwave therapy can induce a better clinical and functional outcome in patients with AT. A standardised questionnaire, Victorian Institute of Sports Assessment (VISA-A) can be used as an outcome measure in future research to allow in-between studies comparison.

P04

Vitamin D status correlates with bone mineral accrual towards pubertal peak bone mass for adolescent idiopathic scoliosis: a 6-year prospective cohort study**Kenneth Guang Pu Yang, Wayne Yuk Wai Lee, Alec Lik Hang Hung, Jack Chun Yiu Cheng, Tsz Ping Lam***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

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

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

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

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

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

P05

Immunomodulation via therapeutic pathogen recognition receptor ligands in 3D printed implants for treating osteoporotic fracture—an in vivo study

Carissa Hing Wai Wong,¹ Keith Yu Kin Cheng,¹ Patee Khokhani,² Wing Hoi Cheung,¹ Cumhuri Öner,² Rene Castelein,² Saber Amin Yavari,² Harrie Weinans,² Moyo Kruyt,² Simon Kwoon Ho Chow¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Orthopaedics, University Medical Center Utrecht, Utrecht, The Netherlands*

Fracture healing is often impaired in osteoporotic patients due to ageing and sex hormone depletion with altered systemic inflammatory response. This difference in the initial inflammatory phase of healing leads to poor coordination of subsequent healing stages which compromises bone healing outcomes. Specific targeting of pathogen recognition receptors (PRRs) with ligands derived from bacterial cell wall components could stimulate bone formation. Here we compare their relative performance in vivo. 3D-printed implant designs were first tested on ovariectomised rats that underwent diaphyseal fracture, namely 'Solid-star', 'Porous-grid', and 'Inner-hole'. Another batch of fractured ovariectomised rats were tested on either treatment of therapeutic PRRs ligands, C. Albicans, Poly(I:C) and CpG ODN C. Bone healing outcomes were assessed by weekly radiographs, biomechanical tests, and microCT scan analyses. Inflammatory markers IL-6, TNF- α and IL-10 were measured via ELISA. Both 'Solid-star' and 'Porous-grid' performed similarly in terms of mechanical properties at week 4. 'Inner-hole' was eliminated due to a 100% failure rate as depicted by weekly radiographs at week 2. CpG ODN C and Poly(I:C) showed an apparent advantage over OVX control by week 2 with more callus mass, and have shown an altered cytokine expression profile by at the hematoma at day 3. Poly(I:C) showed enhanced energy to failure, stiffness, and ultimate load at week 4 though not statistically significant. Porous-grid' performed best for its porous interior that can be useful for drug delivery. Both Poly(I:C) and CpG ODN C show potentials in altering bone healing outcomes (Acknowledgement:OTC-foundation:2019-MCRC).

P06

A simple and effective technique of femoral and tibial tunnels bone grafting in revision anterior cruciate ligament reconstruction

Keith Hay Man Wan, Christine Yuen Shan Lai, Stephen Pui Kit Tang, Richard Hin Lun Lee, Kevin Kwun Hung Wong, Kam Kwong Wong

Department of Orthopaedics and Traumatology, Kwong Wah Hospital

Anterior cruciate ligament (ACL) reconstruction is one of the most common performed orthopaedic procedures. Despite the generally favourable outcome after the surgery, failure does occur, with the commonest causes being postoperative septic arthritis and graft re-tear. The incidence of graft failure ranges from 2.1% to 6%. Revision of failed ACL reconstruction can be carried out as a single-stage or two-stage procedure. The primary indications for a two-stage revision reconstruction are the following: (1) suboptimal position of the initial bone tunnels or (2) the presence of significant tunnel osteolysis in which the initial bone tunnel is too wide to accommodate secure placement of a newly reconstructed graft. In such cases, a first stage revision with bone grafting to the tunnels is indicated. The purpose of this technical note is to provide a detailed description, using commonly available surgical instruments, to perform bone grafting to the tunnels with allograft.

P07

Effects of workplace-based exercise programme on upper trapezius stiffness in office workers: a randomised controlled trial**Herman Ming Hei Tsui,¹ Sheryl Lok Chi Man,² Michael Tim Yun Ong,¹ Annie Hio Teng Leong,¹ Patrick Shu Hang Yung¹**¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*²*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

Introduction: Neck pain is a common problem and around 30% to 50% of adults suffering from chronic neck pain in a year. This problem is particularly affecting office workers who are regarded to have sedentary workplace settings (Hagberg, 1987). 11% to 14% of office workers experience loss of work productivity every year. This study aimed to implement a 10-week workplace-based exercise programme and to determine whether this programme can reduce Upper Trapezius muscle (UT) stiffness to enhance working efficiency and productivity in office workers without sacrificing their physical health.

Methods: Seventeen adults with chronic neck pain were randomised into intervention (n=9) or control group (n=8). Subjects in the intervention group received a 10-week workplace-based exercise programme and ergonomic advices and the control group only received ergonomic advices. Outcomes including the upper trapezius stiffness measured by Supersonic Shear Imaging (SSI), questionnaire such as SPADI, DASH, NDI, WAI, physical examination including range of motion (ROM) and muscle strength were recorded.

Results: Reductions in post-intervention NDI score (p=0.017), neck VAS (p=0.011), and dominant hand UT stiffness (p=0.008) in the intervention group, while reduction in the neck VAS score was also found in the control group (p=0.045). However, correlation between the VAS score and the outcome variables was not significant.

Discussion and Conclusion: 10-week workplace-based exercise programme showed improved UT SSI value and other outcome variables. Ergonomic advices might improve VAS of both groups. The findings may contribute to promoting workplace-based exercise programme, and ergonomic working positions among office workers as an occupational health strategy.

P08

Prevalence and risk factors of task-related shoulder pain among workers who performed forehead temperature check during the Covid-19 pandemic

Shang Lee,¹ Karen Ka Man Ng,² Michael Tim Yun Ong,¹ Annie Hio Teng Leong,¹ Patrick Shu Hang Yung¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

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

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

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

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

P09

Effect of vitamin D supplementation on serum 25(OH)D concentration and muscle strength in athletes: a systematic review and meta-analysis, the 2021 update

Zixian Wei, Naomi Pui Yan Fung, Michael Tim Yun Ong, Patrick Shu Hang Yung

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

Introduction: Vitamin D has been shown to increase the size and number of fast-twitch muscle fibres. A recent meta-analysis found that up to 44% to 67% of athletes can have vitamin D insufficiency, while oral vitamin D supplementation can be an effective means of improving vitamin D status. This study aimed to explore the effect of vitamin D supplementation on athletes' serum 25(OH)D concentration and muscle strength.

Methods: Four electronic databases: PubMed, EMBASE, MEDLINE, Cochrane Library databases were systematically searched for randomised control trials (RCTs). The research keywords were vitamin D, muscle strength, supplementation. The primary outcome was the standardised mean difference (SMD) between post- and pre-supplementation in groups. Heterogeneity among the studies was assessed using the I² (inconsistency) statistic.

Results: Seven RCTs with 221 athletes met the inclusion criteria. Seventeen athletes lost follow-up, and 204 athletes recorded complete results. Our meta-analysis found that one-repetition-maximum Bench Press showed no improvement whereas maximal quadriceps contraction showed improvement but did not reach statistical significance (SMD 0.01, 95% CI=-0.36 to 0.37, p=0.97 and SMD -1.36, 95% CI=-3.38 to 0.66, p=0.19). In addition, vitamin D intervention had no significant overall effect on muscle strength (SMD -0.56, 95% CI=-1.31 to 0.18, p=0.14).

Discussion and Conclusion: With a dosage of 2857-5000 IU vitamin D for over 4 weeks can help athletes achieved serum 25(OH)D concentration sufficient. Vitamin D supplementation showed a small improvement in muscle strength for athletes but not statistically significant.

P10**Case report on subchondral insufficiency fracture of the knee at lateral femoral condyle with unicompartmental knee arthroplasty****Chun Hin Lo, Bruce Yan Ho Tang***Department of Orthopaedics and Traumatology, Tuen Mun Hospital*

Spontaneous insufficiency fracture of the knee (SIFK) is a potentially devastating yet poorly understood disease entity that can lead to secondary osteoarthritis. Most cases involve the medial femoral condyle, while the lateral femoral condyle is rarely affected. The optimal treatment of SIFK of lateral femoral condyle remains undetermined and there are no previous dedicated reports on treatment outcome with unicompartmental knee arthroplasty (UKA). In this case report, a middle-aged lady presented with subacute debilitating left knee pain with locked knee, where the diagnosis of SIFK at lateral femoral condyle was confirmed with subsequent imaging. UKA was performed with satisfactory outcome. Upon completion of rehabilitation, the patient had only minimal knee pain and was able to resume working.

P11**Effect of foot muscles strengthening in people with plantar fasciitis: a systematic review****Fannie On Yue Lau, Samantha Pui Wa Chu, Daniel Tik Pui Fong, Patrick Shu Hang Yung, Samuel Ka Kin Ling***Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

P12**The novel Proximal Femur Maturity Index for patients with idiopathic scoliosis****Prudence Wing Hang Cheung,¹ Federico Canavese,² Chris Yin Wei Chan,³ Janus Siu Him Wong,¹ Hideki Shigematsu,⁴ Keith Dip Kei Luk,¹ Jason Pui Yin Cheung¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Pediatric Orthopedic Surgery Department, Lille University Hospital, Loos, France*³*Department of Orthopaedic Surgery, University of Malaya, Kuala Lumpur, Malaysia*⁴*Department of Orthopaedic Surgery, Nara Medical University, Nara, Japan*

No copyright transfer for abstract printing.

P13

Effect of adiposity on inflammatory response of tendon-derived stem cells

Shiyi Yao,¹ Yuk Wa Lee,¹ Chi Ming Wong,² Patrick Shu Hang Yung,¹ Pauline Po Yee Lui¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Health Technology and Bioinformatics, The Hong Kong Polytechnic University*

The aberrant differentiation of tendon-derived stem cells (TDSCs) upon overuse-induced inflammation has been suggested to cause failed healing and tissue metaplasia in tendinopathy. Obesity increases tendinopathy's risk and may be mediated by its low-grade inflammation. This study examined the effect of high-fat diet (HFD) on the inflammatory response of TDSCs. Mice were fed with standard chow (SC) or HFD for 12 weeks. The inflammation resolving ability of Achilles TDSCs of SC and HFD groups were evaluated by the mRNA expression of pro-inflammatory markers (IL-33, IL-6, TNF- α , MMP3) and anti-inflammatory markers (IL-10, TIMP-1) upon IL-1 β stimulation. At basal level, the expression of inflammatory markers IL-33 and TNF- α , but not IL-6 and MMP3, was higher in TDSCs in the HFD group compared to the SC group. Upon IL-1 β treatment, the expression of pro-inflammatory markers increased in both groups. The fold change of gene expression after IL-1 β treatment relative to the basal condition was calculated. Except TNF- α , there were higher fold changes of both pro-inflammatory and anti-inflammatory markers in the HFD group compared to the SC group. TDSCs isolated from HFD group produced higher inflammatory markers under both basal and inflammatory states. The higher expression of anti-inflammatory makers in an inflammatory state relative to the basal state in TDSCs isolated from HFD might represent an attempt of the cells to resolve the inflammatory and degenerative effects after induced inflammation. The altered inflammatory response of TDSCs might contribute to the effect of obesity on the development and progression of tendinopathy.

P14

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

Dick Ho Kiu Chow,¹ Wenxue Tong,¹ Lizhen Zheng,¹ Kathy Oi Lan Lui,² Ling Qin¹

¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

²*Department of Chemical Pathology, The Chinese University of Hong Kong*

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

P15

Gelatin methacryloyl hydrogel encapsulated human adipose stem cell-derived exosomes enhanced Achilles tendon healing by optimising dynamic macrophage response
Dan Wang,¹ Patrick Shu Hang Yung,² Hongtao Xu,² Elmer Dai Fei Ker¹
¹*School of Biomedical Sciences, The Chinese University of Hong Kong*
²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

P16

Expression of adiponectin in clinical samples of tendinopathy
Zuru Liang,¹ Chi Ming Wong,² Patrick Shu Hang Yung,¹ Pauline Po Yee Lui¹
¹*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*
²*Department of Health Technology and Bioinformatics, The Hong Kong Polytechnic University*

Introduction: The pathological changes and the underlying mechanisms of obesity-induced tendon disorders remain unclear. Low circulating adiponectin level in obesity was associated with elevation of various inflammatory markers. Adiponectin's supplementation ameliorated inflammation and promoted healing in various tissues. This study examined the expression of adiponectin in clinical samples of tendinopathy.

Methods: Fourteen patients with clinically diagnosed tendinopathy (rotator cuff: 11; patellar: 3) and fifteen patients undergoing ACL reconstruction with healthy hamstring tendon graft were recruited respectively as cases and controls. Adiponectin expression in tendinopathy and healthy controls was compared by immunohistochemical staining.

Results: Hypercellularity, hypervascularity, chondrocyte-like cells, loss of cell alignment, and matrix degeneration were observed in the tendinopathy samples. There was higher adiponectin expression in the cases compared to that in the controls ($p < 0.05$). The strong expression of adiponectin was observed in the blood vessels, chondrocyte-like cells, tendon fibroblasts, and extracellular matrix (ECM) in the cases. However, very-weak-to-null expression of adiponectin was observed in the tendon fibroblasts and ECM in the controls.

Discussion and Conclusion: A difference in the expression of adiponectin expression level was found between tendinopathy and healthy controls. The strong expression of adiponectin was observed in the pathological areas including blood vessels, chondrocyte-like cells, tendon fibroblasts, and ECM suggested that adiponectin might have roles in tendinopathy. Further studies are needed to find out its role in the development of tendinopathy.

P17

Atypical periprosthetic femoral fracture fixation: a case report
Richard James Harries, Bruce Yan Ho Tang, Hung On Cheng
Department of Orthopaedics and Traumatology, Tuen Mun Hospital

We describe a 55-year-old man who sustained a Vancouver B1 periprosthetic atypical femur fracture to his left cementless total hip arthroplasty stem after 2 years of Fosamax for osteoporosis. A Synthes broad femur cable plate fixation was initially applied. However, this was complicated with nonunion and displacement 4 months later. The subsequent successful revision required double plate fixation, bone graft from iliac crest, recombinant bone morphogenetic protein supplementation and a postoperative Forteo course. Radiological bone union was seen at 7 months postoperatively, upon which he was able to independently walk with full weight bearing using a frame. We discuss the methods employed in this case.

P18

Wnt16 interacting with vitamin D generate synergistic effect on bone quality in Chinese adolescent females

Kenneth Guang Pu Yang,¹ Man Fung Tang,² Tsz Ping Lam,¹ Alec Lik Hang Hung,¹ Ting Fan Leung,² Jack Chun Yiu Cheng,¹ Wayne Yuk Wai Lee¹

¹Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong

²Department of Paediatrics, The Chinese University of Hong Kong

Introduction: Literature has reported a decrease in bone density and the associated increase of fracture risk at pubertal growth spurt. Whether it is associated with genetic polymorphism remains unclear. Previous studies mainly focused on the effect of single nucleotide polymorphism (SNP). This study aimed to explore if there is gene-gene interaction between vitamin D pathway genes and Wnt16 on the bone quality in Chinese adolescent females.

Methods: Three SNPs were genotyped in 519 girls including rs3801387 in Wnt16, rs2282679 in VDBP, and rs2228570 in VDR. Gene-gene interactions were analysed by generalised multifactor dimensionality reduction (GMDR). Serum total 25OHD level was measured. Bone density and quality were evaluated by DXA and HR-pQCT.

Results: For serum total 25OHD level, it was lower in those homozygous for rs3801387 and rs2282679. GMDR revealed a three-locus model involving the three selected SNPs ($p < 0.05$) where high-risk subjects had lower 25OHD level than low-risk subjects (43.93 vs 50.82 nmol/L; $p < 0.001$). For bone density, rs3801387 was associated with high cortical bone thickness and cortical bone area in vitamin D deficient subjects. Another three-locus model was revealed including the three SNPs for trabecular area ($p < 0.05$). Trabecular area was lower in high-risk than low-risk subjects (140.64 vs 149.06 mm²; $p = 0.002$).

Discussion and Conclusion: Wnt16, VDBP and VDR may interact to alter serum vitamin D level and bone quality in Chinese female adolescents. This interaction supports our previous HKOA presentation that Wnt16 and vitamin D supplementation can generate synergistic effect on bone quality in mice.

Acknowledgement: This study is supported by RGC-GRF(14163517).

P19

A retrospective study comparing articular surface-mounting computer-assisted total knee arthroplasty with conventional total knee arthroplasty in limb alignment, component position, clinical outcomes and survival

Eugene Pak Lin Ng, Hing Cheong Wong

Department of Orthopaedics and Traumatology, Kwong Wah Hospital

No copyright transfer for abstract printing.

P20

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

Prudence Wing Hang Cheung,¹ Sachiko Kawasaki,² Hideki Shigematsu,² Masato Tanaka,² Yuma Suga,² Yusuke Yamamoto,² Yasuhito Tanaka,² Jason Pui Yin Cheung¹

¹Department of Orthopaedics and Traumatology, The University of Hong Kong

²Department of Orthopaedic Surgery, Nara Medical University, Kashihara City, Nara, Japan

No copyright transfer for abstract printing.

P21

The first Congenital Upper Limb Anomalies Registry in Hong Kong—an early review**Pak Cheong Ho,¹ Wing Lim Tse,¹ Michael Chu Kay Mak,¹ Fiona Wai Ping Yu,² Kar Wai Wong,² Wai Wang Chau²**¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*²*Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong*

Introduction: Congenital upper limb anomalies (CULA) encompasses a wide variety of deformities, which have extremely significant functional impact on the physical and psychosocial development of children. Currently there are no registries for the epidemiology and interventional outcomes in Hong Kong.

Methods: All patients with CULA presenting in CULA clinic at Prince of Wales Hospital since 1984 were included and classified by Oberg, Manske, and Tonkin (OMT), International Federation of Societies for Surgery of the Hand (IFSSH), and Japanese Society for Surgery of the Hand (JSSH) classifications based on their conditions. CULA registry has been developing since July 2020. Retrospective medical records have been prospectively entered.

Results: Based on the 715 records entered as of June 2021, mean age at present was 12.2 (max 48.9 years old) and the oldest was born in year 1972. 418 (58.5%) patients were male and 59 (8.3%) patients had one or more additional abnormalities at lower limb (7.6%), cardiovascular system (2.0%) and craniofacial region (2.0%). 84.2% of patients resided in NT, and 2.2% in HK Island. 6.3% reported family history. Among those 715 patients, 52.2% had surgical treatment. Of the classified cases, 61.4% were radial polydactyly, 14.3% were clasped thumb, 12.1% were symbrachydactyly, 6.4% were hypoplastic thumb and 5.7% were trigger thumb.

Discussion and Conclusion: We present an early report on the first CULA registry in Hong Kong. This registry serves as an important platform for planning on health resource allocation and provides optimum care for CULA patients as the registry grows.

P22

A novel advance in non-invasive wound closure for total joint replacement surgery: a new paradigm**Man Hong Cheung,¹ Henry Fu,² Amy Cheung,² Ping Keung Chan,² Vincent Wai Kwan Chan,² Kwong Yuen Chiu¹**¹*Department of Orthopaedics and Traumatology, The University of Hong Kong*²*Department of Orthopaedics and Traumatology, Queen Mary Hospital*

No copyright transfer for abstract printing.

P23

Knee osteoarthritis with extra-articular femoral deformity treated with total knee arthroplasty

Calvin Tsoi,¹ Yiu Chung Wong²

¹*Department of Orthopaedics and Traumatology, Princess Margaret Hospital*

²*Department of Orthopaedics and Traumatology, Yan Chai Hospital*

Introduction: A successful TKA procedure requires restoration of mechanical axis and soft tissue balancing. Deformity of tibia and femur occurs with history of trauma or osteotomy, infection, metabolic bone disease and excessive bowing. Tackling pre-existing extra-articular deformity of lower limbs during total knee arthroplasty can be challenging due to difficulty in restoring alignment axis and soft tissue balancing.

Methods: 6 Patients underwent total knee arthroplasty with pre-existing extra-articular femoral deformity by intra-articular correction from 2010 to 2017 at Yan Chai Hospital. All patients had extra-articular deformity of the femur due to fracture malunion which were treated either conservatively, plating or intra-medullary nail.

Results: Coronal deformity is corrected from an average of 15.5 degrees to 4.6 degrees from neutral axis. Sagittal deformity is corrected from average of 6.8 degrees to 3.6 degrees. One patient developed progressive genu recurvatum, at 7 years of follow-up with range of motion at 25 degrees extension and 110 degrees flexion. Average preoperative WOMAC score was 68.5 (range 51-87) decreased to 50.7 (range 21-71) at 12 months postoperative and knee score averaged 53.3 (range 51-55) increased to an average of 88.5 (range 82-94). There was only one revision for aseptic loosening 16 years after TKR and no other cases of radiological sign of aseptic loosening.

Conclusion: Intra-articular correction of an extra articular femoral deformity for TKR is an attractive approach in mild to moderate deformity further from the knee joint.

P24

Identifying spatial-temporal pathological properties in osteoarthritis subchondral bone: a radiological and histological analysis

Xiaobo Zhu,¹ Micheal Tim Yun Ong,¹ Patrick Shu Hang Yung,² Yangzi Jiang³

¹*Department of Orthopaedics and Traumatology, Prince of Wales Hospital*

²*Department of Orthopaedics and Traumatology, Princess Margaret Hospital*

³*Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong*

No copyright transfer for abstract printing.

P25

Partial-thickness rotator cuff tear—when and how to repair?**Ka Chun Leung,¹ Tak Man Wong²**¹*Department of Orthopaedics and Traumatology, Queen Mary Hospital*²*Department of Orthopaedics and Traumatology, The University of Hong Kong*

Introduction: Surgical treatment of partial-thickness rotator cuff tear (PTRCT) remains controversial. While debridement with or without acromioplasty has been shown to be effective in tears less than 50% thickness, surgical repair is commonly advocated for refractory symptomatic PTRCT involving over 50% thickness. In situ repair and repair after conversion to full-thickness tear are the two competing techniques which have triggered heated debates. Our literature review aimed to summarise the up-to-date evidence of PTRCT repair techniques.

Methods: We searched 'partial thickness rotator cuff tear' in PubMed during the period of January 2011 to December 2020. Our inclusion criteria included studies stipulating surgical indications, repair techniques, outcomes and follow up duration of at least 12 months. All reviews and articles concerning non-repair treatment or full thickness tear were excluded. 91 articles were retrieved, of which 83 articles were excluded after screening. 8 articles were included.

Results: Acute versus delayed repairs at 6 months did not alter outcomes, hence a period of conservative treatment is reasonable. One meta-analysis including three randomised controlled studies reported largely comparable satisfactory outcomes between in situ and conversion repairs, with higher retear rates in the conversion groups. Various transtendon and transosseous repair techniques for articular-sided PTRCT were reported with excellent clinical and radiological outcomes.

Discussion and Conclusion: Surgical repair of partial-thickness rotator cuff tears generally yields promising outcomes. Repair in situ and repair after conversion were found to be comparable except higher retear rate in the latter. Further randomised studies are needed to elucidate the best surgical treatment.

P26

Radiographic parameters of wrist in Hong Kong Chinese population by multiplanar reconstruction of computed tomography scans**Chun Kit Chan,¹ Esther Ching San Chow,¹ Ka Chi Lau,¹ Michelle Syn Yuk Lee²**¹*Department of Orthopaedics and Traumatology, United Christian Hospital*²*Department of Orthopaedics and Traumatology, Tseung Kwan O Hospital*

Introduction: Radiological parameters of the wrist are important in understanding wrist anatomy and pathology. To date, most of the radiological indices are measured from radiography. The use of computer tomography in measuring such radiographic parameters are more accurate but results are lacking in the literature.

Methods: Computer tomography of wrist images with the forearm in supination were retrieved from 1 July 2018 to 30 September 2020. 29 patients with 31 wrists were included. Multiplanar reconstruction of CT images were processed & measured by OsiriX MD software. Radiographic parameters include the following: radial height, radial inclination, radial palmar tilt, ulnar variance, shape of DRUJ, DRUJ angle in midcoronal plane and shape of sigmoid notch in transverse plane. Inter and intra-observer reliabilities of sigmoid notch shape were calculated.

Results: Mean value of radial height was 11.3 mm (SD \pm 1.9 mm), ulnar variance was -0.48 mm (SD \pm 1.8 mm), radial inclination was 24.1° (SD \pm 3.0°) and radial palmar tilt was 13.7° (SD \pm 4.1°). The morphology of sigmoid notch was as follows: flat shape 26% (N=8), ski-slope shape 6% (n=2), C shape 52% (n=16), S shape 16% (n=5) with 92% intra-observer reliability and 87% inter-observer reliability.

Conclusion: This is the first study that measure the radiological parameters of wrist in the Hong Kong Chinese population by using multiplanar reconstruction of CT scans, which can potentially affect the treatment modality for patients with wrist pathology.

P27

Spontaneous regression of osteochondromas: two cases and literature review

Alvin Zheng Chen, Yung Chak Hsu, Ching San Chow, Lin Wing Lok
Department of Orthopaedics and Traumatology, United Christian Hospital

Introduction: Osteochondromas are common benign bone tumours found in children and adolescents. Spontaneous regression of osteochondromas had been reported but it is an extremely rare event. We reported 2 cases of spontaneous regression of osteochondroma: one was a solitary lesion while the other occurred in a patient with hereditary multiple exostoses (HME).

Materials: The clinical details and radiographs were retrieved from hospital record.

Case 1: The first case presented with an asymptomatic right shoulder mass at 10 years old. The mass was non-tender, bony hard and immobile. The distal neurovascular status was intact with normal shoulder function. The initially radiographs showed a 2-cm sessile osteochondroma at the right proximal humerus. Interval radiographs showed progressive reduction in size of the lesion. The lesion showed complete resolution at 7 years after initial presentation.

Case 2: The second case was a boy with Hereditary multiple exostosis presented at 8 years old. Radiographs showed typical osteochondromas located over the foot, knee, shoulder and wrist region. There were also sessile osteochondromas located at left middle and little fingers distal phalanx, associated with nail deformity. Interval radiographs taken 2 years after presentation showed regression of the osteochondromas at the distal phalanges with resolving nail deformity.

Discussion and Conclusion: Spontaneous regression of osteochondromas is a rare phenomenon with very few case reports. The mechanism of spontaneous resolution remains unknown. A better understanding of the natural course of osteochondroma can provide better guidelines for monitoring affected patients.

Author Index

B

Bai S

FP3.8

Bao ZY

FP3.15

Bian L

AP04, FP3.1

C

Canavese F

BP03, P12

Cao M

FP3.6, P03

Castelein R

P05

Chai HL

FP7.5, FP7.6

Chan CF

FP5.23

Chan CK

FP2.8

Chan CK

P26

Chan CYW

BP03, P12

Chan HMMH

FP5.21

Chan HY

FP1.14, FP2.20, FP2.21

Chan JKT

FP4.5

Chan O

AP08, FP3.11

Chan PK

AP01, AP02, AP09, AP10, AP11, FP1.9, FP1.10, FP1.11, FP2.1, FP2.3, FP2.4, FP2.7, FP2.10, FP2.11, FP2.12, FP2.13, FP2.15, FP2.16, FP2.17, FP2.18, FP2.20, FP2.21, FP2.22, FP3.3, FP6.3, FP6.6, FP6.10, FP6.11, FP6.14, FP6.15, FP6.16, FP6.17, FP6.18, P22

Chan SHS

FP4.7

Chan TC

FP1.14, FP2.20, FP2.21

Chan TCW

FP5.11

Chan VKW

FP4.5

Chan VWK

AP01, AP02, AP09, AP10, AP11, FP2.1, FP2.3, FP2.4, FP2.7, FP2.10, FP2.11, FP2.12, FP2.13, FP2.15, FP2.18, FP2.22, FP3.3, FP6.3, FP6.10, FP6.11, FP6.14, FP6.15, FP6.16, FP6.17, FP6.18, P22

Chan WM

FP5.23

Chang L

FP3.13

Chau BKP

FP4.5

Chau KMH

FP2.19

Chau LTC

FP7.2

Chau WW

FP1.12, FP2.6, FP5.17, FP6.5, FP6.12, FP7.18, FP8.3, FP9.6, FP9.7, FP9.10, P21

Cheah K

FP3.10

Chen AZ

P27

Chen H

FP2.14

Chen KW

FP2.3

Cheng HC

FP5.25

Cheng HO

P17

Cheng JCY

AP03, AP08, BP01, FP1.3, FP3.11, FP3.12, FP4.1, FP4.3, FP7.2, P04, P18

Cheng KW

FP4.6, FP9.5

Cheng KYK

AP05, FP3.14

Cheng SK

FP9.9

Cheuk KY

AP03, FP4.3

Cheung A

AP01, AP02, AP09, AP11, FP2.1, FP2.3, FP2.4, FP2.7, FP2.11, FP2.12, FP2.13, FP2.15, FP2.16, FP2.17, FP2.18, FP2.22, FP3.3, FP6.3, FP6.6, FP6.10, FP6.11, FP6.14, FP6.15, FP6.17, FP6.18, P22

Cheung BKC

FP7.16

Cheung BYY

FP5.23

Cheung CL

FP5.18

Cheung CT

FP1.6

Cheung J

FP5.26

Cheung JPY

BP03, BP05, FP4.2, FP4.4, FP7.8, FP7.9, FP7.12, FP7.13, FP7.15, P12, P20

Cheung KMC

FP1.7, FP4.4, FP5.20, FP5.24, FP7.8, FP7.10, FP7.11, FP7.12, FP7.13, FP7.14, FP7.15, FP7.16, FP7.17

Cheung KSC

FP3.10

Cheung LHY

FP5.20, FP5.24

Cheung MH

AP01, AP02, AP09, AP11, FP2.1, FP2.3, FP2.4, FP2.7, FP2.11, FP2.12, FP2.13, FP2.15, FP2.16, FP2.17, FP2.18, FP2.22, FP3.3, FP6.3, FP6.6, FP6.10, FP6.11, FP6.14, FP6.15, FP6.17, FP6.18, P22

Cheung PWH

BP03, BP05, FP4.2, P12, P20

Cheung SSY

FP1.4, FP2.9, FP8.9, FP10.12

Cheung WH

AP05, FP1.12, FP1.13, FP3.5, FP3.14, FP3.15, FP5.15, FP5.17, P05

Cheung YC

FP5.16

Ching K

FP5.20, FP5.22

Chiu PKY

AP01, AP02, AP09, AP10, AP11, FP1.9, FP1.10, FP1.11, FP2.1, FP2.3, FP2.4, FP2.7, FP2.10, FP2.11, FP2.12, FP2.13, FP2.14, FP2.15, FP2.16, FP2.17, FP2.18, FP2.20, FP2.21, FP2.22, FP3.3, FP6.3, FP6.6, FP6.10, FP6.11, FP6.12, FP6.14, FP6.15, FP6.16, FP6.17, FP6.18, P22

Choi AKY

FP4.8, FP4.9, FP5.9, FP5.23

Choi BCY

FP10.4, FP10.5, FP10.9, FP10.10, FP10.12

Choi CH

FP2.3

Choi SH

FP5.6, FP5.8, FP5.19

Choi TL

FP2.2, FP6.7, FP6.8, FP6.13

Chong YC

FP5.7

Chow BC

FP1.4, FP2.9, FP8.9, FP10.12

Chow CS

P27

Chow D

FP7.12, FP7.15

Chow DHK

AP04, BP04, FP3.1, FP3.9, P14

Chow ECS

FP4.6, FP9.5, FP9.9, FP9.11, P26

Chow MCS

FP10.8

Chow SKH

AP05, FP1.12, FP3.5, FP3.14, FP3.15, FP5.15, FP5.17, P05

Chu CWY

FP5.7

Chu SLH

FP7.16

Chu SPW

P11

Chui CS

FP1.13

Chui E

FP8.5

Chui VWT

FP8.3, FP8.4

Chung DLL

FP4.5

Chung PM

FP9.9

Chung YL

FP5.15

Cui C

FP3.15

F

Fan JCH
FP2.2, FP6.7, FP6.8, FP7.6

Fang CX
FP3.4, FP5.1, FP5.2, FP5.3, FP5.4, FP5.5,
FP5.6, FP5.8, FP5.11, FP5.14, FP5.16,
FP5.18, FP5.19, FP5.20, FP5.21, FP5.22,
FP5.24, FP5.26

Fang E
FP5.20, FP5.24

Fang SYJ
FP5.11

Fei N
FP1.1

Fok MWM
FP1.2

Fong DTP
AP06, FP8.3, FP8.7, FP8.8, FP10.8, P03, P11

Fong YF
FP1.9

Fu BSC
AP06, FP1.4, FP2.9, FP3.6, FP8.8, FP8.9,
FP10.4, FP10.5, FP10.6, FP10.9, FP10.10,
FP10.12, P03

Fu H
AP01, AP02, AP09, AP11, FP2.1, FP2.3,
FP2.4, FP2.7, FP2.11, FP2.12, FP2.13,
FP2.15, FP2.16, FP2.17, FP2.18, FP2.22,
FP3.3, FP6.3, FP6.6, FP6.10, FP6.11, FP6.14,
FP6.15, FP6.17, FP6.18, P22

Fung HF
FP1.9

Fung NPY
FP10.10, FP10.11, P09

Fung WC
AP09, AP10, FP2.10, FP2.18, FP6.14,
FP6.15, FP6.16, FP6.17, FP6.18

G

Guldeniz O
FP7.11, FP7.12, FP7.15

Guo J
P02

H

Harries RJ
P17

He X
FP10.5, FP10.8, FP10.9

He X
P02

Ho DSL
FP9.11

Ho GPY
FP5.20, FP5.21

Ho HN
FP4.6

Ho J
FP3.10

Ho KKW
FP1.6, FP2.5, FP2.6, FP2.9, FP5.17, FP6.5,
FP6.12, FP8.1, FP8.9

Ho KW
FP1.13

Ho OTS
FP8.2

Ho PC

AP12, FP9.2, FP9.3, FP9.6, FP9.7, FP9.8,
FP9.10, FP9.12, P21

Hsu AYC
FP5.12, P27

Hu Z
FP7.2

Huang R
FP9.12

Huang L
P02

Hui ACL
FP8.1

Hui JYN
FP8.3, FP8.4

Hung ALH
AP03, AP08, BP01, FP3.11, FP4.1, FP4.3,
FP4.5, FP9.12, P04, P18

Hung DLL
AP11, FP3.3

Hung LK
FP9.8

Hung LK
FP1.13

Hung NCL
FP10.5

Hung VWY
AP03, FP4.3

I

Ip J
FP4.4

Ip HHM
FP4.7

Ip M
FP5.15

J

Jiao JJ
FP1.4, FP2.9, FP8.9, FP10.12

Jiang X
FP3.8

Jiang Y
FP3.6, P24

K

Kam SK
FP5.9

Kawasaki S
BP05, P20

Kee HM
FP4.5

Ker EDF
P15

Khokhani P
P05

Ko KSY
FP1.12, FP7.2

Ko VMC
AP06, FP8.8, P03

Koljonen PA
FP1.7, FP7.3

Kong APS
FP3.12

Koo JJSC
AP12, FP9.2, FP9.3, FP9.7, FP9.10

Kruyt M

P05

Kuang X
FP7.9

Kwan CK
FP1.4, FP2.9, FP8.9, FP10.12

Kwan KYH
FP4.4, FP5.20, FP5.24, FP7.8, FP7.12,
FP7.13, FP7.15

Kwan WW
FP7.1

Kwok PP
FP4.9

Kwok TK
FP7.4

L

Lai CYS
FP10.2, P01, P06

Lam CCS
FP9.10

Lam CCY
FP1.7

Lam GYT
FP6.7

Lam KW
FP6.13

Lam M
FP5.19

Lam TP
AP03, AP08, BP01, FP1.3, FP3.11, FP3.12,
FP4.1, FP4.3, FP4.5, FP10.6, P04, P18

Lam YT
FP2.2, FP6.8

Lam YL
FP3.10

Lau A
FP1.13

Lau AWK
FP1.6

Lau C
FP6.5

Lau CK
FP6.13

Lau F
FP5.24

Lau FOY
FP8.7, P11

Lau JYL
FP7.16

Lau KC
P26

Lau KKL
FP7.12, FP7.15, FP7.17

Lau LCM
FP9.2

Lau MY
FP1.6

Lau NN
AP06, FP8.8

Lau RWL
AP03, FP4.3, FP4.5

Lau SK
FP1.11

Lau TW
AP10, FP1.1, FP1.2, FP1.14, FP2.10, FP5.22,
FP5.26

Lau TK
 FP7.2
Lau WH
 FP6.6
Lau YF
 FP5.4
Law KKP
 FP7.1, FP7.17
Law S
 FP5.19
Law SW
 FP1.12, FP1.13, FP7.2
Law WK
 FP2.8
Law YK
 FP10.7
Lee ALH
 FP1.2, FP5.3, FP5.4, FP5.5
Lee CMS
 FP1.14, FP2.20, FP2.21
Lee HS
 FP1.9
Lee LCY
 FP1.12, FP5.17
Lee LS
 AP10, FP2.10
Lee MSY
 FP4.6, P26
Lee MML
 FP1.14, FP2.20, FP2.21
Lee OK
 FP4.8
Lee PL
 FP7.1
Lee QJ
 FP2.8, FP2.19, FP6.1, FP6.2, FP6.9
Lee RHL
 FP10.2, P01, P06
Lee S
 BP02, P08
Lee WYW
 AP03, AP08, BP01, FP1.3, FP3.8, FP3.11,
 FP3.12, FP4.1, FP4.3, P04, P18
Lee YW
 AP07, FP3.7, P13
Leong AHT
 BP02, FP10.4, FP10.10, P07, P08
Leung AKY
 FP9.10
Leung APH
 FP1.3
Leung BLH
 FP2.1
Leung FKL
 FP3.4, FP5.1, FP5.2, FP5.3, FP5.4, FP5.5,
 FP5.11, FP5.18, FP5.19, FP5.20, FP5.21,
 FP5.22, FP5.24, FP5.26
Leung GSC
 FP4.9, FP9.4
Leung HCH
 FP5.3, FP5.4, FP5.5
Leung HY
 FP5.6
Leung KC
 P25
Leung MHY
 FP5.8
Leung MMF
 FP5.19, FP5.24
Leung SSY
 FP5.15
Leung SM
 FP7.6
Leung SHF
 FP4.5
Leung TCM
 FP2.18
Leung TKC
 FP5.26
Leung TF
 P18
Leung YC
 FP1.2
Li C
 FP1.10
Li G
 FP3.2, FP3.8
Li GHY
 FP5.18
Li GTK
 FP4.4, FP7.8
Li HM
 FP7.4
Li J
 FP5.15
Li L
 FP6.16
Li M
 AP08, FP3.11
Li MMC
 FP3.5
Li Q
 FP3.12
Li T
 FP2.15
Li WS
 FP5.13
Li X
 AP04, FP3.1
Li Y
 AP04, FP3.1, P02
Liang Z
 P16
Lin S
 FP3.2
Ling SKK
 AP06, FP8.2, FP8.3, FP8.4, FP8.5, FP8.6,
 FP8.7, FP8.8, FP8.9, P03, P11
Liu AHY
 FP5.3, FP5.4, FP5.5
Liu F
 FP3.4
Liu JHP
 FP10.11
Liu KL
 FP1.13
Liu TCM
 FP2.12
Liu TWK
 FP7.3
Liu Y
 FP3.4
Liyeung L
 FP9.12
Lo BA
 FP4.6
Lo CH
 P10
Lo CK
 FP6.9
Lo CK
 FP10.3, FP10.7
Lo CY
 FP7.5, FP7.6, FP7.18
Lo KKY
 FP5.11
Lo KM
 FP1.6
Lo SY
 FP4.6
Lok LW
 P27
Louie LHT
 FP1.4, FP2.9, FP8.9, FP10.12
Lu WWJ
 FP6.16
Lui KOL
 BP04, P14
Lui PPY
 AP07, FP3.7, P13, P16
Lui TH
 FP5.1, FP5.18, FP5.22
Lui X
 FP3.8
Luk KDK
 BP03, FP7.1, P12
M

Ma AKH
 FP4.8
Ma CM
 FP7.5, FP7.6, FP7.18
Mak CH
 FP1.6
Mak KC
 FP7.1
Mak MCK
 AP12, FP9.2, FP9.3, FP9.6, FP9.8, FP9.12,
 P21
Mak SNT
 FP10.1
Mak SY
 FP7.18
Mak YK
 FP5.21
Man GCW
 FP7.2
Man MC
 FP5.13
Man SLC
 FP2.6, P07
Mo P
 FP5.21
Mok D
 AP08, FP3.11
Mok WY
 FP5.7
Moy LT
 FP5.10

N**Nafo W**

FP7.10, FP7.13

Ng C

FP1.11

Ng CH

FP1.1

Ng CK

FP6.9

Ng EPL

P19

Ng FY

FP6.15

Ng K

FP6.13

Ng KM

FP8.1

Ng KKM

BP02, FP6.8, FP9.2, FP10.4, P08

Ng RCC

FP5.17

Ng SYL

FP7.7

Ng YL

AP10, FP1.9, FP1.10, FP1.11, FP2.10

Ngai SSL

FP1.8

Ö**Öner C**

P05

O**Ong MTY**

AP07, BP02, FP1.3, FP1.4, FP1.5, FP1.8, FP2.5, FP2.6, FP2.9, FP3.6, FP3.7, FP6.5, FP6.12, FP8.9, FP10.3, FP10.4, FP10.5, FP10.6, FP10.7, FP10.8, FP10.9, FP10.10, FP10.11, FP10.12, P02, P07, P08, P09, P24

P**Pan Q**

FP3.8

Poon KC

FP5.21

Pun TCT

FP5.1, FP5.2, FP5.18

Q**Qin L**

AP04, BP04, FP3.1, FP3.9, FP3.13, FP3.15, P02, P14

Qiu J

AP06, FP8.8, FP10.5, FP10.8, FP10.9

R**Rashed S**

FP5.14

S**Sanchayyan S**

FP5.3

Shea GKH

FP7.7, FP7.14

Shen WY

FP5.22

Shigematsu H

BP03, BP05, P12, P20

Siu RWH

FP10.11

Siu YC

FP5.13, FP5.19, FP7.5, FP7.6, FP7.18

So RCK

FP5.3, FP5.4, FP5.5

Su N

FP3.10

Suga Y

BP05, P20

T**Tanaka M**

BP05, P20

Tanaka Y

BP05, P20

Tang BYH

P10, P17

Tang CYK

FP1.1

Tang MF

P18

Tang NP

FP10.1

Tang N

FP5.15, FP5.17

Tang SPK

FP5.10, FP10.2, P06

Tang TCM

AP10, FP2.10, FP6.14, FP6.16

Tian E

FP5.14

To MKT

FP4.2, FP4.7

Tong AHK

FP8.3, FP8.4

Tong CH

FP2.7

Tong W

AP04, BP04, FP3.1, FP3.9, P14

Tsang EWY

FP6.1, FP6.2

Tsang MP

FP1.5

Tsang PL

FP1.13

Tsang PYL

FP7.16

Tsang RCC

FP1.9

Tse MSH

FP7.4

Tse WL

AP12, FP9.2, FP9.3, FP9.6, FP9.8, P21

Tso CY

FP5.15, FP5.17

Tsoi C

FP5.6, FP5.8, P23

Tsui HMH

P07

Tsui JKL

FP1.3

Tung KL

FP7.4

U**U KP**

FP3.8

W**Wan K**

FP1.10, FP1.11

Wan KHM

FP5.10, FP10.2, P01, P06

Wan KTK

FP5.12

Wang B

FP3.8

Wang D

P15

Wang H

FP7.14

Wang WSQ

FP5.14

Wang Y

AP08, FP3.11

Wei JZ

FP7.11, FP7.16

Wei RXY

AP06, FP8.5, FP8.8

Wei Z

P09

Weinans H

P05

Wong A

FP7.12, FP7.15

Wong AKH

FP6.4

Wong ALW

AP10, FP2.10

Wong ALY

FP7.4

Wong AYY

FP8.6

Wong C

FP2.16, FP2.17

Wong CHW

P05

Wong CK

FP9.6

Wong CM

P13, P16

Wong CWY

FP5.14

Wong CY

FP5.2

Wong CY

FP5.14

Wong D

FP7.13

Wong DWY

FP6.1

Wong HC

P19

Wong HH

FP2.2

Wong HW

FP7.2

Wong JSH

BP03, FP1.1, FP1.2, FP2.22, FP4.2, FP4.7, FP5.1, FP5.2, FP5.3, FP5.4, FP5.5, FP5.6, FP5.8, FP5.11, FP5.18, FP5.21, FP5.22, FP6.11, P12

Wong KK

FP5.10, FP7.4, FP10.2, P01, P06

Wong KKH

FP5.10, FP5.19, FP10.2, P01, P06

Wong KW

FP9.8, P21

Wong LCH

FP4.5, FP10.11

Wong NST

FP7.7

Wong RMY

AP05, FP1.12, FP3.5, FP3.14, FP5.15, FP5.17

Wong TM

FP3.4, FP5.1, FP5.2, FP5.18, FP5.21, P25

Wong VSP

FP1.14, FP2.20, FP2.21

Wong YC

FP2.8, FP6.1, FP6.2, P23

Wong YP

FP1.14, FP2.20, FP2.21

Wong YW

FP1.7

Woo AWL

FP4.6

Wu J

FP3.4

Wu YM

FP1.4, FP10.12

Wun YC

FP5.23

X**Xu H**

P15

Xu J

AP04, FP3.1, FP3.9, FP3.13, P02

Y**Yam LS**

FP10.6

Yamamoto Y

BP05, P20

Yan CH

AP09, FP1.10, FP1.11, FP2.14, FP2.18, FP6.3, FP6.15, FP6.16, FP6.17, FP6.18

Yan Z

FP5.14

Yang KGP

AP03, BP01, FP4.1, FP4.3, P04, P18

Yang Y

FP3.8

Yao H

AP04, FP3.1

Yao S

AP07, FP3.7, P13

Yao Z

AP04, FP3.1, FP3.9

Yau WF

FP1.13

Yau YL

FP6.1

Yavari SA

P05

Yee DKH

FP2.2, FP5.6, FP5.8, FP5.16, FP5.19, FP5.22,

FP6.7, FP6.8

Yeung CM

FP4.8

Yeung K

FP3.4

Yeung MHY

FP6.3

Yeung SC

FP5.14

Yeung SS

AP10, FP1.9, FP1.11, FP2.10

Yeung T

FP5.25

Yeung YK

FP6.13

Yick VHT

FP5.1, FP7.7

Yip CCH

FP1.7

Yip EKY

FP9.1, FP9.4

Yiu LR

FP5.6, FP5.8

Yu FWP

AP12, FP9.2, FP9.3, FP9.6, P21

Yu HHT

FP8.4

Yu M

FP2.16, FP2.17

Yuen W

AP04, FP3.1

Yuen WS

FP5.14

Yung BWT

AP12, FP9.3

Yung CSY

FP5.2, FP5.6, FP5.8, FP5.14, FP5.19, FP5.20, FP5.21, FP5.22

Yung PSH

AP06, AP07, BP02, FP1.4, FP1.5, FP1.8, FP1.13, FP2.9, FP3.6, FP3.7, FP8.2, FP8.3, FP8.4, FP8.5, FP8.6, FP8.7, FP8.8, FP8.9, FP10.3, FP10.4, FP10.5, FP10.6, FP10.7, FP10.8, FP10.9, FP10.10, FP10.11, FP10.12, P02, P03, P07, P08, P09, P11, P13, P15, P16, P24

Yung WT

FP9.1

Z**Zhang T**

FP7.9, FP7.14

Zheng L

BP04, P14

Zheng N

FP3.13

Zhou YP

FP4.2

Zhu X

P24

Zu H

P02

Zu Y

FP5.17

Acknowledgement to the Organising Partners

We would like to express our deepest gratitude to the organising partners for their honourable contributions and support throughout this Annual Congress:



**HKU
Med**

LKS Faculty of Medicine
Department of Orthopaedics
& Traumatology
香港大學矯形及創傷外科學系

List of Sponsors

3M Hong Kong Limited
Amgen Hong Kong Limited
Anaheim Medical Product Limited
Baxter Healthcare Ltd
Carl Zeiss Far East Co., Ltd.
Century Empire Enterprises Limited
Globus Medical, Inc.
iMedical Asia Company Limited
Jacobson Medical (Hong Kong) Ltd
Johnson & Johnson (HK) Ltd
Kinwood Healthcare Limited
Koln 3D Technology (Medical) Limited
Medtronic Hong Kong Medical Limited
Molnlycke Health Care / Caster Medical
Montsmed Hong Kong Company Limited
NT Pharma Int'l Co Ltd
Pacific Medical Systems Ltd.
Pfizer Corporation Hong Kong Ltd
Procter & Gamble Hong Kong Limited
Smith & Nephew Limited
Stryker (China) Limited
Viatrix Healthcare Hong Kong Limited
Wolters Kluwer Health Hong Kong
Zimmer Asia (HK) Limited

Acknowledgement to Sponsors

We, the Organising Committee of The Hong Kong Orthopaedic Association 41st Annual Congress, gratefully appreciate the following companies for their generous donation and support for our overseas speakers:

Stryker (China) Limited

Zimmer Asia (HK) Ltd