Thank you to our Host Societies

The Australian Hand Surgery Society

APFSHT

New Zealand Society for Surgery of the Hand

12APFSSH/8APFSHT
Congress Secretariat

ICMS Australasia
Po Box 5005
South Melbourne
VIC 3205
Australia

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MELBOURNE Convention Bureau
IMPORTANT NOTE
Due to the novel coronavirus (COVID-19) we have had a high number of speaker cancellations. This program is correct at time of production however we expect last minute changes to occur.

Health recommendations during the Congress as a result of the novel coronavirus.

- Frequently clean hands by using alcohol-based hand rub or soap and water
- When coughing and sneezing cover mouth and nose with flexed elbow or tissue – throw the tissue away immediately and wash hands
- Avoid close contact with anyone who has a fever and cough
- If you have a fever, cough and difficulty breathing seek medical care and share previous travel history with your health care provider
- Hand sanitiser stands are located throughout the Congress for delegates use.
Dear Colleagues,

On behalf of the Asian Pacific Federation of Societies for Surgery of the Hand and The Asian Pacific Federation of Societies for Hand Therapy it gives me great pleasure to welcome you to Melbourne, Australia for the 12th APFSSH and the 8th APFSHT triennial scientific congress. The meeting this year is hosted by both the Australian Hand Surgery Society and the New Zealand Hand Surgery Society with contribution from the Asian Pacific Wrist Association. The Presidents of the AHSS, Michael Sandow and NZHSS, Bruce Peat also extend a very warm welcome to you all.

The inaugural scientific meeting of the APFSSH was held in Perth, Australia in 1997 and has rotated through all the member Societies now returning to Australia after 23 years. During that time the Federation has grown to include 13 member Societies and 5 Observer Societies from around the Asian Pacific Region.

It is quite significant that we have now completed one rotation in the year when the Federation has finally had its new Constitution registered in Singapore and a bank account opened to allow the Federation to move into the next phase of our growth.

We are indeed very honored to have such a great faculty for this meeting with 7 keynote speakers, over 100 invited speakers contributing over 600 presentations with 170 poster presentations. We have more combined sessions between therapists and surgeons than before and many more shared speakers that we hope will provide an educational and stimulating program.

We are again grateful for our trade support and support from the Victorian Government, IFSSH and the Royal Australian College of Surgeons for speaker support and support for developing nations registrations.

I hope you all enjoy the meeting and all that Melbourne can offer.

Dr Tony Burger
Convenor
On behalf of the Melbourne Convention Bureau, it is my great pleasure to welcome you to Melbourne for the 12th Asian Pacific Federation of Societies for Surgery of the Hand and the 8th Asian Pacific Federation of Societies of Hand Therapists triennial meeting.

Melbourne is renowned as a city that is full of surprises; around every corner, laneway, building and outdoor space, Melbourne is alive with fashion, food, art and culture, and I am excited for you to make these discoveries.

Every Melburnian absolutely loves their city and in the next few days you will find out why. I wish you a very successful and enjoyable visit to Melbourne.

Yours sincerely

Julia Swanson
Chief Executive Officer
Melbourne Convention Bureau
Meet our Organising Committee

12th APFSSH Local Organising Committee

Prof Greg Bain
Flinders University

Dr Anthony Beard
Royal North Shore and North Shore Private Hospitals

Dr Mike Boland
University of Auckland

Dr Jeff Ecker
Jeff Ecker Clinic

Dr Jason Harvey
Orthosport Victoria
President of Victorian Hand Surgery Society

Dr Peter Maloney
St Vincent’s Hospital

A/Prof David McCombe
Victorian Hand Surgery Associates; Royal Children’s Hospital, Melbourne

A/Prof Michael Sandow
Wakefield Orthopaedic Clinic
President of Australian Hand Surgery Society

Dr Stephen Tham
St Vincent’s Hospital

Dr James Thomas
St Vincent’s Hospital

Convenor

Dr Tony Burger
St Vincen’s Hospital
Past President of the Australian Hand Surgery Society
Secretary General of APFSSH

Abstract Review Sub-Committee

Prof Gregory Bain
Dr Anthony Beard
Mr Anthony Berger
Mr Michael Boland
Ms Sara Brito

Mrs Katherine Dalton
Mr Jeffery Ecker
Mrs Joy Hanna
Dr Jason Harvey
Mr Peter Maloney

A/Prof David McCombe
Mr Luke Robinson
A/Prof Michael Sandow
Mr Stephen Tham
Mr James Thomas
8th APFSHT Local Organising Committee

Co-Convenor
Mr Hamish Anderson
Anderson Hand Therapy

Co-Convenor
Ms Roskie Koh
The Royal Children’s Hospital Melbourne
AHTA Treasurer

Ms Sara Brito
Monash University

Ms Sally Colwell
ECKO Hand Therapy

Ms Stacey Cross
QEH Hospital

Mrs Katherine Dalton
Royal Children’s Hospital, Melbourne

Mrs Joy Hanna
ECKO Hand Therapy

Ms Karina Lewis
Gold Coast University Hospital

Ms Hana Peake
Dandenong Hospital (Monash Health)

Ms Adrienne Stokes
ECKO Hand Therapy
Delegate Information

Venue
Melbourne Convention and Exhibition Centre (MCEC)
1 Convention Centre Place
South Wharf, 3006
Victoria, Australia

Car Park
MCEC has a car park located within the Exhibition Centre (open 24/7).

Additionally, there are secure car parks located in and around South Wharf including, South Wharf Retails Car Park, Siddeley Street Carpark and Montague Street Carpark.

Transport
Getting around Melbourne using public transport is easy. At https://www.ptv.vic.gov.au you will find timetables, maps and destinations, plus everything you need to know about catching a bus, train or tram.

The closest tram stop is ‘Casino/MCEC/Clarendon Street’ serviced by the 12, 96 and 109 trams. All which travel North into Melbourne CBD and are included in the Free Tram Zone, or South towards South Melbourne or Box Hill.

Taxis
For guests arriving or departing the Centre, two taxi ranks are nearby – at Crown Casino on Clarendon Street, and at DFO South Wharf on Convention Centre Place.

Accessibility
We strive to provide inclusive, safe access for all visitors to the Congress. All buildings and Car Parks at the venue are wheelchair accessible. If you’d like to hire a wheelchair from the venue, please call the MCEC Customer Service team on (+61 3) 9235 8000.

Facilities for People with Sensory Impairment
Braille is provided on all room door signage and fixed directional signage throughout the venue. MCEC is guide dog friendly and welcomes any registered assistance dogs into all areas of the building.

First Aid
In any medical emergency notify your event security or first aid provider immediately. You can also report first aid/medical incidents to the Security Control Centre by calling 6666 from an internal phone.

Security
Please ensure that you take all items of value with you at all times when leaving a room. Do not leave bags or laptops unattended.

Disclaimer of Liability
The Organising Committee will not accept liability for damages of any nature sustained by participants or their accompanying persons or loss of or damage to their personal property as a result of the meeting or related events.

Cloak Room and Luggage Storage
Visit the Customer Service desk at either Convention Centre Place or Clarendon Street entrances for storage facilities.

Lost and Found
Any found item may be turned into the Registration Desk. Enquiries about lost items can be directed there.

Smoking
Smoking is not permitted indoors at the MCEC. Smokers must remain at least 4m from any doorway when smoking. Fines can be imposed for smoking in prohibit places.

Parents’ Rooms
Located in both the Convention and Exhibition Centres the Parents’ Rooms offer a comfortable and private space for parents and children.

Location within Exhibition Centre:
by Clarendon Street entry

Location within Convention Centre:
by Convention Centre Place entry

Emergency Details
In any emergency please notify telephone 000 for Ambulance, Fire Service or Police.
**Registration Desk**
The registration desk is located in the Goldfields Foyer on the Ground Floor by the Convention Centre Place Entrance. Please visit the registration desk to pick up your name badge and congress materials. The registration desk will be open at the following times.

- **Wednesday** 07:00 – 18.00
- **Thursday** 07:00 – 18.00
- **Friday** 07:00 – 18.00
- **Saturday** 07:30 – 17.00

**Name Badges**
For security purposes, delegates, speakers and exhibitors are asked to wear their name badges to all sessions. Entrance into sessions is restricted to registered delegates only. If you misplace your name badge, please see staff at the registration desk to arrange a replacement.

**Exhibition**
The Congress Exhibition will be located in Exhibition Bays 21 and 22 and will be open at the following times:

- **Wednesday** 10:00 – 20:00
- **Thursday** 07:00 – 17:30
- **Friday** 07:00 – 18:00
- **Saturday** 07:00 – 14:00

**Catering**
Morning tea, lunch and afternoon tea will be available during the Congress in the Exhibition area and is included in your registration fee. For break times please refer to the program.

Please speak to a catering staff member if you have dietary requirements.

**Congress Sessions**
Plenary Sessions will be located in Goldfields Theatre and concurrent sessions will run in the Courtyard and Eureka Rooms. Therapist specific sessions will run in the Sovereign Room.

**Program**
Every endeavour has been made to produce an accurate program. If you are presenting at the Congress, please confirm your presentation times as contained within this program. Please note the Organising Committee reserves the right to change the Congress program at any time without notice.

**Abstracts**
Abstracts for plenary, parallel and poster sessions are available to view in your congress app and included in this book from pages 75 onwards.

**Speakers**
Please ensure that you are available in your presentation room at least 15 minutes prior to the start of the session to meet with the Session Chair. Speakers are requested to report to the Speaker Preparation Room at least 2 hours before their scheduled presentation with their presentation on a USB to allow sufficient time to upload and check their audio-visual presentations with the attending technician.

Speakers’ Preparation Room is in Organisers Office 7 and will be open at the following times:

- **Wednesday** 07:00 – 16:00
- **Thursday** 07:00 – 16:00
- **Friday** 07:00 – 16:00
- **Saturday** 07:00 – 16:00

**Photography**
By attending this event and/or associated events as part of APFSSH2020, you consent to being filmed or photographed.

**Media**
Please note that specialist media may be present at the Congress.

**Duplication/ recording**
Unauthorised photography, audio taping, video recording or digital taping or any other form of duplication is prohibited in the Congress sessions.
Delegate Information

**Social Media**
You can follow live updates from the Congress on Twitter, Facebook at LinkedIn by searching for APHand2020

**Wi-Fi**
Free Wi-Fi is available throughout the MCEC.

**To connect:**
1. Select the ‘MCEC Free WiFi’ Wireless Service
2. Open your preferred internet browser (such as Safari or Google Chrome)
3. The MCEC Free WiFi log in page will appear – read and agree to the Terms and Conditions
4. Click the “Connect Now” button and browse away

**Digital Devices**
We encourage delegates to use digital devices throughout the congress to access the congress app and tweet. Please use #APHAND2020 to share your experiences at the Congress.

As a courtesy to speakers and your fellow delegates, please set all of your devices to silent whilst in sessions.

Please also respect the wishes of any presenter who requests that their slides/posters not be photographed and or shared on social media.

**App**

**To Download**
1. Search in your device app store for: World Leading Conference
2. Download the World Leading Conference App
3. Enter Access Code: APHAND2020

Please see the friendly team at the registration desk if you need any assistance using the app.

**Charging Stations**
There are various charging stations located throughout MCEC.
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APFSRM 2020
Table Top Number 01
Phone: +81-92-712-6201
Email: 5apfsrm-47jsrm@convention.co.jp
Website: https://site2.convention.co.jp/5apfsrm-47jsrm/english/

Welcome to the 5th congress of Asia Pacific Federation of Societies for Reconstructive Microsurgery (5th APFSRM) in 2020.

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Website: www.arthrex.com

As an innovation leader in sports medicine and less invasive orthopedics, Arthrex highlights the latest advancements and technology to help surgeons treat their patients better.

Australian Hand Therapy Association
Table Top Number 06
Phone: 02 8776 0205
Email: events@ahta.com.au
Website: www.ahta.com.au

The Australian Hand Therapy Association provides support for its members through continuing education, professional development, networking and representation at state and national levels.

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Singapore Society for Hand Surgery  
Table Top Number 8  
Phone: 65-81230988  
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Website: https://www.sshs.sg  
APFSSH 2023, Singapore.

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Exhibition Floor Plan

CATERING

THROUGH TO PLENARY THEATRE

ENTRY

BARISTA

CATERING

CATERING

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HANDS ON WORKSHOP AREA

DIETARY

(5x) ELECTRONIC POSTEROARDS

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T02

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29 30 31 32
Welcome Reception

Wednesday 11 February

Time: 18:00 – 20:00
Location: Exhibition Hall
Dress Code: Smart Casual
Tickets are included in a full delegate registration, RSVP required. Additional tickets can be purchased for AUD $75 per person.

Take this opportunity to meet your peers from the industry. Experience the best of Australian and New Zealand Cuisine and be captivated by sights, sounds and creatures from our native homelands.

Congress Gala Dinner

Friday 13 February

Time: 19:00 – 00:00
Location: The Melbourne Room, MCEC
Dress Code: Cocktail
Tickets are included in a full delegate registration, RSVP required. Additional tickets can be purchased for AUD $150 per person.

Enjoy a true Melbourne experience at the Congress Gala Dinner. Featuring highlights that make Melbourne unique. A night not to be missed!
Prof Kevin C. Chung  
**Michigan Medicine**  
Kevin C. Chung, MD, MS, the Charles B. G. De Nancrede Professor of Surgery, Plastic Surgery and Orthopaedic Surgery, received his health services research training as a Robert Wood Johnson Clinical Scholar from the University of Michigan. He obtained his general surgery training from the University of Texas in San Antonio, his plastic surgery training from the University of Michigan and his hand surgery training from the Curtis National Hand Center in Baltimore. At the University of Michigan Medical School, he serves as the Assistant Dean for Faculty Affairs in charge of Tenure and Promotion, and is the Associate Director for Global REACH, the global health program of the Medical School. Dr Chung is Chief of Hand Surgery for Michigan Medicine and Director of the Comprehensive Hand Center. Dr Chung has served as the President-Elect in 2019 and President in 2020 for the American Society for Surgery of the Hand, which is the largest hand surgery organization in the world. He has published over 570 peer-reviewed manuscripts (over 16,000 citations, H index 64, i10-index 342), over 300 book chapters, and 24 textbooks. Dr Chung was the past Deputy Editor for the Journal of Hand Surgery (American) and current Associate Editor, the Editor for Hand Clinics and Associate Editor for Journal of Hand Surgery (European). He was the past Outcomes Section Editor for Plastic and Reconstructive Surgery.

Dr Daniel Herren  
**Federation of European Societies for Surgery of the Hand**  
Daniel is a board certified orthopaedic and hand surgeon and chief of the hand surgical department of one of the largest orthopaedic services in Switzerland. Dr Herren is the past-president of the Swiss Society for Surgery of the Hand, board member (treasurer) of the federation of the European societies for surgery of the hand FESSH, European Rheumatoid Arthritis Surgery Society ERASS Treasurer, honorary member of the Argentinian and Australian Hand Society and Co-President of the 25th FESSH congress 2020 in Basel Switzerland. Dr Herren completed his fellowship at the Biomechanical Laboratory at the Mayo Clinic Rochester (Prof. Kai-Nan An) and at the Kleinert and Kutz Institute in Louisville KY (Harold Kleinert). Postgraduate studies as master of health administration (University of Bern) and in biocompatible materials at the Polytechnical University in Zurich (ETH Zurich). Dr Herren is co-author of more than 90 scientific publications and over 200 presentations. His main fields of scientific interest are quality and indication assessment, osteo- and rheumatoid arthritis surgery, joint replacement in the hand.

Judy C. Colditz  
**The Hand Lab**  
Judy C. Colditz, OT/L, CHT, FAOTA is a well-known hand therapist whose skill in teaching is described as “Complex made Simple.” Ms. Colditz has written numerous articles, chapters, and papers on hand therapy, presented many peer reviewed papers and invited lectures, and also has taught numerous live courses in the US and internationally, and has provided online courses. A three-time recipient of the ASHT best clinical paper award, Ms. Colditz has also served as President of the American Society of Hand Therapists and International Federation of Societies for Hand Therapists. Additionally, she has been involved in the design of two hand braces which are commercially produced. Now at retirement age, she is eager to share her most valuable insights gained over many years of focus on hand therapy.

Dr Emily S. Ho  
**Hospital for Sick Children**  
Dr Emily S. Ho is an occupational therapist in the Division of Plastic and Reconstructive Surgery at the Hospital for Sick Children in the area of paediatric upper extremity rehabilitation. Dr Ho completed her Master in Education at the University of Toronto that led to seminal work on outcome measurement in children with congenital hand differences and the development of the internationally recognized Brachial Plexus Outcome Measure (BPOM). Following, she completed her doctorate at the Rehabilitation Sciences Institute, University of Toronto, on shared decision making in youth with brachial plexus birth injuries and their families. Dr Ho has been an invited speaker at several international conferences.
on the rehabilitation management of brachial plexus birth injuries. Dr Ho has an appointment in the University of Toronto, Department of Occupational Science and Occupational Therapy. She has several peer-reviewed publications in the area of paediatric upper extremity rehabilitation and is a reviewer for leading journals in the field. She is a research supervisor for clinical MSc OT and undergraduate MD students. In 2013, Dr Ho was the recipient of the University Health Network and Toronto Rehabilitation Institute Mark Rocon Leadership Award in Rehabilitation Science for leadership in academics and community service.

Dr Donald H. Lalonde
Dalhousie University
Supported by the Royal Australasian College of Surgeons

Professor of Surgery Dalhousie University Saint John Canada, President of the Canadian Society for Surgery of the Hand, American Society for Surgery of the Hand Outreach and International Relations Director, Past President of the American Association for Hand Surgery, Past President of the Canadian Society of Plastic Surgeons, Past Chairman of the American Board of Plastic Surgery.


Prof Cecilia Li Tsang
Hong Kong Polytechnic University

Prof Cecilia Li is specialized in the field of burns and scar management, developmental disabilities and hand rehabilitation. She is the Executive council member of International Federation of Societies of Hand Therapy. She has been successful in bidding more than HK40M of external research fund such as General research fund (GRF), innovation and technology fund (ITF). She has also published over 100 journal articles, author of 4 books, book chapters and 3 patents. Her research works were awarded the State Scientific and Technological Progress Award (Second Class Award) in 2012, Gold Medal with the Congratulation of Jury at the International Exhibition of Inventions of Geneva, and Innovation Award from National Council of Rector from Romania in 2017.

Dr Steve Moran
Mayo Clinic
IFSSH Harold Kleinert Visiting Professorship Recipient

Dr Moran is a Professor of Plastic Surgery and Orthopedic Surgery at Mayo Clinic in Rochester Minnesota, and staff surgeon at the Shrine Hospital for Sick Children in Minneapolis. Dr Moran is the former Chairman of the Division of Plastic Surgery at Mayo Clinic and is now the Surgical Director of the Mayo Clinics’ composite tissue allotransplant program. Dr. Moran’s practice focuses on disorders of the upper extremity as well as microsurgical reconstruction. His primary interests are congenital hand surgery, wrist arthritis and microsurgical reconstruction of the upper and lower extremity. Dr Moran has published over 250 peer reviewed papers, over 75 book chapters and has edited three text books. He was the associated editor for the Journal of Hand Surgery, Hand and the Year Book of Hand Surgery. He is presently the associate editor for The Journal of Wrist Surgery. Dr Moran is a member of 14 professional societies and is founding member of the American Society for Reconstructive Transplantation and is presently a Director for the American Board of Plastic Surgery. He is a previous board member of the American Society for Surgery of the Hand, the American Association for Hand Surgery and American Society for Reconstructive Transplantation. He has been a co-investigator on four NIH grants which were devoted to the study of tissue engineering, tendon healing, carpal tunnel syndrome and ligament injury. Dr Moran’s present research focus is on tissue engineering for which he has institutional directed funds. Dr Moran was named the 2008-2009 Sterling Bunnell traveling fellow by the American Society of Surgery of the Hand and the 2012 Marco Godina traveling fellow by the American Society for Reconstructive Microsurgery. Dr Moran lives in Rochester Minnesota with his wife and three children.
Dr Francisco del Piñal
Dr Pinal Y Asociados
Main interests: Arthroscopy, Microsurgery and Pain.

Dr Aviva Wolff
Hospital for Special Surgery
Aviva Wolff, EdD, OT, CHT is an occupational therapist, clinician-scientist with a strong background in motor control and movement analysis and extensive experience working with performing artists and individuals with musculoskeletal injuries. She currently consults for the Julliard School, and runs the upper extremity clinical movement analysis programs and hand and wrist biomechanics research at the Leon Root, MD Motion Analysis Laboratory at Hospital for Special Surgery. Her research interest is in customizing interventions to each individual’s occupational needs and pathology. She utilizes quantitative and qualitative analysis of upper extremity movement dysfunction to generate data to better inform surgery therapy, and performance. She studies the underlying mechanisms of treatments for musculoskeletal conditions that affect upper extremity motion and function in order to further understand and develop more effective treatment strategies. Her research has focused on wrist biomechanics and function, elbow biomechanics and function, hand and arm function in brachial plexus injury and cerebral palsy, and upper extremity injury prevention in musicians. She has independently led and collaborated with orthopaedic surgeons, scientists, and biomechanists on several funded studies that have led to multiple presentations and publications. Dr Wolff has served in various leadership capacities in multiple professional organizations.
Invited Speakers

Dr Shalimar Abdullah
National University of Malaysia (UKM)
Malaysia

Dr Yukio Abe
Saiseikai Shimonoseki General Hospital
Japan

Dr Amir Adham
Avisena Specialist Hospital
Malaysia

Dr Pankaj Ahire
Nanavati Hospital
India

Dr Roohi Ahmad
Panti Hospital
Malaysia

Dr Peter Amadio
Mayo Clinic
USA

Mr Hamish Anderson
Austin Health; Anderson Hand Therapy
Australia

Dr Stuart Bade
Queensland’s Children’s Hospital
Australia

Dr Alejandro Badia
Miami Hand Surgery
USA

Prof Goo Hyun Baek
Seoul National University
Korea

Prof Greg Bain
Flinders University
Australia

Prof Govinhasamy Balakrishnan
Right Hospital, Chennai
India

Dr Joyshid R Balan
Elite Mission Hospital
India

Dr Eva-Maria Baur
Practice for Plastic Surgery and Hand Surgery
Germany

Dr Anthony Beard
North Shore Private Hospital
Australia

Dr Most Nurunnahar Begum
Sheikh Hasina National Institute of Burn and Plastic Surgery
Bangladesh

Dr Praveen Bhardwaj
Ganga Medical Centre & Hospital
India

Dr Sandeep B
Post Graduate Institute of Medical Education & Research
India

Dr Randy Bindra
Gold Coast University Hospital
Australia

Dr Michael Boland
Hand Institute
New Zealand

Ms Sara Brito
Monash University
Australia

Ms Miranda Buhler
University of Otago
New Zealand

Dr Tanya Burgess
Lingard Private Hospital
Australia

Mr Brent Byrne
Sir Charles Gardiner Hospital
Australia

Ms Suzanne Caragianis
SA Hand Therapy
Australia

Mr Kent Chang
Chang Gung Memorial Hospital
Taiwan

Dr Chun-Yu Chen
Uppsala University
Sweden

Dr Shih-Heng Chen
Chang Gung Memorial Hospital
Taiwan

Ms Therma Cheung
Singapore General Hospital
Singapore

Mr Yung-Cheng Chiu
China Medical University Hospital
Taiwan

Dr Darryl Chew
Singapore General Hospital
Singapore

Prof Chris Coombs
Southern Plastic Surgery
Australia

Ms Cathy Cooper
Austin Health
Australia

Dr Greg Couzens
Brisbane Hand & Upper Limb Clinic
Australia

Dr Esther Chow
United Christian Hospital
Hong Kong

Dr Chun-Yu Chen
Kaohsiung Veterans General Hospital
Taiwan

Dr Bruno Crepaldi
St Vincent’s Hand Centre
Australia

Ms Emily Donovan
Australia

Dr Kazuteru Doi
Ogori Daiichi General Hospital
Japan

Mr Tshering Dorji
Jigme Dorji Wangchuck National Referral Hospital; SA Hand Therapy
Australia

Ms Elaine Duguid
Tamaki Hands
New Zealand

Dr Jeff Ecker
Bethesda Hospital
Australia
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Invited Speakers

Prof Hitoshi Hirata
Nagoya University
Japan

Ms Melissa Hirth
Austin Health; Malvern Hand Therapy
Australia

Dr Pak Cheong Ho
University of Hong Kong
Hong Kong

Dr Harry Hoyen
The MetroHealth System
USA

Dr Jung-Hsien Hsieh
Centre for Human Appearance
Taiwan

Dr Chung-Chen Hsu
Chang Gung Memorial Hospital
Taiwan

Dr David Hunter-Smith
Coastal Plastic Surgery
Australia

Dr Iain Incoll
Australian Orthopaedic Association
Australia

Dr Josephine Ip
The University of Hong Kong Medical Centre
Hong Kong

Prof Hajime Ishikawa
Department of Rheumatology, Niigata University
Rheumatic Center, Japan

Dr Neela Janakiramanan
Eastern Health
Australia

Dr Paul Jarrett
St John of God Murdoch Hospital
Australia

Prof Fuminori Kanaya
University of the Ryukyus
Japan

Dr Hidehiko Kawabata
Osaka Medical Centre
Japan

Mr Cameron Keating
Hobart Institute of Plastic Surgery
Australia

Prof Jihyeung Kim
Seoul National University Hospital
Korea

Dr Brian Labow
Boston’s Children Hospital
USA

Dr Richard Lawson
North Shore Private Hospital
Australia

Dr Wee Leon Lam
Royal Hospital for Sick Children
Scotland

Dr James Ledgard
Royal North Shore Hospital
Australia

Prof Donald H Lee
Vanderbilt University
USA

Dr Hyun-Joo Lee
Kyungpook National University Hospital
Korea

Dr Joo-Yup Lee
Catholic University of Korea
Korea

Mr Siddharth Karanth
Royal Hobart Hospital
Australia

Prof Young Keun Lee
Chonbuk National University
Korea

Mr Hercy Li
President APFSHT
Hong Kong

Prof Luke Cheng-Hung Lin
Chang Gung Memorial Hospital
Taiwan

Dr Yu-Te Lin
Chang Gung Memorial Hospital
Taiwan

Dr Chihhung Lin
Chang Gung Memorial Hospital
Taiwan

Ms Jacqui Louder
Olympic Park Sports Medicine Centre
Australia

Ms Brodwen McBain
La Trobe University; Melbourne Hand Rehab
Australia

Prof Duncan Angus (Gus) McGrouther
Singapore General Hospital
Singapore

Mr Simon MacLean
Grace Orthopaedic Centre
New Zealand

Dr Michael Mak
University of Hong Kong
Hong Kong

Prof Wayne Morrison
St Vincent’s Hospital
Australia

Prof Toshi Nakamura
Department of Orthopaedic Surgery,
School of Medicine, International University of Health and Welfare
Japan

Mr Alexander O’Beirne
Western Orthopaedic Clinic
Australia

Prof Richard Page
Barwon Health
Australia

Ms Liyang Pang
Rehabilitation Centre, National University Hospital
Singapore

Ms Jill Peck-Murray
Rehab Education, LLC
United States

Dr Theddeus Prasetyono
University of Indonesia
Indonesia
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Invited Speakers

Dr Mark Puhaindran  
National University of Singapore  
Singapore

Mr Daniel Purtell  
St Vincent’s Hospital  
Australia

Prof Santosh Rath  
Kalinga Institute of Medical Sciences  
India

Dr Nyoman Riasa  
Sanglah Hospital and BIMC Hospital  
Indonesia

Ms Lisa Robin  
Royal Children’s Hospital  
Australia

Dr Mark Ross  
Brisbane Hand & Upper Limb Clinic  
Australia

Dr Damian Ryan  
North Shore Private Hospital  
Australia

Dr Raja Sabapathy  
Ganga Medical Centre & Hospital  
India

Prof Kanit Sananpanich  
Chang Mai University  
Thailand

A/Prof Michael Sandow  
Wakefield Sports Clinic  
Australia

Dr John Scott  
Dr John Scott Orthopaedic Surgeon  
Australia

Dr Peter Scougall  
Sydney Hospital  
Australia

Dr Juiitien Shih  
Armed Forces Taoyuan General Hospital  
Taiwan

Dr Kozo Shimada  
Jcho Osaka Hospital  
Japan

Dr Alexander Shin  
Mayo Clinic  
USA

Dr Jeremy Simcock  
University of Otago  
New Zealand

Dr Karen Smith  
The Orthopaedic Clinic NZ  
New Zealand

Dr Nicholas Smith  
Southern Highlands Private Hospital  
Australia

Dr Heri Suroto  
SMF Orthopaedics and Traumatology  
Indonesia

Dr Caroline Stegink-Jansen  
University of Texas Medical Branch  
USA

Dr Makoto Tamai  
Director and Hand Surgeon West 18th Street Hand Clinic  
Japan

Ms Charlie Tan  
JoinCare Rehabilitation Centre  
Malaysia

Mr Eng-Wah Tan  
RehabMalaysia  
Malaysia

Dr Jacqueline Tan  
Singapore General Hospital  
Singapore

A/Prof Ezekiel Tan  
Gold Coast University Hospital  
Australia

Ms Alison Taylor  
Baylor Scott and White Sports Therapy Research  
United States

Dr Kristoffer Thorvaldson  
Maitland Private Hospital  
Australia

Dr Sarah Tolerton  
Randwick Plastic Surgery  
Australia

Prof Yuan-Kun Tu  
E-Da Hospital  
Taiwan

Dr Michael Wagels  
Princess Alexandra Hospital  
Australia

Dr Abhijeet Wahegoankar  
The Hand Surgery Clinics  
India

A/Prof Anne Wajon  
Macquarie Hand Unit  
United Kingdom

Dr Sudhir Warrier  
Laud Clinic  
India

Dr Douglass Wheen  
Hand Surgery Sydney  
Australia

Dr John White  
Hand and Upper Limb Clinic, Flinders Medical Centre  
Australia

Dr Clara Wing Yee Wong  
The Chinese University of Hong Kong Medical Centre  
Hong Kong

Mr Warwick Wright  
Malvern Orthopaedic Centre  
Australia

Dr Andrew Yam  
Farrer Park Hospital  
Singapore

Dr Fok-Chuan Yong  
Tan Tock Seng Hospital  
Singapore

Mr Ahmad Zamir Che Duad  
Universiti Teknologi Malaysia
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**Wednesday 11 March 2020**

**08:30 – 10:00 Opening Ceremony**

*GOLDFIELDS THEATRE*

- Traditional welcome to Country
- Victorian Government welcome message
- Opening note from Congress Convenor
  
  **Tony Berger**

- Welcome from APFSSH President
  
  **Goo Huyn Baek**

- Welcome from APFSHT President
  
  **Hercy Li**

**10:00 – 10:30 Morning Tea**

*EXHIBITION HALL*

**10:30 – 13:00 Scientific Session A1**

*GOLDFIELDS THEATRE*

**APWA / IWAS Plenary Session Current Practice of wrist arthroscopic surgery**

**Session Chair: Eva-Maria Baur, Greg Bain, Jan Ragnar Haugstvedt**

- **10:30 – 10:45** Wrist Arthroscopy: How did we get here?
  
  **Greg Bain**

- **10:45 – 11:00** Arthroscopy and Distal Radius Fractures
  
  **Francisco del Piñal**

- **11:00 – 11:15** Arthroscopy for scaphoid pathology
  
  **PC Ho**

- **11:15 – 11:30** Arthroscopy for Scapholunate Ligament Pathology
  
  **Juitien Shih**

- **11:30 – 11:45** Arthroscopy and the TFCC
  
  **Toshi Nakamura**

- **11:45 – 12:00** Limited Wrist Fusions
  
  **Eva-Maria Baur**

- **12:00 – 12:15** Arthroscopy and ulnar carpal pathology
  
  **Jan Ragnar Haugstvedt**

- **12:15 – 12:30** Arthroscopic management of Kienbock's Disease
  
  **Greg Bain**

- **12:30 – 13:00** Panel Discussion: Wrist Arthroscopy. Where are we going?
  
  **Moderated by: Marc Garcia Elias**

**10:30 – 11:45 Scientific Session A1**

*COURTYARD ROOM 1&2*

**Dupuytren's Contracture 1**

**Session Chair: Duncan Angus McGrouther, Tanya Burgess**

- **10:30 - 10:39** Surgery: What secrets have I learnt?
  
  **David Gilpin**

- **10:39 - 10:48** FNA vs collagenase is there real evidence
  
  **Phil Griffin**
10:48 - 10:57  Radiotherapy. What is the evidence  
Tanya Burgess

10:57 - 11:06  Outcome studies for Dupuytren’s and recurrence definition  
Warren Rozen

11:06 - 11:15  Dupuytren’s fibrosis: Outcome of dermatofasciectomy and full thickness graft  
Jeff Ecker

11:15 - 11:24  Post operative therapy  
Dan Purtell

11:24 - 11:36  Panel Discussion: Can Surgery alter the Natural History of Dupuytren’s

11:45 – 13:00  Scientific Session A1  
COURTYARD ROOM 1&2

Session Chair: Neela Janakiramanan, Phil Griffin

11:45 - 11:53  Clinical Tests of Individual Intrinsic Muscles  
Duncan Angus McGrouther

11:53 - 12:01  Minimal endoscopic decompression of ulnar nerve in the cubital tunnel  
Dawid Mrozik

12:01 - 12:09  Identifying factors that would predict postoperative recovery of McGowan grade II cubital tunnel syndrome cases  
Takao Omura

12:09 - 12:17  Long-term protective effect of biodegradable nerve conduit against peripheral nerve adhesion in animal models  
Kosuke Shintani

12:17 - 12:25  Active von Frey filament test: new technique for evaluation of hand tactile sensation measuring in continuous variable units  
Hyun-Joo Lee

12:25 - 12:33  Comparative Study among Nerve Repair, Orthodromic and Antidromic Nerve Grafts: An Experimental Study in Rabbits  
Jihyeung Kim

12:33 - 13:00  Panel Discussion:

10:30 – 13:00  Scientific Session A1  
EUREKA ROOM 1&2

PART 1: Session Chair: Raja Sabapathy, Roohi Ahmad

10:30 - 10:45  Digital and Macro replantation  
Raja Sabapathy

10:45 - 11.00  Hand replantation and repair, setting priorities  
Rajendra Nehete

11:00 – 11:06  Is staged nerve reconstruction surgery necessary for replantation of fingers? Clinical outcomes of sensory recovery with staged nerve reconstruction and with immediate nerve repair  
Hirotada Matsui
11:06 – 11:12  The Trend of Upper Extremity Replantation in Japan: A Nationwide Population-Based Study from the Japan Trauma Data Bank  
Taichi Saito

11:12 – 11:22  Secondary Reconstructive Surgery following Major Upper Extremity Replantation  
Chih-Hung Lin

11:22 – 11:32  Functional outcomes of digital replantation. It worth while?  
Kevin Chung

PART 2: Session Chair: Raja Sabapathy, Kevin Chung, Chih Hung Lin

11:32 – 11:44  Avoiding unfavorable results in microsurgical reconstruction in upper extremity  
Chih-Hung Lin

11:44 – 12:02  High velocity ballistic injuries  
Bruno Crepaldi

12:02 – 12:10  Reconstructive Surgery on High Voltage Electric Injury of the hand and upper extremity  
Nyoman Riasa

12:10 – 12:18  Resurfacing of Soft Tissue Defect of Upper Limb following Electric Burn :Study of 64 Cases  
Nurunnahar Begum

Roohi Ahmad

12:26 - 12:34  Compartment Syndrome  
Raja Sabapathy

12:34 - 12:42  Outcome of gracilis free functioning muscle transfer for finger flexion in severe Volkmann’s ischemic contracture  
Praveen Bhardwaj

12:42 – 13:00  Panel Discussion: Setting priorities and realistic goals. One stage vs Multistage reconstruction  
Raja Sabapathy, Chi Hung Lin

10:30 – 13:00  Scientific Session A1  
EUREKA ROOM 3

RECONSTRUCTION 1 - Cerebral Palsey, Stroke and Acquired Brain Injury

Session Chair: Wee Leon Lam, Claudia Gschwind, Praveen Bhardwaj

10:30 - 10:40  Current concepts on the Aetiology of Cerebral Palsy and the place of Selective Neurectomy  
Wee Leon Lam

10:40 - 10:50  Principles of surgery for the spastic upper limb in children/adolescents and what does the future hold?  
John Scott

10:50 - 11:00  25 Year review of CP Surgery at RCH  
Bruce Johnstone

11:00 - 11:10  Outcomes of Single-Event Multilevel surgery (SEMLS) for Upper Extremity in Cerebral Palsy  
Praveen Bhardwaj

11:10 - 11:16  Cerebral Palsy Hand Surgery at Canterbury District Health Board 2010-2019  
Hyok Jun Kwon

11:16 - 11:22  Botox in Cerebral Palsy  
Bruce Johnstone
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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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<tr>
<td>11:22</td>
<td>Panel Discussion / Questions</td>
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<tr>
<td>11:22</td>
<td><strong>Wee Leon Lam, Claudia Gschwind, Praveen Bhardwaj</strong></td>
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<td>11:42</td>
<td>Stroke and ABI Assessment and principles</td>
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<td>11:42</td>
<td><strong>Wee Leon Lam</strong></td>
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<td>11:52</td>
<td>Surgical options for shoulder and elbow</td>
<td><strong>Claudia Gschwind</strong></td>
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<td>11:52</td>
<td>11:52 - 12:02 Surgical options for spasticity in the hand and wrist</td>
<td><strong>James Ledgard</strong></td>
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<tr>
<td>12:02</td>
<td>12:02 - 12:12 Surgical options for spasticity in the hand and wrist</td>
<td><strong>James Ledgard</strong></td>
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<td>12:12</td>
<td>12:12 - 12:27 Contralateral C7 transfers for Spastic Arm Paralysis</td>
<td><strong>Yohan Lee</strong></td>
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<td>12:27</td>
<td>12:27 - 12:37 Surgical Treatment of the Non-Functional Upper Limb</td>
<td><strong>Claudia Gschwind</strong></td>
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<td>12:37</td>
<td>12:37 - 13:00 Panel Discussion / Questions</td>
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<td>10:30</td>
<td>10:30 – 13:00 Hand Therapy A1</td>
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<td>10:30</td>
<td>Session Chair: Mandy Gumbley, Hamish Anderson</td>
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<td><strong>Hand Therapy A1</strong></td>
<td><strong>SPORT</strong></td>
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<td>10:30</td>
<td>Sport, Elbow, Function</td>
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<td>10:30</td>
<td><strong>Session Chair: Mandy Gumbley, Hamish Anderson</strong></td>
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<td>10:30</td>
<td><strong>SPORT</strong></td>
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<td>10:48</td>
<td>Rehabilitation in elite level sporting injuries of the UL</td>
<td><strong>Hamish Anderson</strong></td>
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<td>10:48</td>
<td>10:48 - 10:56 Distal radioulnar joint kinematics during handstanding in female gymnasts</td>
<td><strong>Shinya Nishimura</strong></td>
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<td>10:56</td>
<td>10:56 - 11:04 Cost and profile of sport and exercise-related acute hand and wrist injuries</td>
<td><strong>Luke Robinson</strong></td>
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<td>11:04</td>
<td>11:04 - 11:12 Panel Discussion / Questions</td>
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<td>11:12</td>
<td>11:12- 11:37 Dry needling for acute sporting injuries</td>
<td><strong>Charlie Tan</strong></td>
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<td>11:37</td>
<td>11:37 - 11:42 Questions</td>
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<td>11:44</td>
<td>11:44 - 12:04 Elbow Instability and Stiffness: Considerations for treatment – biomechanics, stability and function</td>
<td><strong>Aviva Wolf</strong></td>
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<td>12:04</td>
<td>12:04 – 12:12 Effects of Focused Extracorporeal Shock Wave Therapy for Chronic Lateral Epicondylitis</td>
<td><strong>Shuichiro Sakai</strong></td>
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<td>12:12</td>
<td>12:12 – 12:19 Panel Discussion / Questions</td>
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Wednesday 11 March 2020

FUNCTION

12:20 - 12:30 Occupation based intervention in hand rehabilitation
Ahmad Zamir Che Daud

12:30 - 12:34 FUNction: When to return to fun and games?
Emily Donovan

12:34 - 12:40 Functional outcome following Single Event Multiple Level Surgery (SEMLS) with rehabilitation for spastic hand using Shriners Hospital Upper Extremity Evaluation (SHUEE)
Gobinath Kannan

12:40 - 12:46 Can Pressure Garment Improve Arm Function in the Early Stages after Stroke?
Siaw Chui Chai

12:46 - 12:52 Activity recommendations in the first six weeks following surgical treatment of distal radius fracture: a systematic review
Julie Collis

12:52 - 13:00 Panel Discussion / Questions

13:00 – 14:00 Lunch & Poster Sessions

13:15 – 14:00 Newclip Technics Lunch Symposium

14:00 – 15:30 Scientific Session A2
APWA Wrist 1 - Scaphoid Fractures
Session Chair: Jeff Ecker, Clara Wing Yee Wong

14:00 - 14:08 The vascularity of the carpus: new discoveries and implications for scaphoid surgery
Steve Moran

14:08 - 14:16 Mapping of Scaphoid fractures
John White

14:16 - 14:24 Acute Scaphoid Fractures: Splint Vs Percutaneous fixation
Esther Chow

14:24 - 14:32 Open Fixation: surgical approaches and techniques
Jacqueline Tan

14:32 - 14:40 Arthroscopic reduction and internal fixation scaphoid
Clara Wing Yee Wong

14:40 - 14:48 Bone Graft Substitute In Delayed Union
Jui-Tien Shih

14:48 - 14:56 Acute Ligament Injuries Associated with Scaphoid Fractures
Michael Mak

14:56 - 15:04 Transcaphoid perilunate fracture dislocations
Francisco del Piñal

15:04 - 15:30 Case Discussions
Moderated by: Clara Wing Yee Wong
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>14:00 – 15:30</td>
<td><strong>Scientific Session A2</strong></td>
<td><strong>COURTYARD ROOM 1&amp;2</strong></td>
<td><strong>Free Papers 2 - HandFractures, Rheumatoid Arthritis</strong></td>
<td></td>
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<tr>
<td>14:00 – 14:08</td>
<td>Second toe middle phalanx osteochondral autografts as an alternative to hemihamate arthroplasty for proximal interphalangeal joint fracture-dislocations</td>
<td></td>
<td>George Miller</td>
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<td>14:08 – 14:16</td>
<td>Role of regional anaesthesia for the management of hand fractures</td>
<td></td>
<td>Andrew Hart-Pinto</td>
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<tr>
<td>14:16 – 14:24</td>
<td>Traction Splinting vs. Operative Fixation of Proximal Phalanx Fractures – a Retrospective Study</td>
<td></td>
<td>Alyse Hopkins</td>
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<tr>
<td>14:24 – 14:32</td>
<td>Modified tension band wire- an ideal low profile internal fixation method for 5th metacarpal neck fracture</td>
<td></td>
<td>Cheng En Hsu</td>
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<td>14:32 – 14:40</td>
<td>Comparative Study of Pinning and Plate Fixation for Pediatric Forearm Fractures</td>
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<td>Akira Kawabata</td>
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<td>14:40 – 14:48</td>
<td>MCP Joint replacement Objective and Subjective outcomes over an 11yr period</td>
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<td>Chris Lowden</td>
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<td>14:48 – 14:56</td>
<td>Cross-shaped Bone Grafting and Locking Plate Fixation for Arthrodesis of the Trapeziometacarpal Joint: Surgical Technique and Early Mobilization</td>
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<td>Keiichi Muramatsu</td>
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<td>14:56 – 15:04</td>
<td>Medium- to long-term outcome of Total Finger Arthroplasty using FINE Total Finger System for rheumatoid arthritis</td>
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<td>Masayuki Sekiguchi</td>
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<td>15:04 – 15:30</td>
<td>Panel Discussion</td>
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<td>14:00 – 15:30</td>
<td><strong>Scientific Session A2</strong></td>
<td><strong>EUREKA ROOM 1&amp;2</strong></td>
<td><strong>Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions</strong></td>
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<td>14:00 – 14:10</td>
<td>Flexor tendon repair is changing a lot for the better</td>
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<td>Don Lalonde</td>
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<td>14:10 – 14:20</td>
<td>Understanding the Ambiguous “Work of Flexion”</td>
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<td>Judy Colditz</td>
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<td>14:20 – 14:28</td>
<td>Flexor tendon repairs, what makes a good repair</td>
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<td>Michael Sandow</td>
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<td>14:28 – 14:36</td>
<td>Primary vs Secondary tendon reconstruction. When and How</td>
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<td>Jui-Tien Shih</td>
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<td>14:36 – 14:44</td>
<td>Staged Tendon Grafting, what I do and how.</td>
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<td>Amir Adham</td>
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<td>14:44 – 14:52</td>
<td>Flexor tenolysis</td>
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<td>Michael Sandow</td>
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<td>14:52 – 15:02</td>
<td>Post-operative management of Flexor tenolysis: maximising outcome</td>
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<td>Bhavana Jha</td>
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<td>15:02 - 15:08</td>
<td>Preventing Muscle Contracture: New Protocol after Flexor Tendon Repair</td>
<td>Sotetsu Sakamoto</td>
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<td>15:08 - 15:16</td>
<td>Tissue Engineering for Tendon Repair and Reconstruction: are we making progress?</td>
<td>Peter Amadio</td>
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<td>15:16 - 15:22</td>
<td>Outcome of early active mobilization after flexor tendon repair in Zone-II in hand.</td>
<td>Krishna Priya Das</td>
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<td>15:22 - 15:30</td>
<td>Panel Discussion: What to do with the late FDP avulsion, How late is too late, When to graft.</td>
<td>Michael Sandow, Jui-Tien Shih</td>
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<td>14:00 – 15:30</td>
<td>Scientific Session A2</td>
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<td>14:00 – 15:18</td>
<td>PLEXUS 1- Paediatric Plexus Injuries</td>
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<td>Session Chair: Stuart Bade, Emily Ho, Nicholas Smith</td>
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<td>14:00 - 14:08</td>
<td>Indications for Nerve Reconstruction</td>
<td>Stuart Bade</td>
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<td>14:08 - 14:18</td>
<td>Sensory Outcome and Pain in OBPI</td>
<td>Emily Ho</td>
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<td>14:18 - 14:26</td>
<td>Indications for shoulder surgery</td>
<td>Nicholas Smith</td>
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<td>14:26 - 14:34</td>
<td>Surgical Reconstruction of Upper Extremity Paralysis following Acute Flaccid Myelitis.</td>
<td>Kazuteru Doi</td>
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<td>14:34 - 14:42</td>
<td>Acute flacid myelitis</td>
<td>Richard Lawson</td>
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<td>14:42 - 14:52</td>
<td>Panel Discussion / Questions</td>
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<td>15:00 – 15:30</td>
<td>Hand Therapy A2</td>
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<td>14:00 – 15:30</td>
<td>Assessment, Considerations in Practice</td>
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<td>Session Chair: Seiji Nishimura, Rosie Koh</td>
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<td>14:00 - 14:10</td>
<td>The journey of MHQ</td>
<td>Kevin Chung</td>
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<td>14:10 - 14:18</td>
<td>Preliminary study on the usability of a tri-axial accelerometer:</td>
<td>Terufumi Iitsuka</td>
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<td>Evaluation of how postoperative distal radius fracture patients use their hands in ADL</td>
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</table>
| 14:18 - 14:28 | GripAble: Affordable grip and movement assessment and treatment – the portable and digital future | Nicola Goldsmith
14:28 - 14:34 The hand function that can be evaluated by Simple Test Evaluating for Hand Function
Kaoru Abe

14:34 - 14:42 The role of wearable wrist inertial sensors to quantify arm asymmetry during gait in unilateral spastic cerebral palsy (USCP)
Aviva Wolff

14:42 - 14:48 Panel Discussion / Questions

CONSIDERATIONS IN PRACTICE
Session Chair: Terufumi Litsuka, Rosie Koh

14:50 - 14:58 Hand Therapy around the world: How national societies function and the aspirations of emerging countries
Nicola Goldsmith

14:58 - 15:08 A Qualitative Analysis of an IFSHT Global Panel Presentation: Service Delivery, Education, and Practice
Caroline Jansen

15:08 - 15:16 Cost, profile and resource use for acute hand and wrist injuries: A local and global perspective
Luke Robinson

15:16 - 15:24 Exploring IT in Hand Therapy: the use of video-narrated exercise clips and education to enhance patient engagement
Nicola Goldsmith

15:24 - 15:30 Panel Discussion / Questions

16:00 – 18:00 Scientific Session A3
APWA Wrist 2 - DRUJ Symposium 1: The TFCC
Session Chair: PC Ho, Eva-Maria Baur, Jan Ragnar Haugstvedt

16:00 - 16:15 Anatomy and Biomechanics of the DRUJ and ulnocarpal joint
Jan Ragnar Haugstvedt

16:15 - 16:25 Examination of the ulnar wrist
PC Ho

16:25 - 16:35 Imaging of ulnar sided wrist pain
Toshiyasu Nakamura

16:35 - 16:45 The Arthroscopic Hook Test is Not Pathognomonic for a Foveal Tear of the Triangular Fibrocartilage
Jeff Ecker

16:45 - 16:55 Arthroscopic TFCC repairs, How I do it and Why
Eva-Maria Baur

16:55 - 17:05 Inside out TFCC repair. How I do it and why
Keiji Fujio

17:05 - 17:15 Arthroscopic TFCC repair using target guide, How I do it and why
Toshiyasu Nakamura

17:15 - 17:25 Tendon TFCC Graft Reconstruction: which is the best and how good are they?
Michael Mak

17:25 - 17:35 ECU Pathology and TFCC Tears
David Tan

17:35 - 18:00 Panel / Case Discussions
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<th>Speaker(s)</th>
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<tr>
<td>16:00 – 18:00</td>
<td>Scientific Session A3 Free Papers 3 - Congenital, Paediatric</td>
<td>Session Chair: David McCombe, Brian Labow</td>
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<tr>
<td>16:00 - 16:08</td>
<td>Assessing the Feasibility of an Oberg Manske Tonkin (OMT) Classification Mobile App for Congenital Hand Differences (CHD)</td>
<td>Wee Leon Lam</td>
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<td>16:08 - 16:16</td>
<td>How Important is Embryology for Parents of Children Born with Congenital Hand Differences?</td>
<td>Andrew Clelland, Wee Lam</td>
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<td>16:16 - 16:24</td>
<td>Split skin-subcutaneous resurfacing technique for Apert’s syndactyly reconstruction</td>
<td>Pobe Luangjarmekorn</td>
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<td>16:24 - 16:32</td>
<td>Toe transfers for reconstruction of post-traumatic thumb loss in children</td>
<td>Praveen Bhardwaj</td>
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<td>16:32 - 16:40</td>
<td>Non-Vascularized Free Toe Phalangeal Transfer (NVFTT) in Congenital Hand Anomalies</td>
<td>Monusha Mohan</td>
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<td>16:40 - 16:48</td>
<td>Bone lengthening of the radius with temporary external fixation of the wrist for mild radial club hand.</td>
<td>Takehiko Takagi</td>
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<td>16:48 - 16:56</td>
<td>Making five fingered hand in Type III B thumb hypoplasia</td>
<td>Govindasamy Balakrishnan</td>
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<td>16:56 - 17:04</td>
<td>Free vascularised joint transfers from toes for finger reconstruction in a 2 year old child, an interesting case report</td>
<td>Jyoshid R Balan</td>
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<td>17:04 - 17:10</td>
<td>Pre-operative angulation as a Predictor for operations and prognosis of thumb polydactyly surgery</td>
<td>Natthawat Virojanawat</td>
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<td>17:10 - 18:00</td>
<td>Discussion:</td>
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<td>16:00 – 17:00</td>
<td><strong>Scientific Session A3</strong></td>
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<td><strong>PIP JOINT 1 - Traumatic injuries to the interphalangeal joints</strong></td>
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<td><strong>Session Chair: Roohi Ahmad</strong></td>
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<td>16:00 - 16:12</td>
<td>Anatomy of the PIP joint</td>
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<td>Duncan Angus McGrouther</td>
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<td>16:12 - 16:19</td>
<td>Pilon fractures of the PIPJ understanding and approach to management</td>
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<td>TC Tan</td>
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<td>16:19 - 16:26</td>
<td>PIP Dorsal Fracture Dislocations</td>
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<td>Pankaj Ahire</td>
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<td>16:26 - 16:33</td>
<td>Volar plate arthroplasty / Hemi hamate. When and How</td>
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<td>Mark Hile</td>
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<td>16:33 - 16:40</td>
<td>Hemi arthroplasty for the unsalvagable fracture</td>
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<td>Mark Ross</td>
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<td>16:40 - 16:47</td>
<td>Acute Ligamentous injuries in the fingers</td>
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<td>Roohi Ahmad</td>
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<td>16:47 - 16:54</td>
<td>Management of chronic PIP ligament injuries</td>
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<td>Randy Bindra</td>
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<td>16:54 - 17:00</td>
<td>Panel Discussion:</td>
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<td><strong>Scientific Session A3</strong></td>
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<td><strong>PIP JOINT 2 - Interphalangeal joint arthroplasty. Current concepts</strong></td>
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<td><strong>Session Chair: Daniel Herren, Damian Ryan</strong></td>
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<td>17:00 - 17:10</td>
<td>PIP arthroplasty, what surgical approach</td>
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<td>Daniel Herren</td>
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<td>17:10 - 17:17</td>
<td>MatOrto PIP replacements</td>
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<td></td>
<td>Damian Ryan</td>
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<td>17:17 - 17:27</td>
<td>PIPJ arthroplasty - long term survivorship - outcomes and techniques optimise outcome</td>
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<td>Mark Ross</td>
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<td>17:27 - 17:37</td>
<td>How to develop a PIP arthroplasty. The road to a surface replacement.</td>
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<td>Daniel Herren</td>
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<td>17:37 - 17:47</td>
<td>Toe joint transfers, how to make them work</td>
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<td>Yu-Te Lin</td>
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<td>17:47 - 17:54</td>
<td>Denervation of the small joints</td>
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<td>Paul Jarrett</td>
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<td>17:54 - 18:00</td>
<td>Panel Discussion: Is silicone the past or the future?</td>
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<td>Daniel Herren, Mark Ross, Damian Ryan</td>
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<td>16:00 – 18:00</td>
<td><strong>Scientific Session A3</strong></td>
<td><strong>EUREKA ROOM 2</strong></td>
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<td><strong>RECONSTRUCTION 2 - TETRAPLEGIA SURGERY</strong></td>
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<td><strong>Session Chair: Natasha Van Zyl, Claudia Gschwind, Jeremy Simcock</strong></td>
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<td>16:00 – 16:12</td>
<td>Tendon transfers for tetraplegia, what works and what doesn’t</td>
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<td><strong>Sandeep Sebastin</strong></td>
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<td>16:12 – 16:24</td>
<td>Restoration of upper extremity and trunk control in spinal injury with innovative functional electrical stimulation</td>
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<td><strong>Harry Hoyen</strong></td>
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<td>16:24 – 16:36</td>
<td>Nerve Transfer Surgery Has Expanded The Therapeutic Options in Tetraplegia</td>
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<td><strong>Claudia Gschwind</strong></td>
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<td>16:36 – 16:48</td>
<td>Nerve transfers for the restoration of upper limb function in tetraplegia: Expanding on traditional tendon-based techniques</td>
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<td><strong>Natasha Van Zyl</strong></td>
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<td>16:48 – 17:00</td>
<td>double nerve transfer for finger flexion</td>
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<td><strong>Kanit Sanapanich</strong></td>
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<td>17:00 – 17:15</td>
<td>Panel Discussion: Current problems and future directions</td>
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<td><strong>Natasha Van Zyl, Claudia Gschwind, Kanit Sanapanich</strong></td>
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<td>17:15 – 17:27</td>
<td>Revolutions in reconstructive surgery for spinal cord injury</td>
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<td><strong>Yuan Kun Tu</strong></td>
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<td>17:27 – 17:37</td>
<td>Tetrplegia, The NZ experience</td>
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<td><strong>Jeremy Simcock</strong></td>
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<td>17:37 – 17:45</td>
<td>Neurophysiological Assessment for Prediction of Outcomes in Upper Limb Nerve Transfer Surgery in Tetraplegia</td>
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<td><strong>Edward Stanley</strong></td>
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<td>17:45 – 17:53</td>
<td>When is long, too long</td>
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<td><strong>Claudia Gschwind</strong></td>
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<td>17:53 – 18:00</td>
<td>Panel Discussion:</td>
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<td>16:00 – 18:00</td>
<td><strong>Hand Therapy A3</strong></td>
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<td><strong>Hand Therapy In Depth Practice Topics 1 (a)</strong></td>
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<td><strong>Session Chair: Carmal Bohan, Karen Fitt</strong></td>
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<td>16:00 – 16:55</td>
<td>Overuse and Sporting Injuries in the Elite Paediatric Elbow - a practical approach</td>
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<td><strong>Elizabeth Ward</strong></td>
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<td>17:00 – 18:00</td>
<td>Performance Related Musculoskeletal Injuries in Musicians: Assessment, Prevention, Management</td>
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<td><strong>Aviva Wolff</strong></td>
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<td><strong>Hand Therapy In Depth Practice Topics 1 (a) (yellow sticker)</strong></td>
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<td><strong>Session Chair: Sally Colwell</strong></td>
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<td>16:00 – 18:00</td>
<td>Treating without Pain (Taping for the UL)</td>
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<td><strong>Alison Taylor</strong></td>
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<td>18:00 – 20:00</td>
<td><strong>Welcome Reception</strong></td>
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Arthrex Breakfast Symposium

**07:00 – 07:45**
EUREKA ROOM 3

**08:00 – 10:00**
**Scientific Session B1**
**APWA Wrist 3 - Scaphoid non union, AVN and malunion**

**Session Chair:** Steve Moran, Clara Wing Yee Wong, Wolfgang Heiss-Dunlop

- **08:00 - 08:10**
  - Natural History of the Mobile and Non-mobile Scaphoid Non-Union
    - Wolfgang Heiss Dunlop

- **08:10 - 08:20**
  - Is there a place for open cancellous and trapezoidal avascular bone graft
    - Margaret Fok

- **08:20 - 08:30**
  - Arthroscopic bone graft to scaphoid
    - Young-Kuen Lee

- **08:30 - 08:40**
  - Pedicled Bone Grafts for Scaphoid non union
    - David Tan

- **08:40 - 08:50**
  - MFC for scaphoid nonunions
    - Sudhir Warrier

- **08:50 - 09:00**
  - Arthroscopic Management of Scaphoid Non-Union: an evaluation of failures and how to avoid
    - PC Ho

- **09:00 - 09:10**
  - Costochondral graft
    - Michael Sandow

- **09:10 - 09:20**
  - MFT vs costochondral graft
    - David McCombe

- **09:20 - 09:30**
  - Arthroscopic Bone Graft of the Proximal Pole
    - Jeff Ecker

- **09:30 - 09:40**
  - Decision Making in Delayed Union and Non-Union
    - Clara Wing Yee Wong

- **09:40 - 10:00**
  - Panel Discussion: How do you treat scaphoid non-union? What is your preference and why?
    - All speakers: panel lead Mark Ross

**08:00 – 10:00**
**Scientific Session B1**
**COURTYARD ROOM 1&2**

**PAEDIATRICS 1 - Introduction and Complex Differences of the Digits and Limb**

**Session Chair:** Goo Hyun Baek, Richard Lawson

- **08:00 - 08:10**
  - Embryology of the Hand and Upper Limb - Current Understanding and Implications for the Hand Surgeon
    - Wee Leon Lam

- **08:10 - 08:18**
  - Classification
    - Sarah Tolerton

- **08:18 - 08:23**
  - Panel Discussion / Questions
<table>
<thead>
<tr>
<th>Time</th>
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</table>
| 08:23 - 08:43 | Surgical Mobilization of Symphalangism of the Hand
Goo Hyun Baek |
| 08:43 - 08:53 | Aperts
Brian Labow |
| 08:53 - 09:01 | Macrodactyly
Raja Sabapathy |
| 09:01 - 09:11 | Syndactyly, without graft
Esther Chow |
| 09:11 - 09:21 | Long term results of Free phalangeal transfers and toe transfers for symbrachydactyly
Raja Sabapathy |
| 09:21 - 09:31 | Reconstruction of the donor site in non-vascularized toe phalanx transfer
Hidehiko Kawabata |
| 09:31 - 09:36 | Panel Discussion / Questions |
| 09:36 - 09:46 | Vascular anomalies
Brian Labow |
| 09:46 - 09:56 | Congenital radioulnar synostosis
Fuminori Kanaya |
| 09:56 - 10:00 | Panel Discussion / Questions |

**08:00 – 10:00**  
**Scientific Session B1**  
**PLEXUS 2 Adult brachial plexus**  
Session Chair: Alex Shin, Scott Ferris, Kaz Doi

**UPDATES AND DEBATES**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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</table>
| 08:00 - 08:10 | Update on adult BPI
Kazuteru Doi |
| 08:10 - 08:20 | Treatment for Brachial Plexus Injuries in Cambodia: a program of development and the results of the first 150 cases treated.
Ou Cheng Ngiep |
| 08:20 - 08:28 | Measuring outcomes in BP palsy
Bridget Hill |

**SHOULDER**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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</table>
| 08:36 - 08:44 | Should we trust less than normal triceps nerves for deltoid reinnervation?
Scott Ferris |
| 08:44 - 08:52 | Regional muscle transfers for shoulder reconstruction
Alex O’Beirne |
ELBOW PLUS

08:52 - 09:00  Nerve transfers for elbow function
Emmanuel Estrella

09:00 - 09:08  Regional Muscle transfers for elbow flexion
Praveen Bhadwaj

09:08 - 09:18  Panel Discussion and Debate – ‘In 2020 pure C56 palsy, who wants to explore the neck?’
Kazuteru Doi, Andrew Yam, Scott Ferris

FUNCTIONING FREE MUSCLE TRANSFERS

09:18 - 09:26  The One Army! Therapy input and functional outcomes following FFMT for the complete BPI patient
Melanie McCulloch

09:26 - 09:36  Triple muscle transfer – how and why
Yuan Kun Tu

09:36 - 09:46  A comparison of clinical outcomes in primary Free Functioning Muscle Transfer and Nerve Reconstruction for Elbow flexion of acute BPI
Heri Surotu

09:46 - 10:00  Panel Discussion

08:00 – 10:00  Scientific Session B1
Arthritis 1 Rheumatoid Arthritis
Session Chair: Daniel Herren, Duncan Angus McGrouther

08:00 - 08:20  The changing spectrum of rheumatoid surgery
Kevin Chung

08:20 - 08:40  Evidence for surgery in RA
Daniel Herren

08:40 - 09:00  Patient reported outcome (PRO) of the wrist and hand surgeries for patients with rheumatoid arthritis
Hajime Ishikawa

09:00 - 09:15  Biomechanics of the rheumatoid hand
Duncan Angus McGrouther

09:15 - 09:25  Soft tissue vs bony surgery in the rheumatoid wrist
Fuminori Kanaya

09:25 - 09:35  Early synovectomy in rheumatoid arthritis
Doug Wheen

09:35 - 09:45  Tendon rebalancing in rheumatoid Arthritis
Damian Ryan

09:45 - 10:00  Panel Discussion Is there a place for prophylactic surgery. Are we proactive or reactive?
Karen Smith, Danien Herren, Hajime Ishikawa
**Thursday 12 March 2020**

**08:00 – 10:00 Scientific Session B1**

**Free Papers 4 - TFCC, Miscellaneous**

*Session Chair: Tanya Burgess, Peter Maloney*

08:00 - 08:08 Does Injury Mechanism Affect TFCC Lesion Type?
*Sanae Irimura*

08:16 - 08:24 Arthroscopic TFCC repair - outcome in 42 patients
*Bharath Kadadi*

08:24 - 08:32 Anatomy regarding the morphology of the styloid process of the ulna and radioulnar ligament attachment
*Akimoto Nimura*

08:32 - 08:40 Influence of surgical delay on outcome of TFCC foveal repair
*Hoyoung Jung*

08:40 - 08:48 Simple, novel technique to create silicone vessels for microsurgical training
*Joyce Tie*

08:48 - 08:56 Development and implementation of an evidence-based analgesia protocol for overnight admission hand surgery patients at a quaternary referral hand centre
*Dumindu Katupitiya*

08:56 - 09:04 Pain Perception During the Phases of Manual Reduction of Distal End Radius Fracture With A Periosteal Block
*Gill Parminder Singh*

09:04 - 10:00 Discussion

**08:00 – 10:00 Hand Therapy B1**

**Tendons**

*Session Chair: Elaine Duguid, Jane Skeen*

08:00 - 09:00 Nuances of Flexor Tendon Surgery and Rehabilitation
*Judy Colditz & Don Lalonde*

09:00 - 09:15 Relative Motion Orthoses
*Melissa Hirth*

09:15 - 09:25 Panel Discussion / Questions
*Melissa Hirth, Don Lalande, Judy Colditz*

09:26 - 09:36 Flexor Pollicis Longus Rehabilitation: Outcomes comparing Early Active with Immobilisation
*Elaine Duguid*

09:36 - 09:42 Is relative motion extension splinting non-inferior and more cost-effective
*Miranda Buhler*

09:42 - 09:48 Ultrasound evaluation of tendon disorder during hand therapy: Two case reports
*Tomoi Yamada*

09:48 - 10:00 Panel Discussion / Questions
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>10:00 – 10:30</td>
<td>Morning Tea</td>
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<tr>
<td>10:30 – 12:15</td>
<td>Scientific Session B2</td>
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<tr>
<td></td>
<td><strong>COMBINED HAND THERAPY 1 - Scapholunate ligament injuries, assessment, Conservative and operative management, rehabilitation</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Session Chair: Michael Sandow, Steve Moran, Aviva Wolff</strong></td>
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<tr>
<td>10:30 - 10:40</td>
<td>Pathomechanics of scapholunate ligament tears and the scapholunate spectrum</td>
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<td></td>
<td>Steve Moran</td>
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<tr>
<td>10:40 - 10:48</td>
<td>The dorsal lunate bare area: clinical significance, identification, and management</td>
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<td></td>
<td>Mark Ross</td>
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<tr>
<td>10:48 - 10:56</td>
<td>Anatomy of the dorsal scapholunotriquetral ligament complex</td>
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<td></td>
<td>Mark Ross</td>
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<tr>
<td>10:56 - 11:04</td>
<td>Proprioception in Rehabilitation of Low Grade Scapholunate Ligament Injuries of The Wrist</td>
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<td>Ben Bugden</td>
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<tr>
<td>11:04 - 11:10</td>
<td>Dynadesis: Treatment of Dynamic Scaphoid Instability, A 20-year Minimum Prospective Outcome Study</td>
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<td>Houshang Seradge</td>
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<tr>
<td>11:10 - 11:16</td>
<td>HOW DO I IT AND WHY?</td>
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<tr>
<td>11:10 - 11:16</td>
<td>Arthroscopic Dorsal Scapholunate capsulodesis</td>
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<td>Jeff Ecker</td>
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<tr>
<td>11:16 - 11:22</td>
<td>Volar Capsulodesis for Dynamic SL instability</td>
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<td></td>
<td>Steve Moran</td>
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<td>11:22 - 11:28</td>
<td>AIM reconstruction for Scapholunate Instability</td>
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<td>Nicholas Smith</td>
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<td>11:28 - 11:34</td>
<td>ANAFAB</td>
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<td>Michael Sandow</td>
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<tr>
<td>11:34 - 11:40</td>
<td>Scapholunate ligament reconstruction using CH-BLB</td>
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<td>Toshiyasu Nakamura</td>
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<tr>
<td>11:40 - 11:46</td>
<td>Reconstruction for chronic SL with DIC stabilized by RASL vs SwieveLock.</td>
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<td>Keiji Fujio</td>
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<tr>
<td>11:46 - 11:54</td>
<td>Tailoring Treatment to Occupational Needs and Individual Pathology:</td>
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<tr>
<td></td>
<td>The Interplay of Research and Practice for Wrist Biomechanics and Function</td>
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<td>Aviva Wolff</td>
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<tr>
<td>11:54 - 12:04</td>
<td>Post-operative rehabilitation of S-L repair</td>
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<td>Christina Harwood</td>
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<tr>
<td>12:04 - 12:15</td>
<td>Panel Discussion: Are we all treating the same condition in the same patient?</td>
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</table>
**Thursday 12 March 2020**

<table>
<thead>
<tr>
<th>Time</th>
<th>Scientific Session B2</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>10:30 – 12:15</td>
<td><strong>Tumours 1 - Malignant tumours of the hand</strong></td>
<td>COURTYARD ROOM 1&amp;2</td>
</tr>
<tr>
<td>10:30 – 12:15</td>
<td><strong>Session Chair: Emmanuel Estrella, Jacqueline Tan</strong></td>
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<tr>
<td>10:30 - 10:40</td>
<td><strong>Imaging of tumors, Red Flags</strong></td>
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<td>10:40 - 10:50</td>
<td><strong>Epidemiology of Paediatric Upper Limb Tumours</strong></td>
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<td>10:50 - 11:00</td>
<td><strong>Principles of tumor reconstruction in the hand</strong></td>
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<td>11:00 - 11:15</td>
<td><strong>The Management of Malignant tumors of the hand</strong></td>
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<td>11:15 - 11:25</td>
<td><strong>Vascularized fibula graft for long bone reconstruction after tumor resection</strong></td>
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<td>11:25 - 11:35</td>
<td><strong>Three-dimensional printed custom-made endoprosthesis reconstruction after En-bloc resection in giant cell tumor of distal radius</strong></td>
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<td>11:35 - 11:50</td>
<td><strong>Adjuvant therapy for hand sarcomas</strong></td>
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<td>11:50 - 12:00</td>
<td><strong>Outcome of Management of Hand Tumor</strong></td>
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<td>12:00 - 12:15</td>
<td><strong>Panel Discussion: Does the biology or behaviour of malignant tumors determine treatment?</strong></td>
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<th>Time</th>
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<tbody>
<tr>
<td>10:30 – 11:30</td>
<td><strong>Paediatrics 2 - The Thumb</strong></td>
<td>EUREKA ROOM 1</td>
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<tr>
<td>10:30 – 11:30</td>
<td><strong>Session Chair: Daryl Chew, David McCombe</strong></td>
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<td>10:30 - 10:40</td>
<td><strong>Is the thumb saving surgery in Blauth IIIB acceptable?</strong></td>
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<td>10:40 - 10:46</td>
<td><strong>Fanconi anaemia and hypoplastic thumb</strong></td>
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<td>10:46 - 10:52</td>
<td><strong>Satisfaction with Appearance in Children with Index Pollicizations for Thumb Hypoplasia</strong></td>
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<td>10:52 - 11:06</td>
<td><strong>What my Professors taught me on radial polydactyly</strong></td>
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<td>11:06 - 11:16</td>
<td><strong>Neurovascular Island Flap for Pulp &amp; Nail Augmentation in Duplicated Thumb Reconstruction: Indications &amp; Long Term Outcome</strong></td>
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<td>11:16 - 11:22</td>
<td><strong>Suture-only technique in the bony reconstruction of thumb polydactyly</strong></td>
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<td>11:22 - 11:30</td>
<td><strong>Panel Discussion</strong></td>
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</table>
### Scientific Session B2
**PAEDIATRICS 3 - What information do we need to make decisions**

**Session Chair:** Sarah Tolerton, Chris Coombs

**11:30 – 11:38**
**Outcome measurement: What are we looking for?**
*Richard Lawson*

**11:38 – 11:46**
**Registries: Where do we find it**
*David McCombe*

**11:46 – 11:56**
**Shared Decision Making in congenital hand surgery: Is it the way it works or looks? Parent and youth’s perceptions of appearance and function**
*Emily Ho*

**11:56 – 12:04**
**Cosmetic considerations in children’s Hand surgery**
*Chris Coombs*

**12:04 – 12:10**
**The psychosocial impact of congenital hand and upper limb differences on children**
*Lucy McDougall*

**12:10 – 12:15**
**Panel Discussion / Questions**

### Free Papers 5 - Miscellaneous, Brachial Plexus, Cerebral Palsy

**Session Chair:** Scott Ferris, Josephine Ip.

**10:30 – 10:38**
**Preventing tissue necrosis in hand infection**
*Duncan Angus McGrouther*

**10:38 – 10:46**
**COMPARISON OF PRE OPERATIVE GRIP STRENGTH AND ELBOW FLEXION RECOVERY FOLLOWING OBERLIN TRANSFER IN UPPER EXTENDED BRACHIAL PLEXUS PALSY**
*Praveen Bhardwaj*

**10:46 – 10:54**
**Elbow Flexion Deformity in Children with Birth Brachial Plexus Palsy - Analysis of its Cause and Prevention**
*Praveen Bhardwaj*

**10:54 – 11:02**
**Decision Making in Birth related brachial plexus injuries - Where is the controversy?**
*Bharath Kadadi*

**11:02 – 11:20**
**Outcome of Flexor Carpi Ulnaris to Brachioradialis transfer for restoration of forearm supination**
*Praveen Bhardwaj*

**11:20 – 11:28**
**Comparison between with or without axillary nerve neurotization for the management of upper brachial plexus palsy**
*Krishna Priya Das*

**11:28 – 11:36**
**A study on psychosocial status of patients with global brachial plexus injury – Ganga Hospital Experience**
*Praveen Bhardwaj*

**11:36 – 11:44**
**New strategy for adult total arm-type brachial plexus reconstruction using two-stage free functioning muscle transfer**
*Yu-Huan Hsueh*

**11:44 – 11:52**
**How, When, Where and How Much?: The Role of Botulinum Toxin in Upper-Limb Spasticity**
*Claudia Gschwind*

**11:52 – 12:00**
**Brachial Plexus Injury, Incomplete Type C5C6C7 Treated with Neurotization Modified Oberlin Procedure in Orthopaedic Hospital**
*Tito Sumarwoto*

**12:00 – 12:15**
**Discussion**
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<td>10:30 – 12:15</td>
<td>Scientific Session B2</td>
<td>EUREKA ROOM 3</td>
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<tr>
<td>10:30 - 10:38</td>
<td>Finger tip reconstruction with composite graft and cross finger flap in type IV amputations</td>
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<td></td>
<td>Govindasamy Balakrishnan</td>
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<td>10:38 - 10:46</td>
<td>Outcomes and impact of fingertip amputation injuries in a local tertiary hospital in Singapore</td>
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<td>Aaron Koh</td>
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<td>10:46 - 10:54</td>
<td>Pepper potted composite fingertip grafts; a working technique</td>
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<td>Louise Thomas</td>
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<tr>
<td>10:54 - 11:02</td>
<td>Strategy for the parrot beak deformity of nail</td>
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<td>Mikio Yagishita</td>
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<td>11:02 - 11:10</td>
<td>Gender and age differences in thumb carpometacarpal joint kinematics: a quantitative four-dimensional computed tomography study</td>
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<td>William Chen</td>
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<td>11:10 - 11:18</td>
<td>Total joint replacement (TJR) arthroplasty for base of thumb arthritis: A systematic review</td>
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<td>Dasun Ganhewa</td>
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<td>11:18 - 11:26</td>
<td>Blind technique of marginal osteophyte excision for mucous cysts accompanied with Heberden’s nodes</td>
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<td>Yuichi Ichikawa</td>
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<td>Naur Knightly</td>
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<td>11:34 - 11:42</td>
<td>Arthroscopic trapezial hemiresection and suspensionplasty for trapeziometacarpal osteoarthritis with dorsal dislocation</td>
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<td>Shohei Omokawa</td>
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<td>11:42 - 11:50</td>
<td>Clinical outcomes of thumb metacarpophalangeal joint arthrodesis with the XMCP™ intramedullary fusion device</td>
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<td>Libby Anderson</td>
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<td>11:50 - 12:15</td>
<td>Discussion</td>
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<tr>
<td>12:15 – 13:00</td>
<td>Tajima Oration</td>
<td>GOLDFIELDS THEATRE</td>
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<td>Replantation, transplantation and beyond- experience and observations</td>
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<td>Wayne Morrison</td>
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<tr>
<td>13:00 – 14:00</td>
<td>Lunch &amp; Poster Sessions</td>
<td>EXHIBITION HALL</td>
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<tr>
<td>13:15 – 14:00</td>
<td>Medical + Optical Live Surgery</td>
<td>GOLDFIELDS THEATRE</td>
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### Scientific Session B3

**Wrist 4 - Limited Wrist Fusions. Pearls and Pitfalls. How To Get Them To Work**

**Session Chair:** Mark Ross, PC Ho, Eva-Maria Baur

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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:00</td>
<td>2, 3, 4 corner midcarpal fusions risk vs benefit</td>
<td>Greg Bain</td>
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<tr>
<td>14:09</td>
<td>Limited wrist fusions, plates staples and screws. What works and what doesn’t</td>
<td>Mark Ross</td>
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<tr>
<td>14:18</td>
<td>Radiocarpal Fusions</td>
<td>Abhijeet Wahegaonkar</td>
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<tr>
<td>14:27</td>
<td>Capitate head replacement including salvage for LWF</td>
<td>Mark Ross</td>
</tr>
<tr>
<td>14:36</td>
<td>Dart Throwing Motion: A clinical comparison of four-corner-fusion to radio-scapho-lunate fusion using inertial motion capture</td>
<td>Sina Babazadeh</td>
</tr>
<tr>
<td>14:57</td>
<td>The management of SNAC and SLAC arthritis. A 20 year struggle with performing a PRC</td>
<td>Steve Moran</td>
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<td>14:00</td>
<td>Comparison of Functional Outcomes in Limited Carpal Fusions and Proximal Row Carpectomy</td>
<td>Uldis Krustins</td>
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<td>15:06</td>
<td>isolated post-traumatic osteochondral lesions over radiolunate joint</td>
<td>PC Ho</td>
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<tr>
<td>15:15</td>
<td>Panel Discussion: Are the scaphoid and triquetrum really necessary in Limited Wrist Fusions?</td>
<td>Greg Bain, Steve Moran, PC Ho, Eva-Maria Baur</td>
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### Surgery 1 - Education and Hand Surgery

**Session Chair:** PC Ho, Go Hyun Baek

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>14:00</td>
<td>Teaching Anatomy</td>
<td>Quentin Fogg</td>
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<tr>
<td>14:09</td>
<td>Teaching and learning complex and infrequent surgery</td>
<td>Alphonsus Chong</td>
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<tr>
<td>14:18</td>
<td>Examining microsurgical skills in simulated training platform versus vascular anastomosis in rat vessels in a laboratory setting</td>
<td>Wendy Teo</td>
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<tr>
<td>14:24</td>
<td>Teaching advanced surgical skills</td>
<td>PC Ho</td>
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<tr>
<td>14:33</td>
<td>What is needed for good research?</td>
<td>Goo Hyun Baek</td>
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<tr>
<td>14:42</td>
<td>Tips from the editor</td>
<td>Toshiyasu Nakamura</td>
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<tr>
<td>14:51</td>
<td>The European Board of Hand Surgery (EBHS) Diploma Examination - history, evolution and current state</td>
<td>Lindsay Muir</td>
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<tr>
<td>15:00</td>
<td>The Use of technology for surgical education in developing countries: work of BFIRST and BSSH</td>
<td>Wee Leon Lam</td>
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<tr>
<td>15:09</td>
<td>Panel Discussion: Should hand surgery be a stand alone specialty?</td>
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</table>
**Thursday 12 March 2020**

### Scientific Session B3 - ARTHRITIS 2 - CMC osteoarthritis

**EUREKA ROOM 1&2**

**Session Chair:** Daniel Herren, Steve Tham, Anne Wajon

- **14:00 - 14:10** Surgery for thumb CMC OA. What is the evidence.
  
  **Daniel Herren**

- **14:10 - 14:18** CMC arthroscopic assessment and reconstruction
  
  **Eva-Maria Baur**

- **14:18 - 14:26** Arthroscopic CM Arthroplasty with Suture-Button Suspensionplasty - more than 2 years f/U
  
  **Keiji Fujio**

- **14:26 - 14:34** Thumb CMC arthroscopic fusion
  
  **Esther Chow**

- **14:34 - 14:44** Thumb CMC Stabilisation in conservative management
  
  **Judy Colditz**

- **14:44 - 14:52** Proprioceptive Management CMC OA
  
  **Anne Wajon**

- **14:52 - 15:00** Suspensionplasty the first 12 months
  
  **Stephen Tham**

- **15:00 - 15:10** Sparing the trapezium
  
  **Alejandro Badia**

- **15:10 - 15:18** CMC arthritis- implant options
  
  **Mark Ross**

- **15:18 - 15:30** Panel Discussion: What to do with a 40 y old with OA CMC joint?
  
  **Daniel Herren, Mark Ross, Esther Chow, Keiji Fujio, Anne Wajon, Judy Colditz**

### Scientific Session B3 - Occupational Disorders 1 - The Musician's Hand

**EUREKA ROOM 3**

**Session Chair:** Michael Mak, Warwick Wright PC Ho

- **14:00 - 14:10** Musical interlude

- **14:10 - 14:22** The musicians Hand. Introduction
  
  **John White**

- **14:22 - 14:34** Motion and force analysis in keyboard playing
  
  **Michael Mak**

- **14:34 - 14:46** Hand Injuries and Dystonia in the musicians hand
  
  **Juijen Shih**

- **14:46 - 14:58** Musician Injury Prevention: How do we close the gap between what we know and what we do?
  
  **Aviva Wolff**

- **14:58 - 15:10** Hand Surgery in Musicians: Unique conditions and special considerations in diagnosis and management
  
  **Warwick Wright**

- **15:10 - 15:20** Rehabilitation for common musician injuries
  
  **Karen Fitt**

- **15:20 - 15:30** Panel Discussion:
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>14:00 – 15:30</td>
<td>Hand Therapy B3, Paediatrics</td>
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<tr>
<td></td>
<td>Session Chair: Rebecca Kilty, Yvonne Morris</td>
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<tr>
<td>14:00 - 14:15</td>
<td>Congenital hand assessment in infants and toddlers: what to assess to determine reconstructive needs Emily Ho</td>
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<tr>
<td>14:15 - 14:23</td>
<td>Post-operative Hand Therapy following a Long Head of the Triceps Transfer in Children with Amyoplasia Amy Lake</td>
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<td>14:23 - 14:31</td>
<td>Participation in home, school and community activities Rose Biggins</td>
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<tr>
<td>14:31 - 14:39</td>
<td>The Impact of Therapeutic Camp on Children with Congenital Hand Differences Amy Lake</td>
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<tr>
<td>14:39 - 14:42</td>
<td>Panel Discussion / Questions</td>
</tr>
<tr>
<td>14:42 - 14:50</td>
<td>An overview of CP and OBPP                                               Bruce Johnson</td>
</tr>
<tr>
<td>14:50 - 15:05</td>
<td>Paediatric sensory evaluation after nerve injury: pearls and pitfalls Emily Ho</td>
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<tr>
<td>15:05 - 15:15</td>
<td>Management of burnt hands for children: research and practice Cecilia Li-Tsang</td>
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<tr>
<td>15:25 - 15:30</td>
<td>Panel Discussion / Questions</td>
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<tr>
<td>15:30 – 16:00</td>
<td>Afternoon Tea</td>
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<tr>
<td>16:00 – 17:30</td>
<td>Scientific Session B4, Combined Hand Therapy 2 - CRPS and Hand Pain</td>
</tr>
<tr>
<td></td>
<td>Session Chair: Phil Griffin, John Scott</td>
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<tr>
<td>16:00 - 16:15</td>
<td>Diagnosis and options in CRPS                                            Phil Griffin</td>
</tr>
<tr>
<td>16:15 - 16:45</td>
<td>Debunking CRPS                                                          Francisco del Piñal</td>
</tr>
<tr>
<td>16:45 - 17:05</td>
<td>Chronic pain, What is real                                               Kevin Chung</td>
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<tr>
<td>17:05 - 17:15</td>
<td>The role of hand surgeons and hand therapists in early identification of CRPS and other pain syndromes Emily Ho</td>
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<tr>
<td>17:15 - 17:25</td>
<td>Getting back on track: hand therapy interventions for CRPS             Zoe Milner</td>
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<td>17:25 - 17:30</td>
<td>Panel Discussion:</td>
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<td>Time</td>
<td>Session</td>
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</table>
| 16:00-17:30 | **Scientific Session B4**  
Free Papers 7 - PIP Joint, Dupuytren’s Tumour  
Session Chair: Avanthi Mandeleson, Tanya Burgess  
**COURTYARD ROOM 1&2**  
16:00 - 16:08  
Ratio of Dislocation Types of the Proximal Interphalangeal Joint of the Fingers:  
A New Classification System for Initial Therapy  
Eichi Itadera  
16:08 - 16:16  
Collateral ligament reconstruction of chronic proximal interphalangeal joint instability using a half slip of the flexor digitorum superficialis tendon; case series.  
Kangwook Kim  
16:16 - 16:24  
Long term results after volar plate interposition arthroplasty for post-traumatic osteoarthritis of digits  
Andy Wen-Chih Liu  
16:24 - 16:32  
The Anatomical Variation of The Distal Articular Surface of The Hamate  
Thanat Sutthiwongkit  
16:32 - 16:40  
Two-stage treatment of severe Dupuytren’s contracture  
Alexander Zolotov  
16:40 - 16:48  
Arthroscopic resection of recurrent wrist ganglia  
Hsien-Chang Huang  
16:48 - 16:56  
Surface Bone Tumours (SBT) of the upper limb: Resolving a diagnostic dilemma  
Zhixue Lim  
16:56 - 17:30  
Discussion: |

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<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 16:00-17:30 | **Scientific Session B4**  
WRIST 5 - Kienbocks disease  
Session Chair: Steve Tham, Yusuke Sogabe  
**EUREKA ROOM 1&2**  
16:00 - 16:12  
Basic Science Theory of Kienbock’s Disease  
Greg Bain  
16:12 - 16:24  
Vascular supply of the lunate and carpus. Re-vascularization procedures in Kienbock’s disease  
Steve Moran  
16:24 - 16:32  
An algorithm based approach to Kienbock’s disease  
Greg Bain  
16:32 - 16:40  
Joint leveling procedures, when and how  
Pankaj Ahire  
16:40 - 16:48  
Lateral wedge osteotomy for advanced Kienbosk’s disease  
Goo Hyun Baek  
16:48 - 16:54  
Isolated capitate shortening osteotomy for Lichtman stage IIIB Kienböck’s disease  
Yusuke Sogabe  
17:02 - 17:12  
Fixation of lunate fractures and Scaphocapitate fusion in Kienbock’s disease  
Stephen Tham  
17:12 - 17:20  
Pyrocarbon arthroplasty in Kienbock’s disease  
Mark Ross  
17:20 - 17:30  
Panel Discussion: Do classification systems assist with treatment options?  
Steve Tham, Greg Bain, Takeru Yokota, PC Ho  |
16:00 – 17:30  **Scientific Session B4**  
**TENDON 2 - Extensor tendon reconstruction**  
**Session Chair:** Tony Beard, Don Lalonde

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<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>16:00</td>
<td>Extensor tendon anatomy and its implications for reconstruction</td>
<td>Tony Beard</td>
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<tr>
<td>16:10</td>
<td>Repaired extensor tendons on the hand can return to work shortly after surgery</td>
<td>Don Lalonde</td>
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<tr>
<td>16:25</td>
<td>Early Active Mobilization After Surgical Repair and Reconstruction of Injured Extensor Tendon of Krishna Priya Das</td>
<td>Krishna Priya Das</td>
</tr>
<tr>
<td>16:35</td>
<td>Modified Stack Reconstruction for central slip reconstruction</td>
<td>Karen Smith</td>
</tr>
<tr>
<td>16:45</td>
<td>Boutonniere deformity, when to operate and how</td>
<td>Don Lalonde</td>
</tr>
<tr>
<td>16:55</td>
<td>Reconstruction of extensor tendon loss in the hand</td>
<td>Sandeep Sebastin</td>
</tr>
<tr>
<td>17:05</td>
<td>Primary open Tendon Graft for Open Zone 3 Injuries of the Extensor Mechanism PIPJ</td>
<td>Jeff Ecker</td>
</tr>
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17:30 – 18:30  **Society Meetings**

- APFSSH Delegates Meeting  
  **COURTYARD ROOM 1&2**
- AHSS AGM  
  **EUREKA ROOM 1&2**
- New Zealand Hand Surgery Society AGM  
  **EUREKA ROOM 3**
- AHTA Society Meeting  
  **SOVEREIGN ROOM**
- APFSHT Society Meeting  
  **HOSPITALITY SUITE 6**
### Friday 13 March 2020

#### PROGRAM - FRIDAY 13 MARCH 2020

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>07:00 - 08:00</td>
<td><strong>Cybersecurity and Patient Privacy</strong></td>
<td>EUREKA ROOM 1</td>
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<tr>
<td>07:00 - 07:10</td>
<td>Electronic Medical Records. Is there a problem?</td>
<td>Session Chair: Michael Sandow</td>
</tr>
<tr>
<td>07:10 - 07:25</td>
<td>Cybersecurity - how to stay safe(r) in an ever more connected world</td>
<td>Peter Amadio</td>
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<tr>
<td>07:25 - 07:40</td>
<td>De-identification doesn’t work: the simple process of re-identifying health records and why it matters</td>
<td>Vanessa Teague</td>
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<td>07:40 - 08:00</td>
<td>Discussion</td>
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<tr>
<td>08:00 – 10:00</td>
<td><strong>Scientific Session C1</strong></td>
<td>GOLDFIELDS THEATRE</td>
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<tr>
<td>08:00 - 08:20</td>
<td>Surgery 2 – WALANT</td>
<td>Session Chair: Don Lalonde, Theddeus Prasetyono</td>
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<tr>
<td>08:00 - 08:20</td>
<td>Indications and technique</td>
<td>Don Lalonde</td>
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<tr>
<td>08:20 - 08:35</td>
<td>FAHS for tendon surgery</td>
<td>Theddeus Prasetyono</td>
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<tr>
<td>08:35 - 08:45</td>
<td>Surgery of the hand in children: embracing One-per-Mil tumescent technique</td>
<td>Theddeus Prasetyono</td>
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<tr>
<td>08:45 - 08:53</td>
<td>Wide awake tendon surgery</td>
<td>Yung-Cheng Chiu</td>
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<tr>
<td>08:53 - 09:03</td>
<td>Proximal forearm and elbow fractures with WALANT</td>
<td>Amir Adham</td>
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<tr>
<td>09:03 - 09:13</td>
<td>WALANT and distal radius fractures</td>
<td>Chun-Yu Chen</td>
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<tr>
<td>09:13 - 09:26</td>
<td>Corrective osteotomies of phalangeal and metacarpal malunion with digital overlap using the WALANT technique</td>
<td>David Tan</td>
</tr>
<tr>
<td>09:23 - 09:33</td>
<td>WALANT in CP and ABI</td>
<td>John Scott</td>
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<tr>
<td>09:33 - 09:41</td>
<td>Surgical Excision of Benign Soft Tissue Tumor of the Hand under Wide Awake Local Anesthesia no Tourniquet</td>
<td>Kee Jeong Bae</td>
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<tr>
<td>09:41 - 09:51</td>
<td>Performing Wrist and Hand Arthroscopy under Walant</td>
<td>PC Ho</td>
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<tr>
<td>09:51 - 10:00</td>
<td>Panel Discussion: How to sell WALANT to your anaesthetist?</td>
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<tr>
<td>08:00 – 10:00</td>
<td><strong>Scientific Session C1</strong></td>
<td>COURTYARD ROOM 1&amp;2</td>
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<tr>
<td>08:00 - 08:15</td>
<td>Nerve 1 - Nerve Compressions</td>
<td>Session Chair: Margaret Fok, Andrew Yam, Roland Hicks</td>
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<tr>
<td>08:00 - 08:15</td>
<td>The aetiology of CTS, occupational or constitutional</td>
<td>Peter Amadio</td>
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<tr>
<td>08:15 - 08:21</td>
<td>Endoscopic Anatomy of the Carpal Canal</td>
<td>Jeff Ecker</td>
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</tbody>
</table>
08:21 - 08:27 Ultrasonography guided Percutaneous Release in Patients with Carpal Tunnel Syndrome: Mid-Term Results of a Series 376 Patients (641 operations) and Review of the Literature
Hsing Hsueh

08:27 - 08:35 ECTR vs OCTR. What is the evidence.
Margaret Fok

08:35 - 08:41 Revision open carpal tunnel release with hypothenar fat-pad flap
Benjamin Hope

08:41 - 08:50 2019 Australian Hand Surgery Society Carpal Tunnel Surgery Audit Report
Roland Hicks

ULNAR NERVE

08:50 - 08:58 ulnar nerve decompression, the options
Clara Wing Yee Wong

08:58 - 09:06 Epicondylectomy
Phil Griffin

09:06 - 09:14 Endoscopic cubital tunnel release and anterior transposition with Hoffman system
Andrew Yam

09:14 - 09:20 In situ decompression of ulnar nerve for patients with failed cubital tunnel surgery
Ji Sup Hwang

09:20 - 09:28 Failed or recurrent decompression surgery
David McCombe

09:28 - 09:36 Uncommon Nerve Compressions
Andrew Yam

09:36 - 09:42 A Proposal of an Approach to the Patients with Neurogenic Thoracic Outlet Syndrome According to Their Clinical Scenarios
Ji Sup Hwang

09:42 - 09:48 14 years of treatment of Thoracic Outlet syndrome: a single surgeon’s experience
Martins Kapickis

09:48 - 10:00 Panel Discussion: When to do what? My Algorithm for cubital tunnel syndrome
Dave McCombe, Clara Wing Yee Wong

08:00 – 10:00 Scientific Session C1
EUREKA ROOM 1
Free Papers 8 - Elbow, Scaphoid
Session Chair: Jason Harvey, Greg Bain

08:00 - 08:08 Individualized Prosthetic System for the Treatment of Irreparable Radial Head Fracture: Preliminary Experience in Eleven Cases
Suriya Luenam

08:08 - 08:16 Mini-operative treatment of tennis elbow using bipolar radio-frequency
Dawid Mrozik

08:16 - 08:24 The sliding osteotomy technique for treatment of the radial head fracture : four case series
Takashi Noguchi

08:24 - 08:32 New strategy for the treatment of lateral epicondylitis of the elbow
Hiroshi Satake
08:32 - 08:40 Supracondylar Fracture of the Humerus and Late Displacement – for Avoiding Cubitus Varus Deformity—
Takehiko Takagi

08:40 - 08:48 Arthroscopic debridement for osteochondral lesion of the posteromedial trochlea in baseball players
Yasuhiro Mitsui

08:48 - 08:56 Salvage of the proximal scaphoid: A retrospective comparison of Medial Femoral Trochlear Osteocartilaginous graft and Costo-osteocondral graft with a minimum 2 year follow-up
John Galbraith

08:56 - 09:04 Volar percutaneous screw fixation of horizontal oblique scaphoid fractures: Does different screw placement affect the fixation strength
Yenwei Li

09:04 - 09:12 Incidence of associated wrist injuries in displaced scaphoid fractures
Geowin Solomon

09:12 - 09:20 Arthroscopic osteosynthesis with bone substitutes in carpal nonunion and arthritis
Jui-Tien Shih

09:20 - 09:28 Volar scaphoid plating for non-union: A multicentre case-series study
Kevin Eng

09:28 - 09:36 Three-Dimensional Computed Tomography Analysis of Acute Scaphoid Fracture Patterns
Arthur Turow

09:36 - 10:00 Discussion

08:00 – 10:00 Scientific Session C1

EUREKA ROOM 2
Wrist 6 - Advancing technologies in hand and wrist surgery
Session Chair: Michael Boland, Greg Couzens

08:00 - 08:15 3D reconstruction and virtual corrective procedure of a malunited, extra-articular radius
Greg Couzens

08:15 - 08:30 3D surgical planning
Michael Sandow

08:30 - 08:45 4D scanning for dynamic wrist disorders
Simon Maclean

08:45 - 08:55 Are our forearms really symetrical?
Michael Boland

08:55 - 09:05 3D-Printed Computer Generated Patient-Specific Guides for Corrective Osteotomy
Jeff Ecker

09:05 - 09:15 Minimal invasive surgery and assessments of upper limb conditions
TC Tan

09:15 - 09:30 Small joint arthroscopy
Alejandro Badia

09:30 - 10:00 Panel Discussion: What for the future?
Alejandro Baria, Greg Couzens, Wen Dong Xu
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<tr>
<th>Time</th>
<th>Session/Panel</th>
<th>Chair/Presenter</th>
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<tbody>
<tr>
<td>08:00 – 10:00</td>
<td><strong>Scientific Session C1</strong>  &lt;br&gt; Reconstruction 3 - Perforator and Local Flaps in the Hand</td>
<td>Session Chair: Sandeep B, Steve Moran</td>
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<tr>
<td>08:00 - 08:20</td>
<td>Reconstructive Microsurgery of the Hand  &lt;br&gt; Nyoman Riasa</td>
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<tr>
<td>08:20 - 08:30</td>
<td>SCIP flaps for hand reconstruction  &lt;br&gt; Sandeep B</td>
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<tr>
<td>08:30 - 08:36</td>
<td>Comparison of outcome of ADP free flap and thin groin flap for coverage of dorsum of hand wound  &lt;br&gt; Sharmin Sumi</td>
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<td>08:36 - 08:57</td>
<td>Local flaps for digital coverage  &lt;br&gt; Steve Moran</td>
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<tr>
<td>08:57 - 09:11</td>
<td>Arterialized venous flaps  &lt;br&gt; Yu-Te Lin</td>
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<td>09:11 - 09:19</td>
<td>Medial sural artery perforator flap: a versatile donor site for hand reconstruction  &lt;br&gt; Cheng-Hung Lin</td>
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<td>09:19 - 09:34</td>
<td>Small flaps thin flaps  &lt;br&gt; Theddeus Prasetyono</td>
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<td>09:34 - 09:44</td>
<td>Toe pulp transfers for finger reconstruction  &lt;br&gt; Jyoshid R Balan</td>
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<td>09:44 - 10:00</td>
<td>Panel Discussion:</td>
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<tr>
<td>08:00 – 09:00</td>
<td><strong>Hand Therapy C1</strong>  &lt;br&gt; Session Chair: Rebecca Crowley, Chai Siaw Chui</td>
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<tr>
<td>08:00 - 08:08</td>
<td>Complex phalangeal fractures - surgical optimisation  &lt;br&gt; Richard Page</td>
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<tr>
<td>08:08 - 08:16</td>
<td>Outcomes following proximal phalangeal fracture fixation  &lt;br&gt; Lauren Miller</td>
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<td>08:16 - 08:24</td>
<td>Surgical rehabilitation for chronic severe flexion contractures of the proximal interphalangeal joint by the external fixator  &lt;br&gt; Kenji Ohira</td>
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<td>08:24 - 08:30</td>
<td>Retrospective Analysis of Outcomes Following Hemi-Hamate Arthroplasty  &lt;br&gt; Amy Sturgeon</td>
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<tr>
<td>08:30 - 08:36</td>
<td>Innovative splint design improves functional movement and grasp in a patient with Rheumatoid Arthritis: A case report  &lt;br&gt; Bec Kevill</td>
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<tr>
<td>08:36 - 08:42</td>
<td>Hand Therapy after Collagenase Injection Treatment in Dupuytren`s Disease  &lt;br&gt; Sonja Pelzmann</td>
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<tr>
<td>08:42 - 08:50</td>
<td>Panel Discussion / Questions</td>
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</table>
FINGER STIFFNESS IN DEPTH

08:50 - 09:30  Different Approaches for Treating Early vs Late Stiffness  
Judy Colditz

09:30 - 10:00  Role of Interosseous/Lumbrical Muscle Shortening in Finger Stiffness  
Judy Colditz

10:00 – 10:30  Morning Tea

EXHIBITION HALL

10:30 – 12:15  Scientific Session C2
The Future 1 - Virtual reality; its place in hand surgery, education, therapy and CRPS
Session Chair: Peter Amadio, Michael Wagels

10:30 - 10:42  The hand that shook the world*: 3D printing, VR, AR and modern approaches to medical anatomy education  
Paul G McMenamin

10:42 - 10:50  Artificial intelligence in Hand Surgery  
Paul Jarrett

10:50 - 11:02  Virtual Surgery Planning  
Michael Wagels

11:02 - 11:12  Objective assessment of pain severity in CRPS with AI  
Hitoshi Hirata

11:12 - 11:27  VR for procedural pain management and its potential application in WALANT surgery  
Paul Leong

Dan Purtell

11:39 - 11:45  3D Bone Model Reconstruction of Distal Forearm from X-ray image of wrist using Artificial Intelligence; 2D-3D Reconstruction  
Ryoya Shiode

11:51 - 12:01  Clinical Application of Robotic Interventions in Hand Therapy and Upper Extremity Rehabilitation  
Eng Wah Tan

12:01 - 12:11  The use of Artificial Intelligence to improve treatment of patients with CTS  
Peter Amadio

12:11 - 12:15  Panel Discussion / Questions

COURTYARD ROOM 1&2

10:30 – 12:15  Scientific Session C2
Sporting Injuries
Session Chair: Jason Harvey, Alejandro Badia, Greg Hoy

10:30 - 10:38  Psychology of the Injured Athlete  
Jacquie Louder

10:38 - 10:46  Finger vs ball injuries  
Alejandro Badia

10:46 - 10:54  Phalanx fractures in collision sports  
Greg Couzens
10:54 - 11:02  Australian Rules Football Thumb Metacarpal Fractures: Surgical Results and Return to Play Time Frames
   Greg Hoy / Hamish Anderson

11:02 - 11:10  Can they box again
   Sudhir Warrier

11:10 - 11:18  Upper Limb nerve injuries in Sports
   Josephine Ip

11:18 - 11:26  Stroke and grip mechanics in tennis
   Michael Wagels

11:26 - 11:34  Common wrist injuries in tennis players.
   Alejandro Badia

11:34 - 11:42  Tennis elbow, pathology, prevention, conservative and operative management
   Pankaj Ahire

11:41 - 11:50  A new treatment for tennis elbow
   Alejandro Badia

11:50 - 11:58  Triceps Rupture in Athletes
   Jason Harvey

11:58 - 12:25  Panel Discussion:

10:30 – 12:15  Scientific Session C2
   Wrist 7 - Distal radius fractures
   Session Chair: Margaret Fok, Mark Ross

10:30 - 10:45  Distal radius fractures, changing trends and emerging evidence
   Richard Page

10:45 - 10:55  the anatomy of the distal radius fracture
   Simon Maclean / Greg Bain

10:55 - 11:03  Plate Presetting Arthroscopic Reduction Technique
   Yukio Abe

11:03 - 11:11  Arthroscopic repair of the unreconstructable radius
   Jeff Ecker

   Uldis Krustins

11:19 - 11:27  High energy Distal radius fractures, ORIF, bridging plates or external fixation
   Alphonsus Chong

11:27 - 11:36  Volar marginal rim fractures
   Simon Maclean

11:36 - 11:42  MIPO
   Paul Jarrett

11:42 - 11:50  Do post-operative radiographs change the management following internal fixation of distal radius fractures?
   Greg Couzens

11:50 - 11:58  Management of associated ligamentous structures in DRF
   Margaret Fok
11:58 - 12:15  Panel Discussion: What is the place for external fixation and K-wires? Ie minimalist treatment

10:30 – 12:15  Scientific Session C2

- Trauma 2 - The Burnt Hand
  - Session Chair: Roohi Ahmad, Nyoman Riasa, Theddeus Prasetyono
  - 10:30 - 10:42  The early treatment of Hand Burns  
    Roohi Ahmad
  - 10:42 - 10:54  The updates for FAHS for burn surgery  
    Theddeus Prasetyono
  - 10:54 - 11:09  Burnt hand  
    Raja Sabapathy
  - 11:09 - 11:15  Treatment of Extensive Friction Burns in Upper Extremity with Microvascular Flaps  
    Aivars Tihonovs
  - 11:15 - 11:27  Hand Burn Contracture Reconstruction  
    Nyoman Riasa
  - 11:27 - 11:39  Boutonniere and swan neck deformity in burns  
    Theddeus Prasetyono
  - 11:39 - 11:51  Burns Scar Management for the UL  
    Cecilia Li-Tsang
  - 11:51 - 11:57  Perforator Flap for Coverage of Post Burn Wound over the Wrist  
    Sharmin Sumi
  - 11:57 - 12:12  Lessons learned from a free reconstructive surgery project for burn victims called “Hope After Fire”  
    Raja Shanmuga Krishnan
  - 12:12 - 12:15  Questions

10:30 – 12:15  Hand Therapy C2

- Wrists
  - Session Chair: Vanessa Zweck, Ahmad Yazid Jus
  - 10:30 - 11:05  Wrist Instability: Considerations for treatment – Biomechanics, Stability, and Function  
    Aviva Wolff
  - 11:05 - 11:11  Rehabilitation of Scapholunate Instability  
    Adrian Leung
  - 11:11 - 11:23  Questions
  - 11:23 - 11:33  Effects of a non-surgical rehabilitation program on pain and function for adults with acute triangular fibrocartilage complex injury  
    Liying Pang
  - 11:33 - 11:43  Surgical management of the TFCC tear  
    David Tan
  - 11:43 - 11:51  Early outcomes of a post-operative protocol allowing immediate forearm rotation  
    Kristine Beacham
<table>
<thead>
<tr>
<th>Time</th>
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</table>
**Zoe Milner** |
| 11:57 - 12:05 | The effects of alcohol consumption on distal radius fracture outcomes  
**Yuen Mei Cheng** |
| 12:05 - 12:15 | Panel Discussion / Questions                                             |
| 12:15 - 13:00 | **Guest Speaker**  
Building an Institution and beyond  
**Raja Sabapathy** |
| 13:00 - 14:00 | **Lunch & Poster Sessions**                                               |
| 13:15 – 14:00 | **Medartis Lunch Symposium**                                              |
| 14:00 – 15:30 | **Scientific Session C3**                                                 |
| 14:00 - 14:10 | What is an occupational injury  
**Kevin Chung**               |
| 14:10 - 14:20 | Undiagnosed Pathology  
**Nicola Goldsmith** |
| 14:20 - 14:30 | Occupational overuse and muscle function  
**Mike Boland** |
| 14:30 - 14:38 | Tendon loading: part of the presentation, part of the solution  
**Brodwen McBain** |
| 14:38 - 14:46 | Work related wrist pain  
**Tanya Burgess**            |
| 14:46 - 14:54 | Relative motion splinting to solve hand pain problems  
**Don Lalonde** |
| 14:54 - 15:02 | A model of management for women with upper limb RSI  
**Therma Cheung** |
| 15:02 - 15:10 | Factitious disorders of the hand  
**Randy Bindra** |
| 15:10 - 15:30 | Panel Discussion: How do surgeons manage the psychological aspects of workers compensation? |
14:00 – 15:30 **Scientific Session C3**
Reconstruction 4 reconstruction of traumatic bone loss in the hand and wrist
*Session Chair: Raja Sabapathy, Phil Griffin*

14:00 - 14:15 *Bone reconstruction in the hand*
Raja Sabapathy

14:15 - 14:27 *Free medial femoral condyle flap for phalangeal and metacarpal bone reconstruction*
Chung-Chen Hsu

14:27 - 14:39 *Triple Chimeric flap- SCIP with vascularised iliac crest bone graft*
Sandeep B

14:39 - 14:51 *Traumatic bone loss in the hand and forearm free fibular flap for post-traumatic composite metacarpal defect*
Chih-Hung Lin

14:51 - 15:03 *Management of traumatic loss of joints in the hand*
Yu-Te Lin

15:03 - 15:15 *Microsurgical reconstruction of bone and cartilage loss in the hand*
Yung-Cheng Chiu

15:15 - 15:30 Panel Discussion: Primary or delayed reconstruction. When and why.

14:00 – 15:30 **Scientific Session C3**
Reconstruction 5 - Nerve transfers vs Tendon transfers for peripheral nerve injuries
*Session Chair: Josephine Ip, Kanit Sanapanich, Duncan Angus McGrouther*

14:00 - 14:20 *Tendon transfers for Paralytic Conditions*
Santosh Rath

14:20 - 14:35 *Distal Nerve transfers in my hands, principles and practice*
Kanit Sanapanich

14:35 - 14:47 *Nerve transfers or tendon transfers for median nerve injury*
Josephine Ip

14:47 - 14:59 *Nerve / tendon transfers for ulnar nerve injuries*
Shih-heng Chen

14:59 - 15:11 *Nerve transfers vs tendon transfers for radial nerve injury*
Sandeep Sebastin

15:11 - 15:23 *Therapy principles following nerve transfers*
Jaslyn Cullen

15:23 - 15:30 Panel: Is there a place for combining tendon and nerve transfers

14:00 – 15:30 **Scientific Session C3**
Wrist 8 - Wrist replacements, now and the future
*Session Chair: Randy Bindra, Tom Thorvaldson*

14:00 - 14:15 *Total wrist arthroplasty- evolution in design*
Randy Bindra

14:15 - 14:30 *Advances in wrist arthroplasty design*
Greg Couzens
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<tr>
<th>Time</th>
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<tr>
<td>14:30 - 14:42</td>
<td>Surgical Technique for the Motec Total Wrist Arthroplasty</td>
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<tr>
<td>Tom Thorvalsdson</td>
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<td>14:42 - 14:51</td>
<td>5 year results for the Motec total wrist in Australia</td>
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<tr>
<td>Shivani Verma</td>
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<td>14:51 - 15:03</td>
<td>The Amandys replacement for proximal scaphoid and lunate</td>
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<td>Mark Ross</td>
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<td>15:03 - 15:15</td>
<td>Fascia Lata interposition, a biologic option.</td>
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<td>Siddharth Karanth</td>
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<td>15:15 - 15:30</td>
<td>Panel Discussion: Is the carpus too complicated to replace with a single</td>
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<td>prosthesis?</td>
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<td>Randy Bindra, Greg Couzens, Tom Thorvaldson</td>
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<tr>
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<td><strong>Afternoon Tea</strong></td>
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<td><strong>Exhibition Hall</strong></td>
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<td>15:30 – 16:00</td>
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<td>16:00 – 18:00</td>
<td>Scientific Session C4</td>
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<tr>
<td></td>
<td>Combined Hand Therapy 4 - Outcome Measures, What, When, Why. Evidence</td>
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<td>of Experience Based Medicine</td>
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<td></td>
<td>Session Chair: Santosh Rath, Richard Page, Natasha Vanzyl</td>
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<tr>
<td>16:00 - 16:15</td>
<td>Evidence vs experience based medicine</td>
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<td>Santosh Rath</td>
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<td>16:15 - 16:30</td>
<td>What are outcome Measures vs PRO</td>
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<td>Kevin Chung</td>
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<td>16:30 - 16:40</td>
<td>Quantitative and qualitative analysis of upper extremity movement</td>
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<td>dysfunction to generate data to better inform surgery/ rehabilitation</td>
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<td>Aviva Wolff</td>
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<td>16:40 - 16:49</td>
<td>EQ5D</td>
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<td>Richard Page</td>
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<td>16:49 - 16:59</td>
<td>What matters for the patient? Minimal important change and other new</td>
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<td>concepts</td>
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<td>Daniel Herren</td>
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<td>16:59 - 17:08</td>
<td>Outcome measures for wrist surgery</td>
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<td>Mark Ross</td>
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<td>17:08 - 17:17</td>
<td>Outcome measures in Tetraplegia surgery</td>
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<td>Bridget Hill</td>
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<td>17:17 - 17:26</td>
<td>Outcome Measures for Thumb and Finger Reconstruction</td>
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<td>Cheng-Hung Lin</td>
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<td>17:26 - 17:36</td>
<td>Clinician Reported (ClinRO), Observer Reported (ObsRO) and Patient</td>
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<td>Reported (PRO) outcomes: What, when, why and respective strengths</td>
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<td>Emily Ho</td>
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<td>17:36 - 17:46</td>
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<td>Greg Bain</td>
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<td>17:46 - 18:00</td>
<td>Panel Discussion: Is a happy patient the best outcome?</td>
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<td>16:00 – 18:00</td>
<td>Scientific Session C4</td>
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<td></td>
<td>Free Papers 9 – Trauma</td>
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<td>Session Chair: Jacqueline Tan, Tim Bennett</td>
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<td>16:00 - 16:08</td>
<td>Hyperbaric oxygen therapy as a synergistic tool in hand injuries</td>
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<td>Govindasamy Balakrishnan</td>
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<td>16:08 - 16:16</td>
<td>Vascularized bone graft for Reconstruction of upper extremities</td>
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<td>Hiroyuki Gotani</td>
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<td>16:16 - 16:24</td>
<td>Medial Sural artery perforator flap a thin alternative for resurfacing of distal forearm and dorsum of hand</td>
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<td>Anil Mathew</td>
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<td>16:24 - 16:32</td>
<td>Use of perforator flaps in reconstruction of different soft tissue defects in hand</td>
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<td>Sk. Nishat Abdullah</td>
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<td>16:32 - 18:00</td>
<td>Discussion:</td>
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<td>16:00 – 18:00</td>
<td>Scientific Session C4</td>
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<td>Free Papers 10- Wrist</td>
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<td>Session Chair: Esther Chow, Peter Maloney</td>
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<td>16:00 - 16:08</td>
<td>A novel dynamic cadaveric wrist simulator for 3-dimensional carpal bone motion measurement using biplane x-ray fluoroscopy</td>
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<td>Xin Zhang</td>
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<td>16:08 - 16:16</td>
<td>Effects of ligament sectioning and reconstruction on scapholunate motion during active wrist flexion and extension: A bi-plane x-ray fluroscopy study</td>
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<td>Xin Zhang</td>
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<td>16:16 - 16:24</td>
<td>Results of Proximal Row Carpectomy.</td>
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<td>Krishna Priya Das</td>
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<td>16:24 - 16:32</td>
<td>Chronic volar instability of the DRUJ corrected by 3D planned rotational osteotomies of both radius and ulna: a single case study</td>
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<td></td>
<td>John Scott</td>
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<td>16:32 - 16:40</td>
<td>Carpal Chondromalacia and Dynamic Scaphoid Instability, A Treatment Dilemma</td>
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<td>Houshang Seradge</td>
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<td>16:40 - 16:48</td>
<td>Arthroscopic Debridement of Scapholunate Interosseous Ligament tears: A 5-year follow-up</td>
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<td>Houshang Seradge</td>
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<td>16:48 - 18:00</td>
<td>Discussion:</td>
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<td>16:00 – 18:00</td>
<td>Scientific Session C4</td>
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<td></td>
<td>Nerve 2 - Nerve Injury and Reconstruction</td>
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<td>Session Chair: Chris Taylor, Andrew Cavallo</td>
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<td>16:00 - 16:20</td>
<td>Nerve repair in 2020</td>
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<td></td>
<td>Alex Shin</td>
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<td>16:20 - 16:30</td>
<td>Conduits for nerve repair, when and how</td>
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<td>Josephine Ip</td>
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<td>16:30 - 16:40</td>
<td>Considerations in Nerve Grafting for the Upper Limb’</td>
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<td>Sandeep Sebastin</td>
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<td>16:40 - 16:50</td>
<td>Is there a place for vascularized nerve grafting?</td>
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<td></td>
<td>Abhijeet Wahegoankar</td>
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</table>
16:50 - 17:00 Management of painful Neuromas
Andrew Yam

17:00 - 17:10 Regenerative Peripheral Nerve Interface Implantation - A Novel Technique to Treat Symptomatic Digital Neuroma
Melissa Chong

17:10 - 17:20 Vein wrapping for radial nerve hyperesthesia
Shalimar Abdullah

17:20 - 18:00 Panel Discussion: Where to from here. Can we make nerve repair any better?

16:00 – 18:00 Scientific Session C4
Wrist 9 - DRUJ Symposium 2 - DRUJ Instability and Salvage Procedures
Session Chair: Michael Boland, Stephen Tham

16:00 - 16:15 DRUJ instability. Only a TFCC problem?
Marc Garcia Elias

16:15 - 16:25 DRUJ instability, the DReaded and Underated Jeopardy
Duncan Angus McGrouther

16:25 - 16:33 Surgical management of TFCC tears and ECU instability in DRUJ instability
David Tan

16:33 - 16:41 How Much Does the Distal Interosseous Membrane of the Forearm Contribute to the Stability of the Distal Radioulnar Joint?
Kim Kyung-wook

16:41 - 16:49 Arthroscopic assessment of distal radioulnar joint laxity, the push and probe manoeuvre
Michael Boland

16:49 - 17:04 DRUJ instability. 15 year experience with the Adams-Berger procedure
Steve Moran

17:04 - 17:12 DRUJ Arthritis, assessment and options
Abhijeet Wahegaonkar

17:12 - 17:20 Sauve Kapandji Procedure
Fuminori Kanaya

17:20 - 17:28 Management of failed SK procedure
Margaret Fok

17:28 - 17:36 DRUJ Hemi Arthroplast
Jan Ragnar Haugstvedt

17:36 - 17:44 Total Distal Radioulnar Joint Arthroplasty
Michael Boland

17:44 - 18:00 Panel Discussion: Is there still a place for excision of the distal ulna?
Marc Garcia-Elias, Michael Boland, Margaret Fok

19:00 – 00:00 Congress Dinner
### Scientific Session D1

**GOLDFIELDS THEATRE**

**Fractures 1**

**Management of Finger Fractures, Form vs Functions**

**Session Chair: Tony Beard, Karen Smith**

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<tr>
<th>Time</th>
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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>08:00 – 08:15</td>
<td>Maximizing motion after finger fracture surgery</td>
<td>Rebecca Lim</td>
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<tr>
<td>08:15 – 08:30</td>
<td>Non-surgical management of digital extra-articular proximal phalangeal fractures and non surgical management of digital metacarpal shaft fractures.</td>
<td>Brent Byrne</td>
</tr>
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<td>08:30 – 08:40</td>
<td>When not to operate. Ten year results using a dynamic treatment for proximal phalangeal fractures of the hands</td>
<td>Margaret Fok</td>
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<td>08:40 – 08:48</td>
<td>Closed reduction and percutaneous cannulated screw fixation of phalangeal fractures</td>
<td>Sam Hamilton</td>
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<tr>
<td>08:48 - 08:56</td>
<td>A comparison of dorsal versus lateral plating in open reduction and internal fixation of proximal phalangeal fractures</td>
<td>Zhixue Lim</td>
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<td>08:56 - 09:04</td>
<td>Comparison of Intramedullary Headless Screw Fixation, Dorsal Plate Fixation and Intramedullary K-wire fixation of Stable Metacarpal Shaft Fractures: A Biomechanical Study</td>
<td>John Galbraith</td>
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<td>09:04 - 09:14</td>
<td>Primary open fixation for PIP joint Fractures (How to make a silk purse from a sow’s ear)</td>
<td>Karen Smith</td>
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<td>09:14 - 09:24</td>
<td>What to do when the base of your Thumb is “All Black”. Management of Basal Thumb Fracture</td>
<td>Wolfgang Heiss-Dunlop</td>
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<td>09:24 - 09:34</td>
<td>Paediatric and epiphyseal fractures</td>
<td>Nicholas Smith</td>
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<td>09:34 - 09:44</td>
<td>The “Boxers” fracture should we ever operate and how?</td>
<td>James Thomas</td>
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</tbody>
</table>
| 09:44 - 10:00 | Panel Discussion: Are we over treating finger fractures? 
**Moderated by: Alex Shin, Richard Page, Roohi Ahmad** |                                                                |

### Scientific Session D1

**COURTYARD ROOM 1&2**

**Elbow and Forearm 1 - Elbow instability and arthritis**

**Session Chair: Michael Boland, Clara Wing Yee Wong**

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<th>Time</th>
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<tr>
<td>08:00 - 08:08</td>
<td>Introduction to elbow and forearm stability and mechanics</td>
<td>Michael Boland</td>
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<tr>
<td>08:08 - 08:16</td>
<td>Lateral Collateral insufficiency- Tendinopathy vs ligament injury. When to repair? And how and when to reconstruct.</td>
<td>Donald Lee</td>
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<td>08:16 - 08:24</td>
<td>Elbow instability reconstruction for chronic and subacute elbow trauma</td>
<td>Wolfgang Heiss Dunlop</td>
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<td>08:24 - 08:32</td>
<td>Fractures and Dislocations, including Monteggia and terrible triad injury- acute management</td>
<td>Amir Adham</td>
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</tbody>
</table>
08:32 - 08:38 Complications Following Distal Biceps Tendon Repair. A Systematic Review
Melanie Amarasooriya

08:38 - 08:44 Assessment Imaging and Arthroscopic Management of elbow contracture
Clara Wing Yee Wong

08:44 - 08:50 4D CT scans of the elbow in arthritis
Benjamin Seah

08:50 - 08:56 Elbow Contracture. Open Osteocapsular Arthroplasty
Yung-Cheng Chiu

08:56 - 09:06 Semi-constrained Hinge Total Elbow Arthroplasty
Donald Lee

09:06 - 09:14 Radial head fractures and replacement
Donald Lee

09:14 - 09:20 Long term outcomes of interposition arthroplasty for chronic neglected elbow dislocations
Abhijeet Wahegaonkar

09:20 - 09:30 Panel Discussion:

09:30 – 10:00 Scientific Session D1
Elbow and Forearm 2 - Forearm Disorders
Session Chair: Michael Boland, Toshi Nakamura

09:30 - 09:40 The interosseous membrane and DRUJ stability
Mike Boland

09:40 - 09:46 Distribution of sensory nerve endings in the interosseous membrane of the forearm
Susanne Rein

09:46 - 09:56 Essex Lopresti Injury and reconstruction
Toshiyasu Nakamura

09:46 - 10:00 Panel Discussion:

08:00 – 10:00 Scientific Session D1
Surgery 3 - The delivery of Hand Care: Challenges and Opportunities
Session Chair:

08:15 - 08:30 Harnessing the digital revolution for patient care
Alphonsus Chong

08:30 - 08:45 Innovations in access to orthopedic healthcare (or hand care)"
Alejandro Badia

08:45 - 09:00 The challenges in provision of hand care in a rural setting
Rajendra Nehte

09:00 - 09:15 Challenges of hand surgery in Cox’s Bazar refugee camp
Shalimar Abdullah
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<tr>
<td>09:15 - 09:25</td>
<td>A review of national hand surgery registries</td>
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<td></td>
<td>Konstantinos Vakalopoulou</td>
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<td>09:25 - 09:35</td>
<td>The USA Hand Trauma Center Program</td>
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<td>Scott Levin</td>
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<td>09:35 - 10:00</td>
<td>Panel Discussion:</td>
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<td>08:00 – 10:00</td>
<td>Scientific Session D1</td>
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<tr>
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<td>Wrist 10 - Ligament anatomy of the wrist, evolution and anatomy / function mismatches</td>
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<td>Session Chair: Mark Ross, Melanie Amarasooriya, Greg Couzens</td>
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<tr>
<td>08:00 - 08:30</td>
<td>Ligament anatomy of the wrist, evolution and anatomy / function mismatches</td>
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<td>Makato Tamai</td>
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<td>08:30 - 08:50</td>
<td>The latest in Wrist Kinetics</td>
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<td>Marc Garcia Elias</td>
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<td>08:50 - 09:00</td>
<td>Does the Stable Central Column Theory of Carpal Mechanics offer anything useful.</td>
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<td>Michael Sandow</td>
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<td>09:00 - 09:10</td>
<td>The utilisation of four-dimensional computer tomography in assessing wrist</td>
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<td>kinematics and pathology</td>
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<td>Greg Couzens</td>
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<td>09:10 - 09:20</td>
<td>Primary Stabilisers of the Proximal Carpal row - a new look at carpal instability</td>
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<td>Mark Ross</td>
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<td>09:20 - 09:30</td>
<td>The Ulnar Column, a dilemma</td>
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<td>TC Tan</td>
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<td>09:30 - 09:40</td>
<td>Lunate types and its influence on carpal mechanics</td>
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<td>Siddith Karanth</td>
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<td>09:40 - 09:50</td>
<td>Quantifying carpal bone motion using 4-Dimentional CT –</td>
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<td>A comparative study of normal wrist and wrist with scapholunate instability</td>
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<td>Melanie Amarasooriya</td>
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<td>09:50- 10:00</td>
<td>Panel Discussion: Where are we now? How to apply what we know.</td>
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<td>Moderated by: Makato Tamiai, Marc Garcia-Elias, Greg Couzens</td>
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<td>08:00 – 10:00</td>
<td>Hand Therapy D1 –</td>
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<td>In-Depth Practice Topics Option 2 (a)</td>
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<td>Session Chair: Kent Chang, Rose Biggins</td>
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<td>08:00 - 08:55</td>
<td>Conservative management of hypertrophic scar: an update on management</td>
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<td>Cecilia Li-Tsang</td>
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<td>09:00 - 09:55</td>
<td>Managing upper limb hypertonicity for children with CP</td>
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<td>Melinda Lewis &amp; Megan Thorley</td>
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<td>08:00 – 10:00</td>
<td>Hand Therapy D1 –</td>
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<td></td>
<td>Hand Therapy In Depth Practice Topics Option 2 (b)</td>
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<td>Session Chair: Ngaire Turnbull</td>
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<td>08:00 - 10:00</td>
<td>Treating without Pain (Taping for the UL)</td>
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<td>Alison Taylor</td>
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</table>
10:00 – 10:30 Morning Tea

10:30 – 13:00 Scientific Session D2
Combined Therapy 5 - Management of the stiff finger
Session Chair: Don Lalonde, Ted Lin, Judy Colditz

10:30 – 10:45 PIP anatomy fibrosis and stiffness
Duncan Angus McGrouther

10:45 – 11:00 Assessing stiffness in the digit
Sandeep Sebastian

11:00 – 11:15 Avoiding and solving stiff PIP problems after surgery and trauma
Don Lalonde

11:15 – 11:25 Surgical tips & techniques to reduce the risk of adhesion formation in the PIPJ -
Roohi Ahmad

11:25 – 11:35 The Stiff straight finger post #/ORIF
Karen Smith

11:35 – 11:45 Release PIP joint with a PIPJAF flap.
Yu-Te Lin

11:45 – 11:55 Management of stiff PIP joint with insufficient soft tissue
Che Hsiung Lee

11:55 – 12:10 How to mobilise the stiff PIP
Judy Colditz

12:10 – 12:25 Mobilising splinting the stiff hand: what do we know and where do we go from here?
Celeste Glasgow

12:25 - 12:35 Tenolysis, flexor and extensor how to make it work
Amir Adham

12:35 - 13:00 Panel Discussion: Can surgery ever remove scar adhesions?
Roohi Ahmad, Judy Colditz, Don Lalonde

10:30 – 13:00 Scientific Session D2
Surgery 4- Leadership in Hand Surgery
Session Chair: Neela Janakiramanan, Jenny Green, Scott Levin

10:30 - 10:40 Leading Outside Silos - Bridging the Ortho-Plastic divide
Scott Levin

10:40 - 10:50 Making medicine excellent - running clinical units
Jacqueline Tan

10:50 - 11:00 Bringing people together - leadership in surgical societies
Eva-Maria Baur

11:10 - 11:20 Changing society - leadership in public policy and health
Neela Janakiramanan

11:20 - 11:30 Building Hand Therapy as a specialty
Tracey Clark

11:30 - 11:40 Driving diversity - what can established institutions do? The AOA perspective
Jennifer Green
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| 11.40 – 11.50| Leadership for the future  
Ian Incoll                                             |
| 11:50 - 12:05| Professionalism, A core value  
Scott Levin                                          |
| 12:05 - 13:00| Panel Discussion: Leadership for the future  
Ian Incoll, Christine Lai, Ruth Mitchell, Jacqueline Tan, Melanie Amarasooiya, Eva-Maria Baur, Sally Langley |
| 10:30 – 11:45| **Scientific Session D2**  
**Trauma 3 - Fingertip injuries and reconstruction**  
**Session Chair: Cheng-Hung Lin, Mike Foster** |
| 10:30 - 10:50| The acute management of finger tip injuries  
Sandeep Sebastin                                   |
| 10:50 - 11:00| Soft Tissue Reconstruction of the Fingertip  
Cheng-Hung Lin                                   |
| 11:00 – 11:12| Outcomes of V-Y plasty, acellular dermal matrix and semi-occlusive dressing for fingertip amputation injuries  
Gong Cheng Sean                                   |
| 11:12 - 11:20| The Clinical result of Arterialized Venous Free Flaps for the Treatment of Soft tissue Defect of the Fingers  
Young Keun Lee                                    |
| 11:20 - 11:30| How do we prevent painful finger tips and neuroma formation?  
Andrew Yam                                         |
| 11:30 - 11:36| Artery-only fingertip replantation distal to the lunula: A retrospective analysis of clinical results  
Yasunori Kaneshiro                                 |
| 11:36 - 11:45| Panel Discussion:                             |
| 11:45 – 13:00| **Scientific Session D2**  
**Elbow 3 - The Paediatric elbow**  
**Session Chair: Jason Harvey** |
| 11:45 - 12:00| Arthroscopy-assisted repair/reconstruction of the osteochondral injuries of the pediatric elbow  
Kozo Shimada                                       |
| 12:00 - 12:12| TRASH elbow and Radial head fractures in children  
Kemble Wang                                        |
| 12:12 - 12:24| The general progression course of the pathological conditions in osteochondritis dissecans of the elbow  
Masatoshi Takahara                                 |
| 12:24 - 12:32| In-house 3D printing - a “how-to” for paediatric elbow/forearm applications  
Ezekiel Tan                                        |
| 12:32 - 12:40| Median nerve entrapment within the elbow after fracture dislocations  
Jason Harvey                                       |
| 12:40 - 13:00| Panel Discussion:                             
Jason Harvey, Masatoshi Takahara                      |
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<td>10:30 – 11:30</td>
<td><strong>Scientific Session D2</strong></td>
<td>EUREKA ROOM 2&amp;3</td>
<td><strong>Wrist 11- Perilunate</strong></td>
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<td>Session Chair: Randy Bindra</td>
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<td>10:30 - 10:40</td>
<td>Perilunate Injuries</td>
<td>Steve Moran</td>
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<td>10:50 - 11:00</td>
<td>Axial injuries of the wrist</td>
<td>Marc Garcia Elias</td>
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<td>11:00 - 11:10</td>
<td>Lunotriquetral Injuries</td>
<td>Alex Shin</td>
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<td>11:10 - 11:25</td>
<td>Complex carpal injuries</td>
<td>Greg Bain</td>
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<td>11:25 - 11:30</td>
<td>Panel Discussion / Questions</td>
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<td>11:30 – 13:00</td>
<td><strong>Scientific Session D2</strong></td>
<td>EUREKA ROOM 2&amp;3</td>
<td><strong>Wrist 12 - Ulnacarpal</strong></td>
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<td>Session Chair: Mark Ross, Clara Wing Yee Wong</td>
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<tr>
<td>11:30 - 11:45</td>
<td>Arthroscopic management of Ulnocarpal Abutment</td>
<td>Clara Wing Yee Wong</td>
<td>When to Wafer? And when to shorten?</td>
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<td>11:45 - 11:55</td>
<td>Ulnar Shortening Osteotomy, does the technique matter?</td>
<td>Ian Hargreaves</td>
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<td>11:55 - 12:05</td>
<td>Metaphyseal shortening osteotomy for ulnar impaction syndrome.</td>
<td>Joo-Yup Lee</td>
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<td>12:05 - 12:15</td>
<td>Regeneration of the TFC after ulnar shortening</td>
<td>Toshiyasu Nakamura</td>
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<td>12:15 - 12:30</td>
<td>Combined ulnar shortening and TFCC repair</td>
<td>Joo-Yup Lee</td>
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<td>12:30 - 12:45</td>
<td>Dealing with the ulna in Madelung’s deformity</td>
<td>Kemble Wang</td>
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<td>12:45 - 13:00</td>
<td>Panel Discussion: How good does the sigmoid notch need to be for an ulnar osteotomy?</td>
<td>Clara Wing Yee Wong, Stephen Tham</td>
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<td>13:00 – 14:00</td>
<td>Lunch</td>
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| 14:00 – 15:30 | **Scientific Session D3**  
**The Future 2 - Regenerative Medicine in Hand Surgery**  
Session Chair: Duncan Angus McGrouther, Randy Bindra |
| 14:00 - 14:08 | Current biologics in hand surgery, what really works  
Randy Bindra |
| 14:08 - 14:16 | ReGeneraTing Agents (RGTA) based Matrix Therapy for  
Wound Healing & Soft Tissue Regeneration in Hand Surgery  
Roohi Ahmad |
| 14:16 - 14:24 | The efficacy of composite of Amnion membrane and Adipose derived  
Mesenchymal Stem Cell in nerve tissue engineering  
Heri Suroto |
| 14:24 - 14:32 | Nerve transfer augmented with collagen membrane, a Western Australian experience  
Alex O’Beirne |
| 14:32 - 14:40 | Biological augmentation of axonal regeneration with the use of freeze dried  
amnion membrane and adipose derived mesenchymal stem cell in Supraspinatus repair  
Heri Suroto |
| 14:40 - 14:48 | Electrospun Nanofibers on Collagen as nerve conduit  
Shalimar Abdullah |
| 14:48 - 14:56 | Clinical Application of Stem Cells in Orthopaedics  
Roohi Ahmad |
| 14:56 - 15:04 | Conceptualisation and in vivo validation of a scapholunate ligament scaffold.  
Randy Bindra |
| 15:04 - 15:12 | Chemical Axon Membrane fusion  
Cameron Keating |
| 15:12 - 15:30 | Panel Discussion: |

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| 14:00 – 15:30 | **Scientific Session D3**  
**Prosthetics 1 - Upper limb prosthetics, current and future directions**  
Session Chair: Scott Levin, James Thomas |
| 14:00 - 14:15 | Upper limb amputation and prosthetics. What’s new and what can we do?  
Hyun-Joo Lee |
| 14:15 - 14:30 | Bionic Arm Dream or Reality  
Frank Bruscino-Raiola |
| 14:30 - 14:40 | Multi-articulating myoelectric prostheses: functional application  
Lisa Robin |
| 14:40 - 14:50 | Experiences with hand transplantation in Taiwan  
Kent (Jui-Kun) Chang |
| 15:00 - 15:15 | Hand Transplantation. Here to stay?  
Scott Levin |
| 15:15 - 15:30 | Panel Discussion: Where to from here? |
14:00 – 15:30 Scientific Session D3
Wrist 13 Proximal Carpal Row Instability
Session Chair: Steve Tham, Marc Garcia-Elias

14:00 - 14:15 Proximal Carpal Row Instability. A new approach to an old problem
Marc Garcia-Elias

14:15 - 14:25 Proximal row instability and Scaphoid fractures
Mark Ross

14:25 - 14:35 Arthroscopic repair of DIC ligament
Toshiyasu Nadamura

14:35 - 14:45 DCSS ligament injury and the stable central column
Michael Sandow

14:45 - 14:55 Palmar Dorsal MCI
Clara Wing Wee Wong

14:55 - 15:05 CIND and distal radius fractures
Margaret Fok

15:05 - 15:15 Conservative proprioceptive therapy for MCI
Christina Harwood

15:15 - 15:30 Panel Discussion: Hyerlaxity and MCI, what is the implication for ligament sparing approaches to the wrist?
Michael Sandow, Margaret Fok, Marc Garcia-Elias

14:00 – 15:30 Scientific Session D3
Radiology – What are we seeing
Session Chair: Greg Couzens, Paul Jarett

14:00 - 14:20 Sorting out the wheat from the chaff
Marcus Pianta

14:20 - 14:35 Ultrasound in the surgeons hand
Paul Jarrett

14:35 - 14:50 When we see too much, what is real?
Greg Couzens

14:50 - 15:05 A Comparison of MRI Imaging and Arthroscopy in the Diagnosis of Triangular Fibrocartilage and Scapholunate Pathology
Jeff Ecker

15:05 - 15:20 SPECT scans
Simon MacLean

15:20 - 15:30 Panel Discussion
### Scientific Session D3
**Free Papers 11 - Tendon**

**Session Chair:** Jenny Green, James Thomas

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<tr>
<td>14:00 - 14:08</td>
<td>A Review of Cyclic Testing Protocols for Flexor Tendon Repairs</td>
<td>Min Kai Chang</td>
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<td>14:08 - 14:16</td>
<td>Clinical Outcomes and Biomechanical Comparison of Modified Lim/Tsai Tendon Repairs</td>
<td>Min Kai Chang</td>
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<td>14:16 - 14:24</td>
<td>Flexor Tendon Degeneration: Does it Influence the Outcome of Open Trigger Finger Release?</td>
<td>Mardhibah Abdul Nasir</td>
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<td>14:24 - 14:32</td>
<td>Tendon Subluxation After Surgical Release of the First Dorsal Compartment in De Quervain Disease</td>
<td>Jong-pil Kim</td>
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<td>14:32 - 14:40</td>
<td>Spontaneous rupture of flexor pollicis longus tendon by tendolipomatosis in proximal phalanx: A case report</td>
<td>Young Keun Lee</td>
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<td>14:40 - 14:48</td>
<td>Flexor Tendon Repairs: Outcomes from a Generalist Orthopaedic Service at a Peripheral Hospital in New Zealand</td>
<td>Yushy Zhou</td>
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### Hand Therapy D3
**Trauma**

**Session Chair:** Jennie Graetz, Kelly Briody

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<td>Replants: How to maximise long term function</td>
<td>PC Ho</td>
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<td>14:10 - 14:16</td>
<td>Venous congestion using negative pressure dressing</td>
<td>Margaret Fok</td>
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<td>14:16 - 14:22</td>
<td>Severity of common Hand injuries and varieties of affecting occupations at a specialized rehabilitation centre (CRP) in Bangladesh</td>
<td>Sumanta Ray</td>
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<td>Panel Discussion / Questions</td>
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<td>14:30 - 14:38</td>
<td>Outcomes following free functioning muscle transfer for management of pan-BPI: An Australian sample</td>
<td>Sara Brito</td>
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<td>14:38 - 14:44</td>
<td>Prospective Assessment of Meaningful Functional Recovery After Nerve Transfer in Traumatic Brachial Plexus and Spinal Cord Injury</td>
<td>Jaslyn Cullen</td>
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<td>14:50 - 15:20</td>
<td>“Holding your Nerve”: therapist and patient perspective on nerve transfers for regaining upper limb function after SCI</td>
<td>Cathy Cooper</td>
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<td>16:00 – 17:15</td>
<td>Scientific Session D4</td>
<td><strong>Surgery 5 - Outreach Services in the Asian Pacific Region</strong></td>
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<td><strong>Session Chair:</strong> Graeme Gumley, Susan Caragianis</td>
<td><strong>GOLDFIELDS THEATRE</strong></td>
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<td>16:00 - 16:07</td>
<td><strong>Introduction to Outreach in the Asian Pacific Region</strong></td>
<td>Graeme Gumley</td>
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<td>16:07 - 16:17</td>
<td><strong>Outreach in New Guinea</strong></td>
<td>Peter Maloney</td>
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<td>16:17 - 16:23</td>
<td><strong>Outreach in Cambodia</strong></td>
<td>Graeme Gumley</td>
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<td>16:33 - 16:43</td>
<td><strong>Outreach in Vietnam</strong></td>
<td>Peter Scougal</td>
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<td>16:43 - 16:55</td>
<td><strong>Outreach in Myanmar, a recipients perspective</strong></td>
<td>Khin Maung Myint</td>
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<td>16:55 - 17:15</td>
<td><strong>Panel and Discussion</strong></td>
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<td>16:00 – 17:15</td>
<td>Scientific Session D4</td>
<td><strong>Free Papers 12 - Distal Radius Fractures</strong></td>
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<td><strong>Session Chair:</strong> Nick Smith, Jacqueline Tan</td>
<td><strong>COURTYARD ROOM 1&amp;2</strong></td>
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<td>16:00 - 16:08</td>
<td><strong>Functional outcomes between early and delayed wrist mobilization after volar fixed-angle plate fixation of distal radius fracture: a randomized controlled trial</strong></td>
<td>Kitidate Boonchai</td>
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<td>16:08 - 16:16</td>
<td><strong>Result of Surgical Treatment of Distal Radius Nonunion With or Without Distal Radioulnar Joint Derangement: A Report of Nine Cases</strong></td>
<td>Chun-Ying Cheng</td>
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<td>16:16 - 16:24</td>
<td><strong>Gait analysis of patients with distal radius fracture using a novel Laser-TUG system</strong></td>
<td>Koji Fujita</td>
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<td>16:24 - 16:32</td>
<td><strong>Flexor tendon complications in distal radius fracture fixation with a Variable-Angle Volar RIM Plate are not frequent despite its plate prominence over the water-shed line</strong></td>
<td>Kazuo Hayakawa</td>
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<td>16:32 - 16:40</td>
<td><strong>Distal screw penetration in volar locking plate fixation for intra-articular distal radius fractures</strong></td>
<td>Seungho Hyun</td>
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<td>16:40 - 16:48</td>
<td><strong>Possibility of fixation of a distal radius fracture with a volar locking plate through a 10 mm approach.</strong></td>
<td>Kiyohito Naito</td>
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<td>16:48 - 16:56</td>
<td><strong>“Stepwise” AARIF of intra-articular distal radius fractures - evolution of technique and instrumentation</strong></td>
<td>Nicholas Smith</td>
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<td>16:56 - 17:04</td>
<td><strong>The vascularized dorsal periosteal curtain for corrective osteotomy of the distal radius</strong></td>
<td>Mark Ross</td>
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<td>17:04 - 17:12</td>
<td><strong>Wrist hemiarthroplasty in traumatology: early results in the elderlies with type C3 fractures</strong></td>
<td>Jean-Yves Beaulieu</td>
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### Scientific Session D4

**EUREKA ROOM 1&2**

**Session Chair:** David Stabler, Mark Allison

**16:00 – 16:45**

**16:00 - 16:15**

**The Orthoplastic Approach to Upper Extremity Reconstruction**

Scott Levin

**16:15 - 16:30**

**My journey with the arthroscope**

PC Ho

**16:30 - 16:45**

**After 25 years I can now tell the future**

Duncan Angus McGruther

**16:45 - 17:00**

**Lessons learned in fracture fixation of the hand and wrist**

Randy Bindra

17:00 - 17:15 Discussion

### Hand Therapy D4

**SOVEREIGN ROOM**

**Session Chair:** Anne Wajon, Hercy Li

**16:00 – 18:00**

**16:00 - 16:35**

**Understanding How the Thumb Moves**

Judy Colditz

**16:35 - 16:43**

**Splinting options and effectiveness in thumb CMC OA**

Miranda Buhler

**16:43 - 16:51**

**Exercise and stability considerations for the thumb**

Anne Wajon

**16:51 - 16:59**

**Assessment considerations in de Quervain’s syndrome**

Brodwen McBain

**16:59 - 17:07**

**Congenital Thumb Hypoplasia**

Jill Peck-Murray

17:07 - 17:15 Panel Discussion / Questions

### Closing Ceremony

**GOLDFIELDS THEATRE**

17:15 – 18:00
Arthroscopy and the TFCC

Prof Toshiyasu Nakamura

APWA/IWAS Plenary - Current Practice of Wrist Arthroscopic Surgery, Goldfields Theatre/Plenary, March 11, 2020, 10:30 AM - 1:00 PM

The triangular fibrocartilage complex is a ligament-fibrocartilage complex in the ulnar side of the wrist. Since this tiny structure exists in the deep part between the radiocarpal and distal radioulnar joint (DRUJ), open exploration sometimes has too invasive to reach this structure. Radiocarpal and DRUJ arthroscopies are strong diagnostic and treatment tool for TFCC injury. In this presentation, presenter demonstrates effectiveness of arthroscopy for TFCC lesions, especially indicates how to do DRUJ arthroscopy.
Scapholunate (SL) instability is the most common dissociative carpal instability condition. It is the most frequent cause of wrist osteoarthritis, defined as scapholunate advanced collapse or SLAC wrist. Familiarity with the SL ligament complex is required to understand the various features of SL instability. Damage to the SL interosseous ligament is the main prerequisite for SL instability; however the extrinsic, palmar and dorsal ligaments of the carpus also come into play. Before osteoarthritis sets in and when the SL instability is still reducible (scaphoid can be reverticalized), ligament arthroscopic surgery is indicated. The arthroscopic surgery approach presented in this presentation is safe and effective in the treatment of SL dissociation, since it offers satisfactory clinical, radiographic and functional results, showing low rates of complications. For patients, it allows the return to their social and professional activities, and increases their life quality.
Dupuytren’s fibrosis: Outcome of dermatofasciectomy and full thickness graft

Mr Jeff Ecker1,2, Mrs Karolina Pavleski1

1Hand And Upper Limb Centre, Claremont, Australia, 2Curtin University, Bentley, Australia

Objectives: 735 patients attended the Dupuytren’s clinic between 2011 and January 2019. Approximately 50,400 measurements of range of motion and contracture have been documented. These measurements formed the clinical basis as to whether to monitor the contracture or intervene. Treatment options included percutaneous needle aponeurotomy with steroid injections (PCA), collagenase injection and dermatofasciectomy with full thickness graft (FTG). This study analyses the outcome of these interventions.

Methods: During this time, 657 PCA, 334 collagenase injections and 44 FTG were performed. Of the 44 FTG, 5 were performed as a primary procedure and 39 were performed subsequent to another intervention. 6 of these had a collagenase injection performed as a ‘staging procedure’ prior to FTG. A recurrence was defined as an increase in contracture of 20° when compared to measurements performed 6 weeks post treatment.

Results: PCA was found to have a 17% recurrence at 2.5 years, collagenase injection a 20% recurrence at 1 year and FTG a 4.5% recurrence at 1 year. The data was analysed according to the degree of contracture (stage N = nodule, stage 1 = <45°, stage 2 = 45-90°, stage 3 & 4 = >90°). It was found that the greater the degree of contracture the higher the recurrence rate and the shorter amount of time in which it recurs.

Summary: Based on these observations, we recommend intervention for primary or recurrent fixed flexion contracture of the PIPJ measuring 20°.
Radiotherapy. What is the evidence

Dr Tanya Burgess

Dupuytren's - Contracture, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Radiation Therapy has historically been considered a poor relation in the management of dupuytren’s disease. Recently there has been an emergence of radiotherapy as a common management option for benign conditions. This has led to an increased awareness in the potential role it may have in both treatment of early disease to prevent progression and after intervention to prevent recurrence.

This presentation will review the theory behind radiation in dupuytren’s, examine the current evidence and discuss the application of radiation in the future management algorithm of dupuytren’s disease.
FNA vs collagenase is there real evidence

Mr Phil Griffin

Dupuytren's - Contracture, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

I shall present in outline my personal experience of outcomes after collagenase treatment and after needle aponeurotomy. Published comparative studies do report similar outcomes, but difference in expense and 'down time'. My current algorithm for care supports needle release in preference.
Assessing outcome studies for Dupuytren's and recurrence definition

Prof Warren Rozen

Dupuytren's - Contracture, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Dupuytren’s disease is a common and debilitating fibroproliferative disorder. Australia has made significant contributions to the understanding of DD, and its treatment methodologies, from Hueston in 1963 to our involvement in the CORD studies for collagenase treatment. Despite much research and outcome studies, there is still a lack of clarity with regards to modes of assessing outcomes and defining recurrence rates. The current talk describes the heterogeneity of disease, the range of modes of assessing outcomes, the differences in defining recurrence in the literature, and compares this to our local results.
Surgery, What secrets have I learnt?

Dr David Gilpin

Dupuytren's - Contracture, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

SURGERY FOR DUPUYTRENS DISEASE: WHAT SECRETS I HAVE LEARNT

The management of Dupuytrens Disease have undergone significant changes in the last 20 years with a shift to less invasive techniques, as well as greater emphasis on PROMs. The role of surgical treatment has been questioned, with indications for treatment and surgical techniques re-evaluated.

This paper examines the issues that have challenged surgeons in the management in the surgical treatment of DD, and offers some views on solutions to improve outcomes of surgical treatment.
Post operative therapy

Mr Dan Purvell

Dupuytren's - Contracture, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Post-Op Dupuytren's fasciectomy can be a difficult time for both patient and therapist. The vast trauma to the palmar surface often results in significant pain and scarring making for a challenging period. Early intervention, education, and clear communication can greatly assist in getting a good outcome. This presentation aims to further promote the above as well as provide some structured ideas to reduce issues during this period.
Minimal endoscopic decompression of ulnar nerve in the cubital tunnel

Dr Dawid Mrozik¹,², Dr Agnieszka Jackiewicz¹,²
¹HANDPROJECT Clinic, Gdansk, Poland, ²SWISSMED, Gdansk, Poland

Free Papers 1 - Nerve, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Compression of the ulnar nerve in the cubital tunnel is the second most frequent entrapment neuropathy of the upper extremity. None of the described techniques have proved to be superior in randomized prospective trials. We present series of endoscopically decompression of the ulnar nerve to determine the effectiveness of this procedure.

Prospective, non-randomize two-center clinical study. Diagnosis was based on history, clinical examination and neurophysiological studies. In 45 patients with clinical McGowan grade I (6), II (29), and III (10), 21-cm of the ulnar nerve was released through a 2-cm long skin incision. A 4-mm, 30° standard endoscope were used during the procedure. The follow-up examination was 12 months.

There were no visible nerves and vessels injured. The postoperative complication was hematoma in 4 patients. There was no elbow extension deficit and surgical wounds all healed well. Outcomes were excellent in 27 of 45 cases and good in 13 of 25 cases. Grip strength showed a highly significant increase after surgery compared to the non-operated hand (p<0.005). DASH score was decreased significantly about 65% (from 74,8 to 26,3) (p<0,005). 88% patients were satisfied with the procedure.

Endoscopic technique for treating CuTS is a safe and reliable procedure, characterized by a short incision, minimal soft tissue manipulation, less scar sensitivity and early postoperative mobilization.

It demonstrates promising benefits against conventional approaches (complete release, good visualization) and reduced complication profile (painful scarring).

Endoscopy is a widely imaging study for assessing nerves providing useful information on the severity and stage of nerve pathology.
Comparative Study among Nerve Repair, Orthodromic and Antidromic Nerve Grafts: An Experimental Study in Rabbits

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Free Papers 1 - Nerve, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Objectives: Although many surgeons have anecdotally described reversing the polarity of the autograft with the intent of improving regeneration, the optimal orientation of the autogenous nerve graft remains controversial. The aim of this study was to compare: (1) the outcomes of orthodromic and antidromic nerve graft to clarify the effect of nerve graft polarity, and (2) the outcome of either form of nerve graft with that of nerve repair.

Methods: In 14 of the 26 rabbits used in this study, a 1-cm defect was made in the tibial nerve. On one side, an orthodromic nerve graft, and on the other an antidromic nerve graft, were performed using a 1.2-cm-long segment of the peroneal nerve. In the remaining 12 rabbits, the tibial nerve was transected completely and then repaired microscopically on one side but left untreated on the other. Electrophysiologic studies were performed in all animals at 8 weeks after surgery and the sciatic nerves were harvested.

Results: Compound motor action potential was visible in all rabbits treated by nerve repair, but in only half of the rabbits treated by nerve graft. There was no significant difference in the compound motor action potential, nerve conduction velocity, or total number of axons between the orthodromic and antidromic nerve graft groups. However, in both groups the outcome was significantly poorer than that of the nerve repair group.

Summary: Direct nerve repair with moderate tension could to be a more effective treatment than nerve graft.
Long-term protective effect of biodegradable nerve conduit against peripheral nerve adhesion in animal models

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Free Papers 1 - Nerve, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Objectives
Peripheral nerve adhesion caused by extraneural and intraneural scar formation leads to nerve dysfunction. We previously developed a novel very flexible biodegradable nerve conduit composed of poly(L-lactide) and poly(ε-caprolactone) for use in peripheral nerve regeneration and protection. We investigated the long-term effect of protective nerve wrapping on preventing adhesion in a rat sciatic nerve adhesion model.

Methods
Rat sciatic nerves were randomly assigned to one of the following three groups: the no-adhesion group, which involved neurolysis alone without an adhesion procedure; the adhesion group, in which the adhesion procedure was performed after neurolysis, but no treatment was subsequently administered; and the nerve wrap group, in which the adhesion procedure was performed after neurolysis and protective nerve wrapping was then performed with the nerve conduit. 18 months postoperatively, we evaluated the extent of scar formation using biomechanical and histological examinations and assessed nerve function with electrophysiological examination and gastrocnemius muscle weight measurement.

Results
Scar tissue adhered to the nerve biomechanically and histologically in the adhesion group. In the nerve wrap group, the adhesion scores and the biomechanical breaking strength were significantly lower and motor nerve conduction velocity was significantly higher than in the adhesion group. The nerve conduit was gradually absorbed without collapse and adverse events.

Summary
The nerve conduit prevented peripheral nerves from developing adhesion and allowed them to maintain their nerve function for 18 months. It effectively blocked scarring and prevented adhesion-related damage in the peripheral nerves.
Active von Frey filament test: new technique for evaluation of hand tactile sensation measuring in continuous variable units

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Objectives To measure and analyze the tactile sensation of human hand, several devices have been introduced. Von Frey filament test (vF) is a mainstay in clinical setting, however, the results can be affected by variable factors such as touch speed. Moreover, the differences between two adjacent grades of filaments are too large to detect fine change. We developed a new tools for evaluation of tactile sense (active Von Frey filament test; AvF), and hypothesized that AvF show different pattern of measured values.

Methods The AvF was developed to provide an accurate force for human skin sensation. The touching force of the AvF started at 1mgf much lower than 1st grade (8mgf) vF. D’Arsonval movement is chosen as an actuator. After acquiring IRB approval, 32 normal subjects were examined. In the autonomous zone of the median and the ulnar nerve, i.e., index and 5th finger volar tip were examined using AvF and vF without visional stilmulation. Each measured value was collected and the correlation between AvF and vF was evaluated. In the same hand, values in the index and fifth finger were compared.

Results Mean value of AvF was significantly higher than that of vF (111.3±46.9 vs 24.1±9.8) (p<0.01) with larger variance. Spearman correlation coefficient between AvF and vF was 0.341. The values of the index and the fifth finger did not show statistically significant difference.

Summary AvF can provide more precise values with continuous units for tactile sensation. Values of AvF and that of vF might not be that correlated.
Clinical Tests of Individual Intrinsic Muscles

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Free Papers 1 - Nerve, Courtyard Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Clinical Tests of Individual Intrinsic Muscles

Objectives
A series of Clinical tests, validated by ultrasound, will be described to examine individually the intrinsic muscle of the hand.

Froment’s sign is a common clinical test for weakness of the ulnar innervated muscles of the hand but it has a number of deficiencies. Depending upon the rotational position of the thumb, it tests principally the adductor pollicis or more correctly it tests the absence of this function and its replacement by Flexor Pollicis Longus. It is therefore an indirect test and there are many ‘trick movements’ to disguise the outcome.

Methods
Normal volunteer subjects and patients with partial or complete nerve palsies of ulnar and median nerves have been examined by clinical palpation and ultrasound examination.

Results It is possible to detect the individual contraction against resistance of each of the palmar and dorsal interossei by palpation of the intermetacarpal webspaces. Contraction can be confirmed by ultrasound examination together with assessment of the gliding planes between palmar and dorsal interossei. In particular Semple’s sign (Ask the patient to hold thumb and index straight and oppose them) detects hardening contraction of the first dorsal interosseous and is a good screening test for ulnar nerve palsy.

Summary
A new clinical protocol is described for examination of all of the individual intrinsic muscles of the hand.

Identifying factors that would predict postoperative recovery of McGowan grade II cubital tunnel syndrome cases

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McGowan’s classification is most frequently used for Cubital tunnel syndrome (CuTS) and the pathology of grade II is considered a mixture of neurapraxia and axonotomesis, showing variable postoperative recovery. The purpose of this study to analyze the postoperative recovery of grade II cases for factors predicting the postsurgical prognosis.

(Methods) 46 cases classified as McGowan grade II with a follow up of over a year were included in this study. 17 cases gained full recovery of ADM muscle power one year post-operatively and were defined as good recovery group (Group G). The remaining 29 cases with postoperative MMT 4 or less were defined as the control group (Group C). The age at the time of surgery, total active motion (TAM) of the elbow, presence of elbow osteoarthritis based on Kellgren-Lawrence (KL) grading scale, duration of symptoms, distal motor latency (DML), compound muscle action potential (CMAP) of the ADM muscle, MCV across the elbow joint and SCV were analyzed and compared among the two groups.

(Results) The duration of symptom was significantly longer in group C (G 4.13, C: 7.03 months, p=0.04). Electrophysiological diagnosis revealed a significant difference in DML (G 2.93, C: 3.30ms, p=0.03) and the amplitude (G: 5.98, C: 4.25mV, p=0.04), whether as MCV and SCV showed no significant difference.

(Summary) The duration of symptoms, preoperative DML and amplitude of the ADM could be a predictor for the postoperative recovery of McGowan grade II CuTS.
Outcome of gracilis free functioning muscle transfer for finger flexion in severe Volkmann’s ischemic contracture

Dr Hari Venkatramani, Dr Praveen Bhardwaj, Prof Raja Sabapathy

Objectives: Volkmann’s ischemic Contracture (VIC) can be a devastating condition. This study hypothesized that restoring finger flexion by free functioning muscle transfer (FFMT) using gracilis would provide functional benefit in severe VIC.

Methods: A retrospective cohort study was conducted, comprising 23 patients who presented to a single center with severe VIC between 2010 and 2017. The mean age was 13 years (range: 7-22). 10 involved the right upper limb and 13 involved the left. 20 were Tsuge class 3 and the other 3 were Tsuge 2. All patients had undergone staged procedures comprising excision of infarcted muscles, median and/or ulnar nerve neurolysis/reconstruction using sural nerve graft, with or without abdominal flap coverage. After recovery of protective sensation and intrinsic function, FFMT was performed for finger flexion. Patients with at least 1-year postop, sensory and motor assessment, and range of motion of the interphalangeal joints were evaluated.

Results: The mean follow-up was 3 years (range 1-5 years). All patients who underwent neurolysis with or without sural nerve grafting had sensory recovery in the form of protective sensations. 13 patients had Doi M3 power, 8 had M4 with finger flexion against resistance and 2 patients had M2 result. In the 2 cases with M2 results, this was attributed to stiff metacarpophalangeal and interphalangeal joints pre-operatively. The patients still reported high satisfaction due to the ability to have hook grip.

Summary: FFMT gives good results in severe VIC when no donors are available for tendon transfers. Staged surgeries may help to optimise results.
Is staged nerve reconstruction surgery necessary for replantation of fingers? Clinical outcomes of sensory recovery with staged nerve reconstruction and with immediate nerve repair

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Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Objectives
The postoperative results of two-stage reconstruction in finger replantation with autologous nerves are compared with the results of direct nerve repair in finger replantation.

Methods
Between 2012 and 2018, completely amputated fingers were replanted in accordance with zones 3–5 of the Tamai classification. Group A consisted of 5 patients in whom sensory reconstruction of 6 replanted fingers was performed with autologous nerves. Group B consisted of 22 patients in whom direct nerve repair was performed during replantation of 28 fingers. The average ages at the time of injuries were 34.8 years in group A and 47.5 years in group B, and the average lengths of follow-up were 37.0 months for group A and 29.9 months for group B. The average length of nerve grafts in group A was 40.8 mm. In both groups, sensory evaluation was performed with the Semmes–Weinstein monofilament test (SWT), and two-point discrimination (2PD) were investigated.

Results
At the time of final follow-up, SWT results were 2 purple, 2 blue, and 2 green in group A and 8 purple, 8 blue, and 10 green in group B. The static 2PD acquisition rates were 50% in group A and 39.3% in group B, and moving 2PD acquisition rates were 50% in both groups.

Summary
The degree of sensory recovery in group A was equal to that in group B. The results of this study indicate that two-stage nerve reconstruction for the replantation of fingers is well worthwhile for cases in which initial nerve repair is difficult.
The Trend of Upper Extremity Replantation in Japan: A Nationwide Population-Based Study from the Japan Trauma Data Bank

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Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Objectives
Establishing a system of transfer patients to adequate hospitals for treatment of upper extremity amputation have been promoted. However, trends of the replantation in Japan are little known. The aim of this study is to clear the trends of the treatment.

Methods
The Data from Japan Trauma Data Bank were used to quantify the trends in replantation volume for amputated upper limbs including fingers. Patients with amputated upper limbs were defined utilizing the Abbreviated Injury Scale code and a subgroup of patients who underwent replantation was delineated. We investigated patient demographics and characteristics of treating facilities.

Results
A total of 1,240 patients were treated for upper extremity amputation, 510 of whom underwent replantation. The rate of replantation did not change in the last ten years. The mean age of patients undergoing replantation was 45.5 years, compared with 47.2 years in patients without replantation. The number of patients who were transferred from another hospital for treatment decreased from 2004 (28.5%) to 2015 (16.3%). The rate of patients who underwent replantation was different among each hospital. Higher volume hospitals, however, were more likely to perform replantation.

Summary
Patients transferred from another hospital decreased, although the rate of patients with replantation did not change. This means that the number of patients who were directly taken from the site of accident to appropriate hospitals has increased, while the quality of care has been maintained. Shared criteria for amputations are indispensable because the rate of patients who underwent replantation was different among hospitals.
INTRODUCTION

Ballistic fractures of the carpus and hand are routinely treated in large urban centers. While these injuries can be challenging due to many factors, but there are limited data available to guide the treating surgeon. This paper will share the Brazilian experience in dealing with these difficult injuries.

LITERATURE REVIEW AND CASES

Ballistic fractures pose a challenge to the hand surgeon. Many factors must be considered, including injury mechanism, involvement of surrounding structures and patient compliance.

We aim to show cases treated in Brazil and discuss the available literature in terms of wound management, bone fixation, nerve and tendons repair/reconstruction, infections and soft tissue treatment timeline.

DISCUSSION

Civilian gun violence rates in USA have continued to increase since 1993. The gun injury rate of Brazil surpassed that of the USA 10 years ago.

There are approximately 20 million guns in Brazil but only 1% of those are officially registered.

Another important difference between gun-related injuries in the USA and Brazil is that the vast majority of the injuries in the United States were the results of accidental incidents while cleaning or loading firearms, while the majority of injuries in Brazil resulted from intentional violence.

There is little consensus in the literature regarding the ideal protocol for ballistic injuries in the hand. Brazilian centers treat a high volume of these injuries. The aim of this paper is to demonstrate some of the strategies used to manage these difficult injuries.
Resurfacing of Soft Tissue Defect of Upper Limb following Electric Burn: Study of 64 Cases

Dr. Most. Nurunnahar Begum, Dr. Mahbub Hasan, Dr. Tanveer Ahmed, Dr. Lutfar Kader, Dr. Salma Poly

Sheikh Hasina National Institute of Burn and Plastic Surgery, Dhaka, Bangladesh

Objective: Electrical burn is one of the most dangerous burn injury involving upper limbs. Upper limbs are involved in more than 80% cases of all burn. Even small burn causes disfigurement, loss of function and loss of the whole upper limb. The aim of this study is to see the severity of electric burn injury involving upper limb, several options for resurfacing of soft tissue defect and outcome.

Method: A prospective observational study was performed in Burn and Plastic Surgery Unit, DMCH from January, 2018 to December, 2018. Sixty four cases with electric burn injury involving upper limb extending from electric flash burn to full thickness burn were included in the study. After initial management by ATLS guidelines, resurfacing of soft tissue defect was done by conservative management, by STSG or by flap according to extent of injury. Patients were follow up for six months after discharge.

Results: On 1st post burn day fasciotomy done in 20 cases. Twelve limb survived but 8 (12.5%) need amputation. Nine patients (14%) managed conservatively and 10 (15.6%) by STSG. Flap coverage done in 37 (57.8%) cases; posterior interosseous artery flap in 8 cases, groin flap in 10 cases, para-umbilical artery perforator flap in 12 cases and thoraco-abdominal flap in 7 cases. Regarding outcome, 34 flaps show excellent outcome, 2 underwent total flap necrosis and one flap underwent partial flap necrosis.

Summary: Electric burn injury has devastating capacity for functional and aesthetic impairment. Most injuries occur in male at work or in children with unsafe household connections. These injuries are preventable through proper education.
Reconstructive Surgery on High Voltage Electric Injury of the hand and upper extremity

Dr Nyoman Riasa

Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Introduction. Morbidity following high voltage electric injury (HVEI) on hand and upper extremity are complex due to various factors determining its manifestation, severity, and distribution of the resulting tissue damage. Damage on essential structures for functioning hand requires multiple extensive reconstructive procedures.

Method. Review of HVEI patients hospitalized from 2004 until 2019 is performed. Evaluation of the types of reconstructive procedures, timing and the function that could be achieved, is used to determine whether the outcome is favorable or unfavorable.

Results. Debridement of the dead tissue is the critical part before reconstruction. Serial surgical debridement is performed after resuscitation and fasciotomy. Debridement consisting of removal of charred muscle and obvious necrotic tissue. Partially damaged tendons, muscles and nerves were preserved and defect coverage was achieved by immediate flap coverage. In some cases, early temporary coverage with split skin graft can reduce inflammation and flap cover. In cases that came late, it usually comes with extensively damaged tendon, nerve and prolonged inflammation. Multiple reconstruction is needed to achieve defect coverage and functional reconstructions. Pedicle flap and free flap are used to cover the defect. Nerve and tendon graft are the primary modalities for functional reconstruction.

Summary. The use of musculocutaneous flap and early reconstruction give favorable results. Meanwhile, late reconstructions and bilateral hand injuries give unfavorable outcomes where a functional hand is very difficult to be achieved.
Secondary Reconstructive Surgery following Major Upper Extremity Replantation

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Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Background: Little literature currently exists on reconstructive strategies following successful upper extremity replantation. The authors hypothesized that the type of secondary surgery would vary predictably depending on mechanism and amputation level.

Methods: The authors performed a retrospective review of upper extremity replantations performed at their institution between 2003 and 2018. The mean follow-up period was 7 years. Patient, injury, and surgical demographics, as well as replantation survival rates and secondary surgical procedures, were recorded.

Results: Forty-five upper extremity replantations met inclusion criteria and the survival rate was 89 percent (n = 40). In 40 cases of successful replantation, the average number of secondary surgical procedures was three per patient (range, zero to seven). The most common reconstructive procedures were soft-tissue coverage (n = 24), tenolysis (n = 24), free functioning muscle transfer (n = 18), and tendon transfer (n = 14). For upper arm replantations, soft-tissue coverage was the most common secondary surgery; free functioning muscle transfer was the most common for amputations between the elbow and mid-forearm; tenolysis was the most common secondary procedure performed for amputations of the distal forearm to wrist.

Conclusions: Proximal-level amputations commonly required soft-tissue coverage. Amputations through the proximal forearm and elbow often underwent free functioning muscle transfer, and tenolysis was the most common secondary surgery following distal forearm and wrist amputations. Secondary surgery could be predicted based on the anatomic levels of injury.
Functional outcomes of digital replantation. Is it worth while?

**Dr Kevin C Chung**

Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Replantation is a complex surgical procedure that often is devoid of outcomes data to guide its application. I will share the current understanding of this procedure to impart a personalized approach in conducting this operation.
Crush Injuries: Pathomechanics, Assessment and Treatment Guidelines.

Prof Roohi Syed Waseem Ahmad

Trauma 1 - Complex and Mutiating Hand Injuries, Replantation, Eureka Room 1 and 2, March 11, 2020, 10:30 AM - 1:00 PM

Crush Injuries are devastating injuries causing harm not only to the limb but also affecting the resolve and psyche of the patient. They may be minor or major but all benefit from understanding the mechanism of how the injury was caused - the pathomechanics (why and how it happened). A thorough assessment will leave no surprises and will allow the surgeon to plan effectively salvage of the damaged parts and reconstruction of what cannot be saved. These are of course emergency cases, but a thorough examination and assessment stands in good stead later. The lecture will take one through the approach to such an injury: important aspects in the history, what to look out for in the examination and investigations that will help make difficult decisions. It will also outline tips and tricks to maximise the functional result of the patient.
Cerebral Palsy Hand Surgery at Canterbury District Health Board 2010-2019

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Reconstruction 1 - Cerebral Palsy, Stroke and Acquired Brain Injury, Eureka Room 3, March 11, 2020, 10:30 AM - 1:00 PM

Objectives: To review our outcomes after a decade of offering cerebral hand surgery locally.

Methods: 10 year review of prospectively recorded database of cerebral palsy hand surgery at Canterbury District Health Board

Results:
Patient characteristics: 16 of 25 patients were included in final analysis. Median age at surgery was 9.5 years (range:6-18), 63% were male, and 14/16 had unilateral hemiplegia. 69% of patients had a GMFCS of 1. 25% of patients had documented intellectual disability, and 12.5% had a degree of neglect. 16 patients underwent an FCU to ECRB transfer, 6 underwent PT release, 3 underwent PL to EPL transfer and 2 patients had EPL tightening.
Goniometric outcomes: There was a significant increase in active wrist extension with fingers extended (-10 vs +41o, p=0.0003) and fingers flexed (-12o vs +37o, p=0.001). The arc of motion remained similar (50.6o vs 53.8o, p=0.729) but the centre of arc shifted to a more neutral position (-44o vs +8o, p=0.0001).
Functional outcomes: The average House classification increased from 4.6 to 5.1, p=0.04. The number of patients scoring 1 in Zancolli classification increased from 5 to 10, p=0.001. The average Melbourne Assessment of Unilateral Upper Limb function score increased from 0.73 to 0.79, p=0.01. 80% of patients met self-determined functional goals. 93% of patients felt they had functional improvement. Most common functional goals related to food, sports and hobbies and self-cares.

Summary: This study demonstrates reliable goniometric and functional improvements after cerebral palsy hand surgery. Our results are comparable to data from other units.
Outcomes of Single-Event Multilevel surgery (SEMLS) for Upper Extremity in Cerebral Palsy

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Background: Surgical procedures at various levels for cerebral palsy can be either staged or done in single stage (Single-Event Multilevel Surgery-SEMLS). Staged approach is conventionally practiced. Aim of our study was to determine the functional outcome of SEMLS using Shriner’s Hospital Upper Extremity Evaluation and to assess the correlation between and objective functional outcome and parental satisfaction.

Methods: The study design was retrospective. Twenty nine cerebral palsy patients who underwent upper extremity single-event multilevel surgery and who had pre-operative Shriner’s assessments were reviewed after a mean follow-up period of 23.9 months. Statistical analysis was done to find the functional improvement and correlation with parental satisfaction.

Results: Mean improvement in post-operative spontaneous functional analysis, dynamic positional analysis and grasp-release analysis were 19.79%, 19.04% and 17.62% respectively and were found to be statistically significant. No significant correlation was detected between the post-operative functional outcome and parental satisfaction. But altogether, parents were satisfied with the outcomes.

Conclusion: Following SEMLS in patients with cerebral palsy, spontaneous use of hand, segmental alignment of the upper extremity as well as ability to perform grasp and release were found to be significantly increased. SEMLS has advantages like, obtaining early improvement in hand function, reducing the need for multiple surgeries and anesthesia, thus improving cost effectiveness. But careful planning and assessment of the deformity, surgeon with sufficient expertise and a dedicated physiotherapy department are essential to correct all the deformities in single stage.
Surgical Treatment of the Non-Functional Upper Limb

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¹Royal North Shore Hospital, Lane Cove, Australia

Objective: We present our approach to upper-limb assessment and our algorithm of surgical treatment in the non-functional upper limb in acquired brain injury, addressing shoulder, elbow, wrist and finger function.

Methods: We review our results of surgery in over 70 non-functional upper limbs using the Carer Burden Score.

Results: Our surgical approach to the non-functional limb brings long-lasting improvement in ease of care.

Summary: We should how appropriate upper-limb surgery can bring lasting improvement in ease of care in severe upper-limb spasticity.
Surgical options for spasticity in the forearm, hand and wrist

Dr James Ledgard

Reconstruction 1 - Cerebral Palsy, Stroke and Acquired Brain Injury, Eureka Room 3, March 11, 2020, 10:30 AM - 1:00 PM

Surgical options include soft tissue lengthening, tendon transfers, neurotomies and joint stabilisations. Procedures and outcomes for the treatment of forearm pronation, wrist flexion, clenched fist, clasped thumb and intrinsic tightness are discussed.
Surgical options for shoulder and elbow in spasticity

Dr Claudia Gschwind

Reconstruction 1 - Cerebral Palsy, Stroke and Acquired Brain Injury, Eureka Room 3, March 11, 2020, 10:30 AM - 1:00 PM

Objective: To present how to approach spasticity in the shoulder and elbow in functional and non-functional upper limbs.

Methods: We identify target muscles responsible for muscular imbalance around the shoulder and elbow and discuss surgical options.

Results: Publications on surgery for functional and non-functional shoulder and elbow joints are reviewed.

Summary: Shoulder and elbow spasticity can be successfully addressed with surgery.
Contralateral C7 transfers for Spastic Arm Paralysis

Dr Yohan Lee

Reconstruction 1 - Cerebral Palsy, Stroke and Acquired Brain Injury, Eureka Room 3, March 11, 2020, 10:30 AM - 1:00 PM

Purpose
Contralateral C7 (CC7) root transfer is an effective treatment for spastic arm paralysis due to the injury of the cerebral hemisphere. However, there are only a few reports on the recovery of symptoms other than upper extremity after CC7 transfer. The purpose of this study was to evaluate functional recovery other than the upper extremity after CC7 transfer.

Method
A retrospective review of all patients with hemiplegia who had undergone CC7 transfer at a single institution during two years was performed. The comprehensive functional recovery, including gait, sight, urination, and speaking, was evaluated according to the patient's disability. The evaluation of functional recovery was based on the subjective statement of the patient.

Result
Seventy-seven patients with hemiplegia underwent CC7 transfer performed between 2017 and 2019 for the restoration of upper extremity function. All 77 patients reported improvement in the function of the upper extremity. Of the 77 patients with walking problems, 60 (78%) had improved gait function. Thirty-three of the 39 (85%) who had vision problems some improved. Of the 44 patients who had problems with pronunciation, 34 patients (77%) reported improvement in speaking. Of the 40 patients with urination problems, 22 (55%) had improved symptoms. Most of the functions improved significantly within two weeks after surgery and showed continuous improvement for one year.

Conclusion
CC7 transfer to hemiplegic patients showed subjective improvement in the function of other sites as well as the upper extremities. Further studies are needed on the comprehensive effects of CC7 transfer in hemiplegia.
Cerebral palsy (CP) is the commonest cause of physical disability in early childhood. There are multiple known risk factors for CP, with prematurity being the single largest risk factor. The underlying events can be divided into three categories; Firstly, predisposing intrauterine factors; mainly fetal growth restriction, congenital abnormalities, intrauterine infection or inflammation and placental vascular disorders. Secondly, acute peripartum events; chorioamnionitis, placental abruption and birth asphyxia and thirdly, events in the neonatal period; intraventricular haemorrhage, periventricular leukomalacia, sepsis, trauma or neonatal stroke.

There are well-established techniques for treating the deformities associated with CP but care must be taken to look at the overall disability. Selective peripheral neurectomy (SPN) is a relatively recent technique introduced to treat the problem of increased tone or spasticity. It may have a complimentary role in reducing the recurrence rate of other techniques, e.g., lengthening. The indications as well as its limitations are discussed.
25 Year review of CP Surgery at RCH

A/Prof Bruce Johnstone

Reconstruction 1 - Cerebral Palsy, Stroke and Acquired Brain Injury, Eureka Room 3, March 11, 2020, 10:30 AM - 1:00 PM

RCH Melbourne, Australia 1992-2001

68 patients (84 limbs) operated on for upper limb spasticity between April 1992 and April 2001. (9 per year).

51 patients had spastic hemiplegic cerebral palsy, 12 had spastic quadriplegic cerebral palsy and 5 had either strokes or head injuries leading to spastic hemiplegia

1992-2001

154 limbs in 135 patients, 516 procedures. Average number of procedures per operation 3.8 range 1 to 17, all in a single tourniquet run.

Botulinum toxin A treated limbs 71, Neurectomies 16, Phenol 8, Shoulder releases 7, Wrist fusions 8, Proximal row carpectomy 4

2008 to 2017 departmental retrospective study by Dr Danielle Sabella included data from 102 individuals with cerebral palsy who had undergone surgical management of their upper limb. There were 138 separate surgical events involving 579 procedures during this period. Data regarding the characteristics of the individuals and details of their perioperative assessment was collected and analysed. Currently, patients are selected for surgery using variable preoperative assessment. Selection has great potential to differ between clinicians. These compounding issues provide rationale for initiating further research into understanding the characteristics of this patient group and promoting better standardisation of perioperative assessment.
Possible benefits of Botulinum Toxin A in cerebral palsy include managing co-contraction, passive ranging exercises, serial casting and splinting, promote recovery, overpowering antagonists, an opportunity to use weak muscles and central neurological reorganization. It may be considered as “something new”, an adjunct to surgery, improved appearance, prevent contractures and skeletal deformity.

We review our experience with Botulinum toxin type-A (BTX-A) injections and aggressive splinting in the management of contractures in the upper limb in children with cerebral palsy (CP). While BTX-A has been used widely in the management of spasticity associated with CP, most previous studies exclude patients with contracture. In our series, many patients who had BTX-A injections into the wrist and finger flexor muscles followed by aggressive splinting had dramatic and often long-lasting improvement of their contractures. Eighty-seven per cent of patients who had these muscles treated had results which were classified as excellent or good. Results of injection into elbow flexors and intrinsic muscles were generally marginal or poor. We believe BTX-A and aggressive splinting has a role to play in the management of contractures in children with CP.
Effects of Focused Extracorporeal Shock Wave Therapy for Chronic Lateral Epicondylitis

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Hand Therapy A1 - Elbow, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

[Introduction]
Many studies have reported that focused extracorporeal shock wave therapy (f-ESWT) for lateral epicondylitis (LE) effectively eliminated pain and function, but others have reported that the treatment is ineffective.
[Objectives]
To assess the effect of f-ESWT on chronic LE.
[Methods]
This study included 43 elbows of 43 patients among those with chronic LE that lasted over three months. These patients were given three sessions of f-ESWT and underwent 3 shock waves per session, followed by a two-week break. That is, they received 9 shock waves over 16 weeks. The Japan Orthopedic Association (JOA) score was used for clinical assessment, and the Visual Analogue Scale was used to assess tenderness pain (TP) and Motion pain (MP). MP was assessed using the Thomsen Test. As parameters of muscle strength, we evaluated grip strength and supination force (SF). Grip strength and SF were calculated relative to the healthy side. We evaluated at before each session and the last assessment was evaluated two weeks after 3rd session.
[Results]
The JOA score, MP, TP, grip strength and SF all improved significantly after each session (P < 0.01)
[Summary]
f-ESWT improved not only pain but also elbow function such as muscle strength from 6 weeks after treatment. f-ESWT for chronic LE was considered a useful treatment.
This lecture will review basic elbow anatomy, biomechanics and pathomechanics contributing to common elbow instability patterns such as Postero-Lateral Rotatory Instability (PLRI), Postero-Medial Rotatory Instability (PMRI), and Valgus Instability. Anatomical and biomechanical contributions to joint stability and instability will be reviewed as a foundation to understand the development of rehabilitation treatment approaches and the creation of the "Varus Protection Rehab Program" for PLRI. A case presentation will demonstrate the mobility and stability components of the program and the appropriate exercises and relevant orthoses. We will conclude with biomechanical and clinical outcome studies that support use of this program for elbow instability rehabilitation.
Can pressure garments improve arm function in the early stages after stroke?

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Hand Therapy A1 - Function, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

Objective: To evaluate the effect of pressure garment on arm function in adults with 1-12 months of stroke.

Methods: This randomized controlled trial recruited 46 participants and randomly assigned them into the control group (CG) or intervention group (IG) using these criteria: age ≥ 21 years old; Mini Mental State Examination (MMSE) score ≥ 24; and Modified Modified Ashworth Scale (MMAS) score of 1, 2, or 3 when wrist and hand perform flexion and extension movements. Arm function was evaluated using Jebsen-Taylor Hand Function Test (JTHFT). For 6 weeks, both groups received a 2 hour/week conventional occupational therapy program, with the IG receiving an additional 6 hour/day pressure garment application (long glove).

Results: Only 43 participants completed the study. Before intervention, both CG (n=22) and IG (n=21) showed no difference in demographics and stroke-related information. Only 9 to 12 participants in the CG and 6 to 11 participants in the IG could perform the JTHFT subtests. After intervention, there was no difference between both groups in arm function improvement, though within-group analysis showed IG gained improvement in Subtest 5 and Subtest 6. IG also gained more improvement (n= 3 to 8) compared to CG (n=0 to 2) in terms of number of participants who were able to perform the JTHFT subtests after intervention (for category with no JTHFT performed before intervention).

Summary: Given only within-group improvements were detected, the effect of pressure garment on arm function in the early stages after stroke needs to be more carefully explored.
Functional outcome following Single Event Multiple Level Surgery (SEMLS) with rehabilitation for spastic hand using Shriners Hospital Upper Extremity Evaluation (SHUEE).

Mr Gobinath Gobinath

1Ganga Medical Center And Hospital, Coimbatore, India

Hand Therapy A1 - Function, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

OBJECTIVES:

SEMLS become familiar in lower limb but its use in upper limb is evolving. Logically it should have great benefit because all units of upper limb have to work in good synchrony to perform a function. So, if all deformities are corrected at same time early return to function can be achieved. However literature regarding this is sparse. Shiners Hospital Upper Extremity Evaluation (SHUEE) analyse the segmental and dynamic alignment of the upper extremity of spastic children while performing the functional tasks. The Aim of the study is to evaluate the Functional outcome of children with spastic hand who underwent Rehabilitation after Single Event Multiple Level Surgery (SEMLS).

METHOD:

Children with spastic cerebral palsy who elected for SEMLS were selected. Selected Children were evaluated by SHUEE video taping which includes spontaneous and dynamic functional tasks, Grasp and release. After 4 weeks of Immobilization, Tendon transfer rehabilitation and functional training were given to all children. Post operative SHUEE measures were assessed at 6 months.

RESULTS:

20 patients with spastic cerebral palsy including 11 males and 9 females performed SEMLS and Rehabilitation. Overall SHUEE in spontaneous functional analysis improved by 32%, dynamic functional analysis improved by 45% and grasp and release improved by 46%.

CONCLUSION:

Surgical interventions followed by proper post surgical therapeutic regime and Activity training improve the hand function in patients with Cerebral Palsy.
Activity recommendations in the first six weeks following surgical treatment of distal radius fracture: a systematic review

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Objectives: Following surgical treatment of distal radius fractures, exercises are routinely used to promote movement of the wrist. Participation in meaningful activities and occupations can also be used to enhance wrist movement but may be less widely promoted as a rehabilitative approach than exercises. This review investigated activity recommendations, without an orthosis, in the first six weeks following surgery, and evaluated effects of activity participation on range of motion, function, grip, pain and adverse events.

Methods: Five databases were searched for studies that evaluated early or accelerated mobilisation (exercise and activity within two weeks), compared with delayed mobilisation or usual treatment following distal radius fracture surgery. The Downs and Black Index was used to evaluate study quality. Results: Seven studies with a mean score of 20.6/28 were included. The term Early Daily Activity (EDA) was used to refer to the specific use of activities without an orthosis within two weeks of surgery. EDA, in combination with exercises, was employed in all early mobilisation groups and resulted in greater wrist range of movement, function and lower pain at eight to ten weeks than in the delayed mobilisation groups. Summary: EDA is used to promote recovery but without clearly specifying the type, duration or intensity of activities. In combination with exercise, EDA is safe, and achieves superior short to medium term outcomes, compared with delaying activity and exercise for longer than two weeks.
Occupation based intervention in hand rehabilitation

Ahmad Zamir Che Duad

Hand Therapy A1 - Function, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

Occupation Based Intervention (OBI) is perceived differently by occupational therapists around the globe. Some believe that OBI is a therapeutic process where occupational therapist and the client co-create the meaning of therapy. Another perspective is OBI includes all forms of occupational therapy interventions such as preparatory and purposeful methods as long as the outcome of intervention is occupational performance. However, most therapists perceive OBI according to concept of occupation as a means and an end. Occupation as a means refer to occupation and purposeful activities as a healing agent or treatment medium, while occupation as an end refer to occupation as an ultimate outcome of intervention. Thus, OBI is an intervention on occupational performance that matches the client’s goal, is identified as meaningful and is done within the client’s context, where the occupational therapist can also use the client’s occupation and purposeful activities as a treatment medium or healing agent. Hand rehabilitation is dominated by a reductionist approach in which the intervention focuses on eliminating impairments. Therapists believe that OBI benefit their clients, but it is challenging for them to adopt OBI in this field. Therefore, many therapists tend to neglect the intervention when treating their clients. This presentation will highlight the integration of OBI in hand rehabilitation. By using a case study, the elements of OBI such as; (1) client-centred approach; (2) top-down evaluation and intervention; (3) gradable and modifiable to suit the client’s abilities and limitations; and (4) context where the intervention is provided will also be discussed.
Establishing when it is safe for a patient to return to function is particularly challenging. Injury, environmental and personal factors all contribute to variation in advice, along with a clinician’s appetite for risk. In this presentation, we review the literature for return to function following a boxer’s fracture. This presentation will focus on how literature measures return to function, and whether education of functional precautions is described. A survey will also be distributed during this session, as part of a research project to address this gap in knowledge.
Cost and profile of sport and exercise-related acute hand and wrist injuries

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Hand Therapy A1 - Sport, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

Background: Injuries to the hand and wrist from sport and exercise are common and costly, although the epidemiology and the true scale of economic burden in Australia are unknown.

Objectives: This cost-analysis was performed with the purpose of estimating the economic implications of hand and wrist injuries that were sustained as a result of participation during sport or exercise at one Australian public hospital health service. Specifically, we aimed to estimate the costs associated with resource use following a sport or exercise-related hand or wrist injury from the perspective of the health care service: and illustrate the demographic profile, patient pathway, and resources used by this patient population.

Methods: Using ICD-10 diagnostic codes and electronic billing records, we identified 778 potential cases for inclusion. Electronic medical records were screened and reviewed to extract demographic and patient pathway data. Costs from the perspective of the health care service were calculated from resource use in the Emergency, inpatient and outpatient settings.

Results: 692 individuals, (n=761 individual zone of injuries), were included. Australian Rules Football (ARF) was the largest contributor to injuries (20.2%) followed by bicycles (15.9%). The total cost of all injuries was $790,325, with a median cost per case of $278 [IQR $210 - $282] in the Emergency Department (n=692), $3,328 [IQR $2,242 - $6,441] in the inpatient setting (n=76) and $630 [IQR $460 - $870] in the outpatient setting (n=244).

Summary: Hand and wrist injuries sustained from sport and exercise contribute to a significant financial burden on the healthcare system.
Distal radioulnar joint kinematics during handstanding in female gymnasts

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Hand Therapy A1 - Sport, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

【Purpose】Wrist joint injury is most frequently occurred in the upper extremity of female gymnasts. It has been reported that one of the mechanisms of wrist pain is soft tissue impingement in radiocarpal joint, however it is still controversial. The purpose of this study is to analyze the kinematics of distal radioulnar joint (DRUJ) during handstanding using ultrasonography.

【Material and method】Fifteen healthy female high school students were involved in this study. The ultrasound probe was placed on the dorsal DRUJ to measure the radioulnar distance, which was defined as the distance between the dorsal tubercle of distal radius and the most dorsal prominence of distal ulna. The radioulnar distance was measured 3 times in neutral and, full extension with non-weight bearing, and during handstanding. The forearm was fully pronated in each position. The radioulnar distance in 3 testing positions were analyzed using one-way ANOVA. P value less than 0.05 was considered statistically significant.

【Results】The radioulnar distance during handstanding was 26.0±3.0mm and significantly larger than 22.9±2.0mm in neutral(p<0.05) and to 23.8±2.0mm in extension(p<0.05).

【Discussion】The radioulnar distance was significantly increased by weight bearing of DRUJ during handstanding. It was suggested that the dynamic motion in DRUJ shown in this study might produce abnormal loading on the soft tissue structures in DRUJ and cause the micro trauma and subsequent wrist pain.
Rehabilitation of upper limb injuries in elite level sport.

Mr Hamish Anderson

Hand Therapy A1 - Sport, Sovereign Room, March 11, 2020, 10:30 AM - 1:00 PM

Whilst the nature of upper limb injury in elite sport may not differ, the environment in which they occur, and the demands athletes face in dealing with injury certainly are. This presentation will examine this environment and help guide clinicians in dealing with athletic injury.

An argument will be made to support the role of hand therapists as part of sports medicine teams, examining the statistics elite sport uses to define hand and upper limb injury. The influence these statistics have, and the reporting of injury through the media certainly influences the general population’s perception of injury severity. How to best deal with pressure from patients to return at all levels, with an injury that still needs time to recover will be discussed.

In addressing the above, other questions will be considered. How can we best combine our clinical reasoning and knowledge of injury with activity analysis to determine the best approach for early return to sport? Is it necessary to have played a sport to be able to treat an athlete who plays that sport? What can be done in the clinic to ensure that your treatment is relevant to your patient but still achieves basic rehabilitative goals?

Case studies and management protocols drawn from several sports will be used to define and explore the above issues which are becoming increasingly relevant for all clinicians, not just those that work with elite athletes.
Acute Ligament Injuries Associated with Scaphoid Fractures

Dr Michael Mak

APWA Wrist 1 - Scaphoid Fractures, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

In the traditional concept of the pathomechanics of carpal instability, scaphoid fracture and scapholunate should not coexist. The concept of greater and lesser arc perilunate injuries introduced by Johnson precluded the combination of these two pathways. Mayfield’s experimental progression of perilunate instability occurred from radial to ulnar and cannot account for a concomitant scaphoid fracture. Lichtman’s carpal ring concept described a continuous ring that when broken at one point, transmission of force is interrupted and should not cause a second break in the ring. In reality, however, ligament injuries do exist in a significant proportion of scaphoid fracture cases. In reported series, SL and LT injuries occurred in up to 71% and 25% respectively. 36 consecutive cases of scaphoid fractures with arthroscopic assessment in our centre were reviewed, and injuries of any ligaments were found to occur in 58.3%. Careful assessment of clinical signs and radiographs are necessary as these formed useful criteria that warrant arthroscopic assessment in scaphoid fractures. In addition to the scaphoid fracture itself, treatment needs to take into account concomitant ligamentous injuries to prevent carpal instability and its chronic sequelae.
Approximately 75% of the surface of the scaphoid is covered with cartilage, forming articulation with adjacent carpal bones. Anatomical fracture reduction is important to restored articular congruity. Most scaphoid fractures occur at the waist, which is the narrowest part of the scaphoid and has very small margin of error in accurate reduction. With limited periosteum and the lack of periosteal source of chondrogenic and osteoblastic cells, scaphoid fractures do not easily make callus during the healing process. Direct absolute bone contact is crucial for primary bone healing to happen, otherwise non-union can easily happen whenever there is a tiny gapping. Anatomical fracture reduction is therefore critical to enhance healing and guarantee clinical outcomes. However, three-dimensional shape of scaphoid is complex. The precise evaluation of the fracture configuration, angulation, displacement, accuracy of fracture reduction and position of the implant in the fracture fragments is hindered by the peculiar twisted peanut-like shape of scaphoid. Overlapping shadows of the carpal bones also make intra-operative fluoroscopic assessment of fracture reduction challenging. Scaphoid has complicated and important surrounding ligamentous structures and precarious vascularity. Open reduction of displaced scaphoid fracture would inevitably jeopardise the residual vascularity which affects the fracture healing, damage the capsular and ligamentous structures which lead to wrist stiffness. Visualization of the fracture reduction is also limited in an open way. Wrist arthroscopy on the other hand provides excellent view of the scaphoid fractures and can be used to monitor anatomical reduction clearly. Displaced scaphoid fractures also have high association with surrounding capsuloligamentous injuries. Arthroscopy at the same time helps to assess the soft tissue lesions and assist repair.
Acute Scaphoid Fractures: Conservative treatment Vs Percutaneous Screw fixation

Dr Esther Chow

APWA Wrist 1 - Scaphoid Fractures, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

The treatment option for non-displaced scaphoid fracture has been controversial. Surgical treatment with percutaneous screw fixation is widely used and can allow faster return to work, earlier return to sports and other recreational activities, avoid disuse osteopenia and muscle atrophy. However, surgical treatment is associated with high radiation exposure and the complication rate was reported to be up to 29%.

The preference of health care workers on the treatment option was not known. Therefore, a brief online survey was distributed via social media (WhatsApp and WeChat) to local and overseas health care workers. Total 56 responses were received. There were 46.4% orthopaedic surgeon, 37.5% hand surgeon, 8.9% medical doctor, and 7.2% Nurses and Allied health workers. The respondents are mainly 35-45 years of age (41.1%). There were 25% female and 75% male respondents. Majority of the respondents (66.1%) choose to treat themselves surgically with percutaneous screw if they sustained a type B2 non-displaced scaphoid fracture on their dominant hand. There was no correlation of the treatment options with age or gender. There was no positive correlation between option of surgical treatment and being active in sports activities. There was also no positive correlation between option of surgical treatment and active in playing musical instruments. There was a preference for male orthopaedic (non-hand) surgeon to choose surgical treatment (p=0.045). There was a predilection for female hand surgeon to choose conservative treatment (p=0.023).

The pros and cons of surgical and conservative treatment for non-displaced scaphoid fracture will be discussed in this lecture.
Bone Graft Substitute In Delayed Union

Dr Juijen Shih

APWA Wrist 1 - Scaphoid Fractures, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

Purpose: This study was analyzing the clinical follow-up results (minimum 2 years) in patients with delay union of the scaphoid with minimal sclerosis or instability treated with arthroscopically assisted osteosynthesis with injection of a bone substitute.

Method: From 2006 to 2017, a consecutive series of 48 patients with nonunion of a carpal scaphoid fracture with minimal sclerosis or cyst formation with or without mild instability were treated with arthroscopically assisted reduction and internal fixation combined with the use of injectable bone substitute. Preoperative and postoperative evaluations included measurement of Wrist scores, radiographic and functional parameters, as well as satisfaction. The series included 39 men and 9 women with mean age of 31 years (range, 20-45 years). We recorded union and return to activity and analyzed data with regular clinical follow-up at a mean 34 months (range, 24 to 49 months).

Results: We confirmed union in 42 of 48 patients (87.5%) at a mean of 15.4 weeks according to clinical examinations and standard radiography. For the Mayo Modified Wrist Score, there were 30 excellent and 14 good results. A total of 44 of 48 (91.7%) returned to work or sports activities at their preinjury level.

Conclusion: This method is a reliable and minimally invasive method to achieve union and scaphoid healing in early stage or mild instability of nonunion.
Cross-shaped Bone Grafting and Locking Plate Fixation for Arthrodesis of the Trapeziometacarpal Joint: Surgical Technique and Early Mobilization

Prof Keiichi Muramatsu¹,², Jessica Gandionco¹, Anthony Suguitan¹, Gaston Roces¹, Jasson Arcinue¹, Yasuhiro Tani¹, Tetsuya Seto¹
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Objective: The trapeziometacarpal joint is the second most common site of osteoarthritis in the hand and the most frequent one to require surgery. Arthrodesis of the trapeziometacarpal joint is recognized as one of the valuable technique but unfortunately there has been wide variation in the union rate. The purpose of this study was to evaluate a new arthrodesis technique involving a cross-shaped bone graft and locking plate fixation.

Methods: Fifteen male patients diagnosed as Eaton’s stage III osteoarthritis of the trapeziometacarpal joint were treated in our institute. The mean patient age was 62 years (range 50 to 80 years). At the day after surgery, physical therapy was started and free use of the hand was permitted.

Results: Patients showed radiographic evidence of trapeziometacarpal joint union after an average postoperative period of 8.3 weeks (range 6-12 weeks). The VAS pain score significantly decreased from 7.2 points preoperatively to 0.4 points after surgery. Mean side pinch strength increased significantly from 3.8 kg (53% compared to unaffected side) prior to surgery to 6.2 kg (86%). The DASH score improved from 38.6 (range 34.1-43.2) preoperatively to 17.0 (6.8-22.7) postoperatively.

Summary: These data suggested that our technique is a successful procedure for the trapeziometacarpal joint arthrodesis. Cross-shaped bone grafts have the advantages of restoring thumb length and providing internal stabilization, especially for rotational force. No complications arose at the bone harvest site of the iliac crest. The procedure seems to be technically demanding, particularly for adapting the bone graft to perfectly match the shape of the defect.
MCP Joint replacement Objective and Subjective outcomes over an 11yr period

Mr Chris Lowden, Dr Charlotte Maxwell, Mrs Theresa Vaughan

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Free Papers 2 - HandFractures, Rheumatoid Arthritis, Courtyard Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Objective;
The objective was to review the clinical results and patient satisfaction in a single surgeon series of mainly rheumatoid patients following MCP joint replacement with up to 11 yrs and a minimum of 3 yrs follow up.

Method;
Following Ethical approval Hospital records and log books were used to identify patients. Assessment tools included the DASH and MHQ and physical assessment by an independent assessor and therapist.

Results;
29 Patients with 108 joints in 35 operations were reviewed. Implants were predominantly Silicon for multiple digits in RA and Pyrocarbon for trauma and osteoarthritis.
DASH scores improved on average by 19.4 points, Ulna drift improved by average of 30 degrees and MHQ hand function averaged 78.5. Grip strength did not improve post surgery. Four patients had complications including two dislocations.

Summary
Patient satisfaction is high and seems to correlate with correction of ulna drift. Hand function scores improved despite no significant increase in grip strength.
Comparative Study of Pinning and Plate Fixation for Pediatric Forearm Fractures

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Objectives
Surgical treatment for pediatric forearm fractures are mainly selected based on the patients’ age and fracture type. Most patients are treated with intramedullary (occasionally percutaneous) pinning or plate fixation. However, determination of the fixation methods is controversial. We examined the outcomes of each surgical treatment retrospectively.

Methods
We examined 64 fractures in 44 patients (aged ≤15 years, with a minimum follow-up of 3 months). Their mean age was 9 years and mean follow-up was 10.3 months. Among these 64 fractures, 20 were injuries involving both radius and ulna diaphyseal fractures. All fractures were examined for injured site, surgical methods, Grace and Eversmann evaluation, bone union, refracture, and postoperative immobilization duration.

Results
Among the 64 fractures, 44 were treated with pinning fixation and 20 with plate fixation. Among the fractures treated with pinning fixation, 11 needed open reduction. Grace and Eversmann evaluation revealed that most outcomes of both techniques were excellent. Among the fractures treated with pinning fixation, delayed union occurred for one fracture and nonunion in another. Refracture occurred for one fracture each treated with pinning and plate fixation. The mean postoperative immobilization duration was 6.6 and 3.1 weeks for fractures treated with pinning and plate fixation, respectively.

Summary
Good clinical outcomes were achievable with both surgical methods. One case of delayed union and one of nonunion occurred after open pinning for the distal third of diaphyseal radius fractures. To determine the surgical methods, the likelihood of union and duration of immobilization should be considered.
Medium- to long-term outcome of Total Finger Arthroplasty using FINE Total Finger System for rheumatoid arthritis

A/Prof Masayuki Sekiguchi¹, Dr Ayako Kubota¹, Dr Kentaro Tsuji¹, Dr Yoshiyuki Ohikata¹, Dr Tatsuro Sakurai¹, Dr Ryo Takamatsu¹, Dr Shigeta Takeuchi¹, Dr Ayaka Kuzuhara¹, Prof Hiroshi Takahashi¹

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Objectives
Total finger arthroplasty (TFA) is an important joint reconstruction method. However, palmar joint dislocation is often a problem in TFA using a surface replacement type implant. We have developed FINE Total Finger System which can control palmar dislocation and lateral instability by utilizing Post-Cam mechanism and have been using this system since 2004. Medium- to long-term outcome of our system is investigated.

Methods
Using our system TFA was performed on twenty-three cases (71 joints) and more than five years of postoperative follow up was investigated. All cases were female, the average age at the time of surgery was 59 years old and the average postoperative follow up period was nine years and three months. ROM, Hand 20, X-ray image changes and complications were assessed. In addition, the strength of the system (polyethylene part) was evaluated by finite element analysis (FEA).

Results
The average range of motion (arc) was 40.6 degrees. The range of extension movement was decreased compared with the early postoperative period. In the HAND 20 rating the pinch action was improved and the pain was reduced. Revision surgery in eight joints and arthrodesis in one joint were performed. There was no breakage or deformation in the implants. The elastic limit values, evaluated by FEA, for the palm-dorsal and horizontal load were 67.5N and 55.7N, respectively.

Summary
FINE Total Finger System has been proved to have the strength necessary for daily life, to be able to maintain lateral stability and to provide excellent ROM.
Traction Splinting vs. Operative Fixation of Proximal Phalanx Fractures – a Retrospective Study

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Free Papers 2 - HandFractures, Rheumatoid Arthritis, Courtyard Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

OBJECTIVES
The objective of this study was present a series of patients who underwent traction using the EVAST (early active vector adjustable skin traction) protocol, for proximal phalanx fractures, comparing them to a cohort of patients who underwent operative fixation (open reduction/k-wires). The cohorts were assessed for strength and range of movement in the affected digit, compared with the opposite hand.

METHODS
A medical records review was performed on outpatient clinic notes from the Plastic Surgery outpatient department at The Nepean Hospital. Patients who had undergone traction or operative fixation for proximal phalanx fractures were included in the review. These patients were then assessed >3 months post injury, for strength and range of motion. The time to return to work, and estimated cost to the healthcare system was also assessed.

RESULTS
Traction splinting using the EVAST protocol has shown to be a minimally invasive and effective technique for fixation of proximal phalanx fractures. Unlike operative fixation, which increases the risk of infection, adhesions and damage to surrounding structures, traction is easy to apply, non-invasive and allows early movement, preventing long term stiffness. This study supports the use of traction for proximal phalanx fractures, showing that long term strength and range of motion can be superior to operative fixation.

SUMMARY
Traction splinting using the EVAST protocol should be considered as an effective alternative to operative fixation for proximal phalanx.
Modified tension band wire- an ideal low profile internal fixation method for 5th metacarpal neck fracture

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Free Papers 2 - HandFractures, Rheumatoid Arthritis, Courtyard Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Objectives
The fifth metacarpal neck fracture is the most common type of metacarpal fracture. Open reduction is sometimes needed when reduction cannot be achieved with closed procedures. Traditional tension band wire (TBW) and plates cause soft tissue irritation for the prominence of the hardware. We proposed a simple and effective surgical technique for 5th metacarpal neck fracture fixation that provides adequate stability and low soft tissue irritation under a wide-awake approach.

Methods
The incision is made and the fracture was exposed. Wire guide made from steel part of 18 gauge needle was drilled into the distal and proximal fragments. Twenty-four gauge wire was used to pass wire guide as the figure 8 style. The fracture stability was checked by active and passive motion of MCP joint under wide-awake approach. Four patients undergone this procedure and the preoperative and postoperative data were collected.

Results
The average preoperative dorsal angulation angle was 51 degrees. The radiography showed bone union without any residual angulation and patients were able to use the finger without any pain or limited range of motion. They are asymptomatic and satisfied with the outcome at postoperative 6 months follow-up.

Summary
Internal fixation is sometimes needed in open reduction for metacarpal fractures. Traditional TBW and plates may cause soft tissue irritation for the prominence of the hardware. The modified TBW that we proposed provides adequate fracture stability and has a very low profile and a low cost. We recommend this method for metacarpal neck fracture when open reduction is performed.
Second toe middle phalanx osteochondral autografts as an alternative to hemihamate arthroplasty for proximal interphalangeal joint fracture-dislocations

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Free Papers 2 - HandFractures, Rheumatoid Arthritis, Courtyard Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Objectives
This prospective study was designed to assess the clinical outcomes of patients with dorsal proximal interphalangeal (PIP) joint fracture-dislocations who had their injured middle phalanx base reconstructed with an autograft from their second toe middle phalanx.

Methods
The surgical technique for autograft harvest and inset is described. The autograft is fashioned to the size of the middle phalanx base defect. The donor site is stabilised with a longitudinal K-wire. Range of motion, grip strength, Disability of the Arm, Shoulder and Hand (DASH) score and donor site morbidity are assessed at regular intervals post-operatively.

Results
Eight patients had dorsal PIP joint fracture-dislocations reconstructed with a second toe autograft. Six patients had acute injuries and two had chronic injuries. Follow up ranged between 3 to 18 months. Average PIP joint range of motion at the most recent review was 65.2 degrees for patients with acute injuries and 40.5 degrees for patients with chronic injuries.

Discussion
Many different surgical techniques have been used to treat unstable dorsal proximal interphalangeal joint fracture-dislocations. Hemi-hamate arthroplasty is the most commonly used autograft in these injuries. However, harvest of this autograft can be challenging and may not adequately recreate the volar lip of the middle phalanx. To address these issues we have used the second toe middle phalanx base as an alternative autograft to hemi-hamate arthroplasty. The autograft harvest is straight-forward and has minimal donor site morbidity. We present the outcomes of the first published series of patients who have undergone the procedure at our institution.
Role of regional anaesthesia for the management of hand fractures

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Free Papers 2 - HandFractures, Rheumatoid Arthritis, Courtyard Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Introduction / Objectives
Hand fractures, representing 40% of all upper limb fractures, frequently present to specialist hand trauma units. Historically surgical practice dictated the use for general anaesthesia for such management. For many patients general anaesthesia carries an increased risks for complications. In our unit a change in practice has occurred with the use of regional local anaesthetic blocks, this has permitted management of hand fractures with reduced anaesthetic risks for patients.

Methods
As of August 2018, practice for the management of hand fractures in Bedford Hospital NHS Trust changed. Due to the demands of patient population, a preference for the use of local anaesthetic blocks has been introduced.

Results
In all cases of metacarpal and phalangeal fractures, the use of regional anaesthesia was well tolerated by our patients. Whilst reducing the risk of cardiorespiratory complications, the use of regional anaesthesia reduced hospital recovery time with patients being able to leave hospital following a short period of observation.

Conclusions
In our experience regional anaesthetic blocks provide a safer alternative to general anaesthesia for the management of hand fracture patients.
Preventing Muscle Contracture: New Protocol after Flexor Tendon Repair

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Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

OBJECTIVES
Most of the protocols always keep repair tendons to be in reduced tension to prevent tendon rupture. Repaired flexor muscles result in contracture. Muscle contractures make a limitation of finger extension and PIP joint flexion contracture. This study reports a new protocol, Tension reducing muscle stretch (TRMS) for prevention of flexor muscle contracture.

METHODS
TRMS is that a therapist holds an affected finger to be in full flexion passively, and extends unaffected fingers to full extension and wrist in 0° extension. Anatomically, the individual FDP tendon of each fingers join together to make FDP muscle belly. To extend unaffected fingers to full extension makes unaffected FDP muscle be stretched. TRMS is done after traditional protocols, as Duran, Kleinert, Synergistic-wrist-motion, and Place-and-hold. At last, after TRMS, Early active flexion motion (EAM) is done. EAM is simple fisting from maximum extension position. Between 2007 and 2018, Fifteen fingers in 14 patients with complete rupture of FDP tendon in zone 1 or 2 were treated by primary repair with TRMS and EAM. FDP tendons were repaired by Tsuge’s method. Completely ruptured FDS tendons were resected. Mobilization was started on the second postoperative day. The mean follow-up period was 6 months.

RESULTS
The mean %TAM at the final was 89%. By the Strickland criteria, eight had excellent, five had good, two had fair results. No tendon repair was ruptured.

SUMMARY
This protocol can prevent to muscle contracture, that contribute to prevent PIP joint contracture without rupture.
Outcome of early active mobilization after flexor tendon repair in Zone-II in hand.

Prof Krishna Priya Das
2BSMMU, Dhaka, Bangladesh

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Objective: Early controlled motion programs after flexor tendon repair in zone II of hand are designed to minimize adhesion formation by promoting the excursion of repaired tendons.

Methods: We conducted a study in BSMMU during July 2014 to December 2018 including 56 patients with 120 digits involving 190 flexor tendons in zone II to observe and record the result of the primary or delayed primary repair with early active mobilization protocol. 46 cases (82.14%) were sustained injury by sharp instrument either accidentally or by assault. 10 (17.86) patients were presented with FPL injury. The repair was done with 4 strand core suture technique with locking epitendinous sutures with a knot inside the repair site, using polypropylene 4-0/3-0 and 6-0 sutures. The final assessment was done at 6 months post repair using the Louisville system of Lister et al. and Buck-Gramco Functional criteria.

Results: 58.33% (n=70) digits were shown excellent result whereas good results were seen in 28.33% (n=34) digits. 8.33% (n=10) digits were shown fair and 5.00% (n=6) digits were shown poor results. P value was < 0.001 by Z test which is significant.

Conclusion: The primary or delayed primary repair of cut flexor tendons even in zone II using the modified Kessler core suture and epitendinous suture with early active mobilization protocol has been given good result, with minimal complications.

Keywords: Flexor tendons, Repair, Early mobilization.
Flexor tendon repairs, what makes a good repair

A/Prof Michael Sandow

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Active mobilization after flexor tendon laceration repair places significant demand on the tenorrhaphy, as it is the suture that maintains the repair integrity until healing is sufficiently advanced. Six-strand single cross grasp repair, although mechanically adequate for post tenorrhaphy active mobilization, is technically challenging. Laboratory studies have continued to suggest that by using a stronger suture (3-0 braided polyester) and a four rather than six-strand repair, mechanical integrity is maintained, but in an easier to use perform.

The repair should be:
1. biomechanically sound
2. biologically inert
3. user friendly

Repair Failure can be assessed by the suture appearance: occurs by:
1. Suture rupture at the knot – biomechanically inadequate repair
2. Suture ruptures mid strand – likely damage to suture during insertion
3. Knot unravelling – incorrect suture material or poor knot technique
4. Suture loop intact – inadequate grapping technique or poor healing

The Adelaide 4 strand single cross grasp repair is repair provides a predictable outcome, a good functional recovery and a low rupture rate. The robustness of this technique is indicated by its efficacy within the relatively less controlled environment of a public hospital hand service, where there are variable experience and skill levels of the surgeons, and where patients are frequently noncompliant and thus difficult to manage optimally. While adequate training and familiarity with the technical nuances of flexor tenorrhaphy are essential, the single crossed grasp four-strand repair continues as the repair of choice for flexor and other tendon lacerations within our institution.
Staged Tendon Grafting, what I do and how.

Dr Amir Adham

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

The flexor tendons are part of a very important anatomical-physiological aspect of the hand. A significant number of patients with flexor tendon injury will not benefit from reconstruction by one stage tendon grafting technique and would rather restore their function by staged reconstruction using silicon rod (tendon spacer), followed by a replacement graft. Delayed or neglected flexor tendon injuries, tendon rupture following previous repair, Zone II hand injuries and more, are all indications of staged flexor tendon reconstruction.

However with the advent of wide awake surgery, we have changed how we manage tendon reconstructions. We will discuss the recent advancement of tendon reconstruction using wide awake surgery and how we can improve the outcome of the patient.
Post-operative Management of Flexor Tenolysis: Maximising Outcomes

Ms Bhavana Jha

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Background:
Adhesions between tendon and surrounding tissues are a common consequence of tenosynovial injury, surgery and immobilization. Adhesions, especially within the fibro-osseous tunnel in zone II injuries can limit tendon excursions, active motion and functional use of the hand. While early active mobilisation regimens post tendon repairs are believed to decrease adhesion formation, a small proportion of patients still require tenolysis surgery to improve motion in the affected digits.

Aim:
To discuss hand therapy rehabilitation guidelines and interventions for maximising outcomes following flexor tenolysis surgery in the hand.

Method:
Hand therapy interventions following flexor tenolysis surgery will be discussed. This will include clinical reasoning based discussion around day of commencement of rehabilitation; acute care strategies to minimise post-operative inflammation; individualised orthosis designs and exercise programs. Common presentations, compensatory motions and outcomes will be discussed. Presentation will also address strategies to maximise active tendon gliding and passive joint motion prior to scheduling tenolysis surgery and the importance of collaboration between the surgeon, therapist and the patient.

Conclusion:
Evidence within the literature and clinical experience suggests tenolysis surgery following flexor tendon surgeries can result in clinically significant improvements in outcomes. A compliant patient with access to high-quality hand therapy post-operative management is essential in maximising surgical outcomes.
Understanding the Ambiguous “Work of Flexion”

Ms Judy Colditz

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Multiple variables alter the work of flexion following flexor tendon repairs: range of motion, friction, load, suture strength, position in orthosis, and the effect of the lumbrical and/or interosseous muscle/s. This brief discussion will recommend how these variables can be minimized.
Flexor tendon repair is changing a lot for the better

Dr Donald Lalonde

Tendon 1 - Flexor tenor injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Flexor tendon repair has changed A LOT in the last few years. If you are not consistently getting good results with clean cut flexor tendons in the finger, please consider changing to:

Summary: 7 most important things to consistently get good results with clean cut finger flexor repairs
1) At least 4 strands and a very solid repair with 1cm bites
2) Bulky repair (10-30%) NOT a grandma kiss repair where the ends are barely touching.
3) To avoid tenolysis, make sure your repair glides freely before closing the skin. Forget the old "don't vent A2 or A4 pulleys rule. Instead, judiciously vent “up to 1.5 to 2cm” of pulleys until you get a full range of active flexion and extension on the operating table by the awake tourniquet free, sedation free patient
4) WALANT repeated intraoperative full fist flexion and extension testing to make sure there is no gapping with the forces of active flexion
5) Intraoperative patient education so your patient knows exactly how to look after the hand after surgery
6) Up to half a fist of true active movement post op (no more Kleinert rubber bands or full fist place and hold)
7) Relative motion flexion splints to improve extensor lag, and relative motion extension splints to improve flexor lag and get profundus out of scar if it gets stuck after surgery. Use ultrasound to know tendon is intact.
Tissue Engineering for Tendon Repair and Reconstruction: are we making progress?”

Prof Peter Amadio

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

The results of tendon repair have certainly improved recently, due largely to a combination of stronger repairs, more aggressive rehabilitation, and the introduction of wide awake methods. However, there is still a need to accelerate the process of tendon healing, manage complications such as adhesions, and to restore tendon function when a tendon is irretrievably damaged, especially in the hands, where the number and quality of autologous donor sources is limited. This presentation will discuss tissue engineering approaches to improve outcomes after tendon injury.
Flexor tenolysis - when / how/ what

A/Prof Michael Sandow

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Timing – clearly healed and passive motion (essentially flexion) is greater than active motion. This is unlikely to be prior to 6 months from repair. Active therapy should continue until progress has clearly ceased. Consider the potential need for a staged or primary tendon graft, or some alternate salvage option, such as a DIP fusion.

Anaesthesia - Wide awake anaesthesia, using local anaesthetic with adrenaline, and the judicious use of titrated sedation and tourniquet is extremely useful.

Approach – Where possible, original wounds, however, due to the revascularisation of the skin and softening of the injured skin, a mid lateral based incision is preferred in many situations. Limited incisions are usually not adequate.

Pulleys – Excise generous windows in non-critical pulleys, but ensure the integrity of those critical pulleys (esp. A2 and A4) before committing. A monofilament or fine braided suture and be used to feed between the pulley and tendon to release fine adhesions and avoid excessive opening of the tendon. Pulley reconstruction if required.

Restriction may be caused by other than intra-pulley adhesion. A fixed flexion deformity of the PIP joint with full passive flexion may be due to both flexor tendon adhesions and volar plate contracture.

Active postoperative mobilisation - soon as possible, and if there is significant pain, an indwelling catheter for local anaesthetic can be helpful.

Likely improvement in 80% of patients, but a 10% rupture rate. Such surgery requires careful surgical technique, a committed and motivated patient, and dedicated and experienced hand therapist.
Primary vs Secondary tendon reconstruction. When and How

Dr Juitem Shih

Tendon 1 - Flexor tendon injury, repair, single and staged reconstructions, Eureka Room 1 and 2, March 11, 2020, 2:00 PM - 3:30 PM

Flexor tendon reconstruction remains one the most challenging problems in hand surgery, but advances in surgical techniques and postoperative Rehabilitation strategies have improved results. Prospective examination and condition during operation needed to help us to decided single or two staged reconstruction for the patient to get best results. The scarred tendon sheath or pulley, collapsed pulley system, combine with fracture or joint damage, no intake FDS tendon, musicians all should be consider for two stage operation. In ten years, we had performed 15 patients for one-staged reconstruction and 16 patients for two-staged reconstruction, they get mean 84% of total active motion after two years follows up.

New directions, such as tissue engineering and biochemical agents to decrease adhesion formation, appear promising.
Deficiency of shoulder function is the commonest sequela following NBPP.
The rationale and indications for interventions around the shoulder are discussed.
The interventions considered are:
1. botox and casting
2. spinal accessory to suprascapular nerve transfer
3. contracture release and latissimus dorsi to infraspinatus tendon transfer (rebalancing)
4. derotation humeral osteotomy
Surgical Reconstruction of Upper Extremity Paralysis following Acute Flaccid Myelitis.

Dr Kazuteru Doi

Plexus 1 - Paediatric Plexus Injuries, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

Background:
Acute flaccid myelitis (AFM) is a debilitating illness that is defined by the sudden onset of flaccid paralysis in the extremities with MRI demonstrating a longitudinal lesion confined to the gray matter. The purpose of this study was to report the types of upper-extremity palsy and outcomes of surgical reconstruction in patients with AFM.

Methods:
Thirty-five patients with 43 limbs were identified. The median age at onset was 3 years. There was loss of shoulder abduction in 33 limbs, loss of elbow flexion in 18 limbs, complete or partial loss of hand function in 11 limbs, and spinal accessory nerve palsy in 11 limbs. 22 patients with 24 limbs underwent surgical reconstruction, which was categorized: nerve transfer, secondary muscle transfer, and free muscle transfer.

Results:
Eight patients with longer than 30 months postoperative follow-up were reported. Four patients obtained 90° of shoulder abduction. The 5 patients who received free muscle transfer or nerve transfer to restore elbow function obtained 140° of elbow flexion. Two patients treated with free muscle transfer to restore finger function obtained satisfactory total active motion of the fingers.

Conclusions:
The patterns of paralysis and the strategy and outcomes of surgical reconstruction for patients with AFM differed from those for traumatic and obstetric brachial plexus palsy. Restoration of shoulder function was unpredictable and depended on the quality of the donor nerves and recovery of synergistic muscles. Restoration of elbow and hand function was more consistent and satisfactory.
Acute flaccid myelitis

Dr Richard Lawson

Plexus 1 - Paediatric Plexus Injuries, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

Acute flaccid myelitis (AFM) is a rare and devastating condition which has come into relative prominence in the last decade. Usually associated with a non-polio enterovirus (often EV-D68), AFM is the result of necrosis of the anterior horn cells; thus, as seen by upper limb surgeons, AFM can result in severe bilateral upper limb weakness with sensory sparing and respiratory dysfunction. The relative paucity of donors for reconstruction makes surgical treatment challenging; the severity of clinical manifestations is particularly stressful for the affected patient and family.

This presentation aims to review the aetiology and presentation of AFM and discuss treatment options and nuances.
Sensory Outcome and Pain in OBPI

Dr Emily Ho

Plexus 1 - Paediatric Plexus Injuries, Eureka Room 3, March 11, 2020, 2:00 PM - 3:30 PM

Studies on sensory and pain outcomes in children with brachial plexus birth injury (BPBI) are limited. Existing reports on sensory function suggest that outcomes are generally good in those with upper plexus injuries, while the prevalence of sensory deficits in children with total plexus injuries is higher. Pain following BPBI remains poorly understood. This presentation will report on current research on sensory and pain outcomes in BPBI using standardized measures including the Weinstein Enhanced Sensory Test (WEST), Faces-R Pain scale, Adolescent Pediatric Pain Tool and Pediatric Pain Test (Pain Interference). The prevalence of sensory deficits and pain in school-aged children will be presented, as well as, characteristics of sensory loss and pain (i.e., age of presentation, intensity, neuropathic/nocioceptive quality)
The majority of patients with obstetrical brachial plexus palsy improve spontaneously without surgical intervention. However for those who do not make a satisfactory recovery, there are a variety of opinions regarding surgical indications and reconstructive approaches for which there is no consensus. The assessment and management of brachial plexus palsy in children differs considerably from brachial plexus injuries in adults. While the traditional approach to brachial plexus surgery in children entails neuroma resection and interpositional nerve grafting, the role of nerve transfers remains a subject of debate.

An overview of the indications for primary nerve surgery in obstetrical brachial plexus palsy will be discussed.
The role of wearable wrist inertial sensors to quantify arm asymmetry during gait in unilateral spastic cerebral palsy (USCP)

Dr. Aviva Wolff¹, Mr. Andrew Sama¹², Mr. Mark Lenhoff¹, Dr. Aaron Daluiski¹
¹Hospital For Special Surgery, New York, United States, ²University of Miami Miller School of Medicine, Miami, United States

Objectives
The purpose of this proof-of-concept study was to quantify arm movement and asymmetry during 3 walking speeds in individuals with USCP using light-weight wearable inertial sensors.

Methods
This is a retrospective pilot study of 14 individuals (8 male, 6 female) with USCP (age range: 3-28, mean age=13±7.8). Participants wore wearable MTw inertial sensors on each wrist (XSens, Enschede, Netherlands) during 3 gait speeds: self-selected comfortable walking, self-selected fast walking, and running. Integrated acceleration data from 3 planes of arm movement were collected continuously at a sample rate of 100Hz during ambulation. The magnitude of the acceleration due to the force of gravity was subtracted from each trial. The maximum average acceleration was calculated for each arm over one second for each of the 3 conditions, and an asymmetry index (ASI) calculated. A one-way repeated measures ANOVA test was completed to compare the mean variance across participants throughout the 3 conditions.

Results
Arm asymmetry increased across speed conditions (F2,38=13.6, p<0.001). ASI (0=perfect symmetry) increased to 44(±21) during fast walking, and to 65(±26) during running compared to 19(±22) at baseline walking.

Summary
Our results that arm asymmetry increased in running and fast walking support the proof-of-concept that inertial sensors are able to quantify differences between arm movements and capture changes in asymmetry across gait speeds in individuals with USCP. These findings have broad implications for use in activity tracking and quantifying arm movements in a wide range of real-world activity in this population.
The hand function that can be evaluated by Simple Test Evaluating for Hand Function - based on factor analysis -

Ms. Kaoru Abe1, Mr. Yasuyuki Hatanaka2, Ms. Mikayo Omori2, Mr. Kazuki Sato3, Mr. Tetsuya Tsuji4

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Hand Therapy A2 - Assessment, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

Objects: Simple Test Evaluating for Hand Function (STEF) was developed to evaluate hand disability in Japan. We previously reported the criterion validity of STEF in patients with hand disability after injuries and disorders. The purpose of this study was to clarify the structural properties of STEF, and to investigate the possibility that STEF could be established as a new optimal evaluation method for hand function.

Methodology: Twenty-three participants with hand disability due to hand injuries or disorders have been examined their hand function using STEF. The results of the affected hand (STEF score) was analyzed using factor analysis.

Results: There were high internal consistency during 10 items of STEF. According to the analysis, 10 items of which STEF is composed were classified into 3 groups (likelihood method). The first group consisted of middle sized cube, small cube, wooden circular disks, and middle sized ball (Cronbachα = 0.956), and the second group consisted of small ball, metallic circular disks, clothes, and pins (0.891). There were large ball and large cubies (0.957) in the third group.

Discussion: The items in the first group are considered to be related in pulp pinch. On the other hand, items in the second and third groups are considered to be related in tie pinch and grasp, respectively.

Summary: There were high integrity in STEF, and ten items of which STEF is composed were classified into three groups (pulp pinch, tip pinch, grasp). By adding or reducing the items, STEF would be more optimal and it would be established as new evaluation method for hand function.
The journey of MHQ

Dr Kevin C Chung

Hand Therapy A2 - Assessment, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

The Michigan Hand Questionnaire is considered a legacy questionnaire after 25 years of field study. I will discuss the genesis of the MHQ to share its development challenges and its applicability across all hand surgery conditions.
Preliminary study on the usability of a tri-axial accelerometer: Evaluation of how postoperative distal radius fracture patients use their hands in ADL

Mr Terufumi Iitsuka

Hand Therapy A2 - Assessment, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

Hand therapy for patients with distal radius fractures aims to help the patients use their hands with no inconvenience in everyday life. In order to meet this goal, this study examines how the everyday-life functionality of hands after distal radius fractures change over time by employing a wearable accelerometer. This measurement method using a wearable accelerometer was developed by Land et al. (2017) and proved to be useful for measuring the upper limb activities of stroke patients. The results of this study have shown the positive correlations 1) between the usage time of injured hands and wrist arcs; 2) between the usage time of injured hands and grip strength; and 3) between the usage time of both hands and patient-based evaluation. Furthermore, the patients with low total magnitude ratio (the proportion of the sum of the vector magnitudes on injured hands to those on the opposite side) have shown degraded functionality recovery (e.g., ROM, grip strength). The wearable accelerometer may be useful for measuring everyday-life activities of upper limbs after distal radius fractures, but continued study will be required for further discussion.
GripAble: Affordable grip and movement assessment and treatment – the portable and digital future

Mrs Nicola Goldsmith

Hand Therapy A2 - Assessment, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

GripAble is a smart mobile device for assessment and training of hand functions. Hand therapy is prescribed based on objective assessment and evaluation of dysfunction. Consequentially understanding functional range of movement and grip vitally underpins the assumptions made by the hand therapist with every patient.

The industry standard dynamometer measures single maximal grip strength. Goniometers traditionally measure range of movement of the wrist without an item in the hand. According to the International Classification of Functioning, Disability and Health (ICF), adopted by the 121 countries in the WHO, we should be concentrating on health and functioning rather than disability. An instrument is therefore required which can measure and treat a wider range of more functional movement and grips.

GripAble’s dynamometry assessment component includes isotonic and isometric grip and pinch strengths and a variety of measures of endurance. Range of movement of the wrist and forearm is measured with the device in the hand, more closely replicating activities of daily living.

Hand therapists prescribe strengthening and stability exercises using putties and sponges. These activities are low in engagement and are untrackable, reducing motivation to train, making objective analysis of the efforts of our patients and the effect of our intervention guesswork at best. GripAble is a highly sensitive instrument which enables the therapist to measure ability, set individualised goals and track all activity carried out on the specifically designed engaging software. Once the therapist has set up the treatment programme, the patient can work independently in the clinic and at home.
Cost, profile and resource use for acute hand and wrist injuries: A local and global perspective

Mr Luke Robinson\textsuperscript{1}, Assoc Prof Ted Brown\textsuperscript{1}, Assoc Prof Lisa O’Brien\textsuperscript{1}

\textsuperscript{1}Monash University, Frankston, Australia

Hand Therapy A2 - Considerations in Practice, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

Background: Injuries to the hand are common and costly. Most uncomplicated and stable injuries will recover with conservative management, however, some will require surgical intervention. The economic burden placed on the healthcare system from these injuries can be considerable.

Objectives: Estimate the economic implications of surgically managed acute hand injuries from a health-care service perspective.

Methods: Billing records for the 2014-15 financial year at one large hospital were retrospectively reviewed for consecutive patients who received surgical intervention for an acute hand injury following an ED presentation and a minimum of one outpatient appointment. Subsequent financial year data was used to calculate outpatient costs. Costs were calculated from resource use in the ED, inpatient and outpatient settings. Results are presented by demographics, surgery type and mechanism of injury.

Results: 257 individuals, (n=264 surgeries), were included. The total cost of all injuries was $1,292,135.96 with a median cost per case of $4,455.82 (IQR $3,571.02 - $6,070.86). Inpatient costs (77%) accounted for the highest portion of total costs. Nerve injuries (n=41) resulted in the largest median cost per injury ($5402.75 [IQR $4025.69 - $6926.02]), followed by muscle/tendon injuries (n=61) ($4548.09 [IQR $3802.75 - $5808.35]) and fractures (n=155) ($4177.15 [IQR $3356.04 - $5762.26]). The median number of medical and hand therapy appointments was 2.00 (IQR 1.00 - 3.00) and 3.00 (IQR 2.00 - 6.00) respectively.

Summary: Surgically managed hand injuries contribute a significant financial burden on the health-care system. Further research is required to establish epidemiological data and national estimates of the cost burden.
Exploring IT in Hand Therapy: the use of video-narrated exercise clips and education to enhance patient engagement

Mrs Nicola Goldsmith

Hand Therapy A2 - Considerations in Practice, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

Lyncoln et al (2004) showed that following distal radius fracture, patient adherence (or compliance) with hand therapist prescribed exercise programmes had a positive relationship on outcome. The quality, not the quantity, of the exercises performed was critical. In health environments where contact time between therapist and patient is under pressure, therapists need to find ways to maximise unsupervised effective replication of exercise. How can a hand therapist maximise their patients’ ability to perform intricate exercises when away from the clinic setting? Weeks et al (2009) demonstrated that when comparing demonstration of exercise with still photographs of exercises and videotape instruction, that the latter improved acquisition and retention, motivation of the patient and confidence in performance.

In 2012, when I was working for a large hospital organisation, I set about developing video-narrated clips of specific hand therapy exercises with a digital partner, Exercise Prescriber. I then introduced this to 54 therapy clinics across the UK. This presentation will discuss the development processes, demonstrate how this platform functions and provides some anecdotal feedback from patients who have used this system.
Hand Therapy around the world: How national societies function and the aspirations of emerging countries

*Mrs Nicola Goldsmith*

Hand Therapy A2 - Considerations in Practice, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

IFSHT was founded in 1989 and now represents over 10,000 therapists around the world. We have 37 full member countries where full membership is for those countries with established hand therapy organisations. IFSHT is also proud to have eight associate member countries and ten corresponding countries. Associate membership is available for countries where there is a small group of therapists trying to get a formal association established whereas corresponding member countries are those with one or two therapists starting to develop hand therapy as a specialty.

In 2019, IFSHT ran a survey of the full member countries to understand what they do and the journey they took to get to the point of association. We were also keen to find countries who would be willing to take on a mentoring role with emerging countries. Simultaneously we ran a survey for the associate and corresponding countries asking about their aspirations in development in the hope that we can match them with full members for help with development.

Some of the data collected from the 55 countries will be explored in this presentation.
A Qualitative Analysis of an IFSHT Global Panel Presentation: Service Delivery, Education, and Practice

Prof Caroline Jansen

Hand Therapy A2 - Considerations in Practice, Sovereign Room, March 11, 2020, 2:00 PM - 3:30 PM

BACKGROUND: Hand therapy is practiced in countries varying in societal systems and population characteristics. A panel addressed three pillars of interest for hand therapy: hand therapy education, service delivery, and practice patterns at the 2019 meeting of the International Federation of Societies of Hand Therapy (IFSHT) for their respective countries/continent.

PURPOSE: The purpose of this project was to synthesize themes of strengths, weaknesses, opportunities and threats (SWOT) presented by the 10 panel members for each country/continent, with the intent to learn from each other, and serve future hand therapy access and development.

METHODS: Panel members were IFSHT delegates of India, Hong Kong, Australia, South Africa, Ghana, Europe, the USA, Guatemala, Colombia, and one member from a United Kingdom based service organization. The presented power point files were used for qualitative analysis, performed by Jansen and De Klerk.

FINDINGS: SWOT analyses showed shared themes, but allocation of the theme, such as it being a strength or weakness, varied. Overarching themes were: 1) the importance professional organizations and collaborations for work force development, accreditation/certification, recognition of the profession, 2) healthcare payment and care systems, rural versus city access to care and 3) poverty, illiteracy, insurance insecurity, and healthcare disparities, lack of surgeons and therapists in under-served areas.

DISCUSSION: The study was successful in identifying opportunities to learn from each other for continued worldwide development of hand therapy. Placing our findings in an access model of health care may provide a framework for future development.
Injury of the triangular fibrocartilage complex (TFCC) is a common cause of ulnar-sided wrist pain. Volar and dorsal radioulnar ligaments and their foveal insertion are the most important stabilizing components of the TFCC. In irreparable tears, anatomical reconstruction of the TFCC aims to restore normal biomechanics and stability of the distal radioulnar joint. We proposed a novel arthroscopic-assisted technique using a palmaris longus tendon graft. Bone tunnels are created in the distal radius and ulna, and the precise exit site of the ulnar bone tunnel at the foveal center is determined under arthroscopy with the aid of an image intensifier. The pathway of the tendon graft follows the anatomy of the radioulnar ligaments. Its intra-articular passage is performed under arthroscopy and the capsule is kept intact, unlike the original technique in which a dorsal capsular flap is created. A third transverse bone tunnel is created proximally in the distal ulna; one limb of the graft is passed through it and tied onto the other limb. After 3 weeks of cast immobilization, early mid-range forearm rotation starts at the 4th week post-operatively.

From 2000 to 2016 we performed 28 arthroscopic-assisted TFCC reconstructions, with an average follow up of 62 months. Mean grip power increased from 58.6% to 71.6% of the contralateral non-affected hand at the final assessment. Mean pronosupination range improved from 84.6% of the normal side to 91.2% at the final post-operative assessment, Mean Mayo wrist score was 58 pre-operatively and was 79 at the final assessment, with a 36% increase. The mean VAS pain score decreased from 5.9 ± 1.5 pre-operatively to 3 ± 2.5 post-operatively. Ulnar nerve palsy due to entrapment by the graft occurred in one patient; graft revision and release of the nerve was performed and the patient had full recovery of ulnar nerve function and no recurrence of instability. There were 3 late graft ruptures and 1 early graft loosening which was revised. 23 patients were able to return to their previous vocations. Arthroscopic-assisted TFCC reconstruction is a safe and effective approach that has comparable outcomes as conventional open reconstruction and may result in a better range of motion from minimizing soft tissue and capsular dissection and subsequent scarring.
The Arthroscopic Hook Test is Not Pathognomonic for a Foveal Tear of the Triangular Fibrocartilage

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APWA Wrist 2 - DRUJ Symposium 1: The TFCC, Goldfields Theatre/Plenary, March 11, 2020, 4:00 PM - 6:00 PM

Objectives: The objective of this study is to evaluate the accuracy of the arthroscopic hook test to determine the presence of a foveal insertion tear using dry arthroscopy of the radiocarpal and distal radioulnar joint.

Methods: 63 dry arthroscopies of the distal radioulnar joint were performed between July 2016 and 2017 for painful distal radioulnar joint instability. The presence of a positive or negative hook test was documented. The integrity of the foveal insertion was determined using debridement, visualisation with a 1.9mm arthroscope and probing.

Results: Of these 63 cases, 44 (70%) were found to have a positive hook test and 19 (30%) were found to have a negative hook test.

Of the 44 cases with a positive hook test, 38 (60%) had an intact fovea (false positive) and 6 (9.5%) had a foveal tear (true positive). Of the 19 cases with a negative hook test, 17 (27%) were found to have an intact fovea (true negative) and 2 (3%) were found to have a foveal tear (false negative).

The specificity of the hook test in determining the presence of foveal pathology was found to be 0.31. The sensitivity was found to be 0.75. The false positive rate was found to be 0.69 and the false negative rate 0.25. The diagnostic accuracy was found to be 0.36.

Summary: All cases with a positive hook test were associated with a tear of the triangular fibrocartilage. However, the hook test was not found to be a specific indicator for a foveal tear.
Arthroscopic TFCC repair using target guide, How I do it and why

Prof Toshiyasu Nakamura

Main stabilizer of the DRUJ is the proximal component of the TFCC, the radioulnar ligament (RUL). The greater the tear of the RUL be, the greater instability of the DRUJ indicates. When the RUL is ruptured at the fovea, the RUL must be introduced into the central lesion of the fovea of the ulna. Treatments of TFCC lesions are depending on the tear site. Palmer 1B lesion is easily treated by arthroscopic capsular repair. Debridement is useful for palmer 1A or 1D tear. We also prefer to shorten the ulna, when there were degenerative changes on the TFC (Palmer Class 2) or with ulnar positive variance. Treatment options for DRUJ instability due to TFCC foveal avulsion are arthroscopic and open repair of the TFCC to the fovea for acute or sub-acute cases and reconstruction of the TFCC using ECU half-slip tendon or PL tendon for chronic TFCC injuries. Ulnar shortening procedure can be useful for partial avulsion of the RUL either dorsal or palmar, but not for complete avulsion of the TFCC at the fovea. Arthroscopic partial resection of the TFCC can no longer indicated for unstable DRUJ, because it does not introduce stabilization of the DRUJ. In this presentation, techniques of arthroscopic outside in repair of the TFCC using target guide.
To diagnose detailed pathology of ulnar side wrist pain, not only radiographs but also MRI and arthrogram are very important. MRI is non-invasive modern modality to delineates details in soft tissue, such as the triangular fibrocartilage complex (TFCC) injuries, lunotriquetral (LT) ligament tear, ECU disorders including ECU dislocation. However, due to limitation of signal noise ratio or partial volume effect, small tear cannot be detected with MRI. Arthrogram still is very useful to detect small injuries in the TFCC or LT ligament tear. In this presentation, presenter demonstrates effectiveness of MRI and arthrogram for TFCC lesions, ECU disorders and LT ligament injury.
Inside out TFCC repair. How I do it and why

Prof Keiji Fuijo

The current study is introducing the modified arthroscopic trans-osseous inside-out technique for TFCC foveal injury. Technique: Wrist arthroscope is inserted from 3-4 portal for exploration to locate the TFCC tear. A probe is inserted via 4-5 portal. The articular disk is then examined by the probe with the hook test and the floating sign, in which TFCC around fovea is floating during suction with a shaver, is usually helpful to make decision on foveal detachment if there is no connection between RCJ and DRUJ. Next, torn TFCC is checked from DRUJ scope directly. From DRUJ-R, scope is inserted, and probing is made from DRUJ-U. Debridement is performed from DRUJ-U with shaver. For the foveal side, remnant is debrided more aggressively to explore the foveal cortex. A 2cm longitudinal skin incision is made just volar to the ulnar styloid. The retinaculum is incised sharply, and the ulnar cortex is explored. Single lumen curved guide is inserted through the 4-5 portal, targeting the fovea. An appropriate entry point for the isometric point would be just dorsal and radial to the recess as viewed from RCJ. At neutral or slightly supinated position, the needle through the curved guide is easier to aim towards the center of fovea because the ulnar styloid moves volar direction. Passing wire with suture tape is drilled via the curved guide through the ulnar TFCC and distal ulna bone and comes out on the ulnar aspect of ulna cortex, and fixed to ulnar cortex using Swieve Lock system.
Assessing the Feasibility of an Oberg Manske Tonkin (OMT) Classification Mobile App for Congenital Hand Differences (CHD)

Mr Wee Leon Lam², Miss Huai Ling Tan¹, Mr Nakorn Boon Han Charayaphan³, Mr Lewis Dingle², Dr Wayne Lam³, Dr Megan Davey⁴, Miss Sarah Tolerton⁵, Mr Maxim Horwitz⁶, Professor Kerby Oberg⁷, Mr Darryl Chew⁸

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Free Papers 3 - Congenital, Paediatric, Courtyard Room 1 and 2, March 11, 2020, 4:00 PM - 6:00 PM

Objectives
Despite the official adoption of the Oberg, Manske and Tonkin (OMT) classification for congenital hand differences (CHD) by the IFSSH, uptake remains slow with surgeons citing difficulties with the need to understand embryology and accessibility to the OMT classification itself. This study examined if a mobile OMT App for smartphone devices would increase its accessibility and practical utilisation as well as improve communication between different specialties.

Methods
The App was based on the 2017 version of the OMT and developed using React Native Framework software. Each condition was described using images, assigned an OMT classification and given a brief description. An etiology tab allows our present and future understanding of errors involved in developmental and genetic pathways to be included. The App was surveyed among 20 participants including congenital hand surgeons, developmental biologists, geneticists and neonatologists in the following areas: accessibility, increased utilisation of the Classification, and improved communication with other specialties.

Results
100% agreed the App has increased their accessibility to the OMT Classification, with 85.7% believed this ease of access will significantly increase the utilization of the classification in their work/practice/research. 85.7% of participants found that frequent usage of this App would improve their communication with other specialties in the multidisciplinary management of congenital upper limb anomalies.

Conclusion
The OMT Mobile App presents a potentially useful digital platform for improved accessibility to the OMT and hence its usage. It is also a potentially useful tool for improving communication between different sub-specialties and for research purposes.
Objectives / Interrogation: Pollicisation remains the gold standard of thumb reconstruction in Type III, IV & V thumb hypoplasia worldwide. Due to cultural differences, Asian parents prefer to have a five fingered hand in Type III B thumb hypoplasia.

Methods: To satisfy these parents, we have developed a novel method to reconstruct the existing hypoplastic digit. A free toe phalangeal bone from third or fourth toe is used to reconstruct the thumb metacarpal in the first stage and an opponensplasty using abductor digiti minimi is performed in the second stage to provide opposition.

Results and Conclusions: We are presenting the technique of thumb reconstruction in Type III B thumb hypoplasia and discuss the functional results of our reconstructive procedure and future options.
How Important is Embryology for Parents of Children Born with Congenital Hand Differences?

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OBJECTIVES
A reluctance remains amongst clinicians to discuss the embryology and hence ‘why’ congenital hand differences (CHDs) occur to the parents of children affected by these anomalies. The primary aim of this work was to determine whether knowledge of embryology was important for parents of children born with CHDs. Secondarily we aimed to investigate whether importance of embryology for parents correlates with disease severity, maternal age or level of education.

METHODS
A retrospective, self-administered questionnaire was designed to evaluate the importance of embryology of CHDs for parents within a congenital hand clinic. Parents of children who met the inclusion criteria were given an explanation of embryology of the hand, tailored to their child’s condition, with visual aids by an experienced consultant hand surgeon before completing the questionnaire in a quiet clinic room setting.

RESULTS
Responses were collated from 44 questionnaires. A significantly higher proportion of parents (0.76 vs 0.24) considered knowledge of embryology important in comparison to those who did not (p=0.02). Significant association was found between importance of embryology knowledge and disease severity (p=0.032) but not maternal age (p=0.769) or level of education (p=0.403).

SUMMARY
We have provided preliminary evidence that suggests parents are highly interested in understanding the embryology of CHDs and hence ‘why’ they happen. CHD embryology knowledge is important for parents and therefore clinicians should explain embryology and hence ‘why’ CHDs happen. Given that the OMT classification system is based on the embryology of the upper limb, this study supports its use in regular clinical practice.
Pre-operative angulation as a predictor for operations and prognosis of thumb polydactyly surgery

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Objectives
Find out the degree of pre-operative angulation that determined the need for corrective osteotomy and compared the prognosis of treatment between thumb polydactyly operated by soft tissue reconstruction alone or with corrective osteotomy.

Methods
Surgical options for correction the angular deformity of metacarpophalangeal (MCP) and interphalangeal (IP) joint in thumb polydactyly were retrospective reviewed. The best cutting point for classified patients into “mild” and “severe” angular deformity was calculated based on degree of pre-operative MCP and IP joint angulation that required osteotomy. Surgical outcomes, complications and residual deformity in each categories were reported.

Results
Total 65 thumb polydactyly were studied. Pre-operative angulation at 30 degrees was the best cutting point calculated by ROC curve to classify patients into “mild” and “severe deformity”. In mild angulation (≤ 30 degrees of MCP and IP joint), soft tissue reconstruction alone was the effective method for correction angular deformity with predictable outcome; no residual deformity (0/34 cases) in MCP and 16.67% (1/6 case) residual deformity in mild IP deformity. In severe angulation (>30 degrees of MCP and IP joint), corrective osteotomy was recommended to achieve proper thumb position, adequate soft tissue balance and statistically decrease residual deformity compared with soft tissue procedure alone (residual deformity decreased from 85.71% (6/7 cases) to 16.67% (3/11 cases) in MCP and from 50% (1/2 case) to 25% (2/8 cases) in IP joint deformity, p < 0.05).

Summary
Pre-operative angulation of MCP and IP joint could determine the surgical operations and predicted the prognosis of thumb polydactyly surgery.
Bone lengthening of the radius with temporary external fixation of the wrist for mild radial club hand.

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Objectives
For mild radial deficiency, we applied a treatment approach using a combination of radius bone lengthening and temporary external fixation between the ulna and the metacarpals to support the radial side of the wrist and prevent the loss of correction for mild radial deficiency. We re-evaluated this method at a longer follow-up period.

Methods
The mean follow-up period was extended to 99.0 months (range, 90–126 months) for 5 patients (three boys and two girls), comprising four affected hands classified as type II and one as type I. All patients had surgical procedures involving radius lengthening and external fixation to support the radial side of the wrist at a mean age of 36.0 months (range, 21–59 months). The mean age was 135 months (11 years, 3 months) at the final follow-up.

Results
The passive range of radial/ulnar deviation at the time of the final follow-up (99.0 months) was 65.0 °/8.3 °, whereas it was 37.0 °/13.0 ° at the previous final follow-up (38.4 months); this reveals gradual recurrence of the radial deviation.

Summary
All patients were actually able to bring objects to the mouth after surgery at the previous final follow-up. Even if the improvements of the activities of daily living were temporary, it is important for young children to learn holding and bringing objects. Although the surgery was never refused, we need to obtain informed consent from the patient and/or the parents that relapse of radial deviation will probably occur at longer follow-up periods.
Toe transfers for reconstruction of post-traumatic thumb loss in children

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Free Papers 3 - Congenital, Paediatric, Courtyard Room 1 and 2, March 11, 2020, 4:00 PM - 6:00 PM

Introduction:
Reconstruction of post traumatic thumb loss in children requires a method with growth potential, sensory recovery and stability. Toe transfers offer the best reconstruction. Few large series are available in the literature. The procedure is feared for its technical complexity, increased vessel spasm and failure. We present our experience of 20 toe transfers in children.

Methods: 20 children with age 3 to 17 years, with a mean of 10.2 years with an average follow up of 6 years form the subject matter of study. The commonest etiology was cracker blast injuries. Level of amputation was Proximal Phalanx (7), metacarpal neck (3), metacarpal base (3), CMC joint (4). Five had associated finger losses. 15 were right side and 5 left side. 15 children had flap cover to stump prior to toe transfer. Success of toe transfer, ability to perform regular tasks were assessed. In 4 children detailed assessment of sensory recovery, DASH and MICHIGAN scores, radiological comparison of growth of transferred toe to native toe of the opposite side was done.

Results: All transferred toes survived. There was minimum of 8 mm 2PD at thumb tip, DASH of 4.3 and MICHIGAN SCORE of 63.5. Radiological growth of transferred toe when compared with opposite foot was 86%. There was negligible donor site morbidity even in the 2 cases of great toe transfer.

Conclusion: With good outcomes and negligible donor site morbidity, we propose toe transfers as the first choice for reconstruction of thumb loss in children.
Split skin-subcutaneous resurfacing technique for Apert’s syndactyly reconstruction

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Objectives
In Apert’s hand, inadequate skin and soft tissue coverage at bone, joint and tendon might happen during syndactyly separation. In this study, we proposed the technique for resurfacing digits after syndactyly separation by split skin and subcutaneous layers to increase the area of soft tissue coverage and reduced the problem of vital structure exposed.

Methods
Split skin-subcutaneous resurfacing technique was explained step by step. The results and complications of Apert’s syndactyly separations by this technique were retrospective chart reviewed.

Results
Surgical techniques for split skin-subcutaneous resurfacing were 1.) Double-layers zigzag incision was planned along the syndactyly digits, 2.) Superficial layer was dissected at sub-dermis plane, 3.) Deep layer was dissected at subcutaneous plane, 4.) Bi-layer soft tissue flaps (skin and subcutaneous layers) were separated and mobilized to coverage both digits especially at vital area such as bone, joint, and tendon, 5.) Full-thickness skin graft was covered on top of subcutaneous layer. In this study, total 5 Apert’s syndactyly were separated by this technique. All skin flaps were healed. No any vital structure was exposed. Most areas of skin graft were healed at 3 weeks. However, there were minimal skin graft loss areas which were healed within 6 weeks by local wound care and oral antibiotics without need for re-grafting.

Summary
Split skin-subcutaneous resurfacing technique could increase the area of soft tissue coverage for syndactyly separation that vital structures were prone to expose such as Apert’s hand.
NON VASCULARISED FREE TOE PHALANGEAL TRANSFER (NVFTT) IN CONGENITAL HAND ANOMALIES

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Objectives: Non-vascularised Free Toe Phalangeal Transfer (NVFTT) is a good option for increasing the finger length in children with symbrachydactyly and constriction ring syndrome. Aim is to study the growth potential of the transferred phalanges and functional and psychosocial outcome in these children.

Method: 41 NVFTPT were done in 20 children between 2005-2008. Long term results in 31 transfers in 14 children are part of the study. Age at surgery, number of phalanges transferred, status of epiphysis at last follow up, growth relative to phalanx of opposite toe, ROM, pinch strength, hand usage were studied. Children were grouped at time of surgery (<1.5 year and 1.5-4 years) and outcome studied. The PODCI and PROMIS scores were comparable with previous studies.

Results: 31 phalangeal transfers in 14 patients were studied with a mean follow up of 4.7 years. All the phalanges survived. Physis remained open in 24/31 patients when reviewed on an average follow up of 4.7 years (77.4%). When analysed as per age at surgery epiphysis was open in 95% of the transfers (below 1 year) and 40% (1.5-4 years). When the growth of 18 phalanges was compared with opposite foot the growth was 76% of normal. The key pinch ranged from 0.5 to 2.67 kgs with a mean of 1.5 kg (3.4 kg unaffected hands). All the digits were sensate. Self-reported scores were better than the parent-proxy score.

Summary: NVFTT is a good option for increasing function of children with short fingers. It is encouraged to do the procedure early to maintain open physis for longer period.
Free vascularised joint transfer from toes for finger reconstruction in a 2 year old child, an interesting case report

Dr Jyoshid R Balan

Abstract:
A two year old male child sustained injury to right hand middle and ring finger following a road traffic accident. He had loss of middle phalanx along with PIP and DIP joint of middle finger and loss of part of middle phalanx and PIP joint of the ring finger along with dorsal tissue loss. Wound debridement along with K wire spacer and groin flap cover were done in the initial surgery. Once the flap was well settled after flap division the spacer was removed and PIP joint of bilateral second toes were harvested and transferred to the middle and ring fingers along with part of the proximal phalanx, extensor tendon and skin paddle. The joint was fixed with K wire and extensor mechanism was restored. Arterial anastomosis was done to the digital vessels and the venous anastomosis was done to the dorsal veins. Post operative period was uneventful and The flaps survived completely. The monitoring of flap survival was done looking at the vascularity of the skin paddle. Physiotherapy was started once the K wires were removed. After one year following the joint transfer the child had good functional out come.
Management of chronic PIP ligament injuries

Prof Randy Bindra

PIP Joint 1 - Traumatic Injuries to PIP Joint, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

Finger sprains are a common occurrence and most heal without any specialist care or intervention. Yet in some cases, pain and swelling of the proximal interphalangeal joints may persist for several months after injury.

These patients usually present with stiffness, swelling and pain. Instability is rare and indicates severe collateral laxity.

Workup of a case includes careful history - severity of injury and whether there was a dislocation at the outset, history of osteoarthritis or inflammatory arthropathy. Clinical examination is necessary to assess the integrity of the collateral ligaments, volar plate and the tendons around the joint.

Plain radiographs, ultrasound scan help as they can provide a dynamic assessment by stressing the joint. MR is not usually helpful.

The mainstay of treatment is rest, anti-inflammatories and splinting in extension until the acute inflammation is controlled. A steroid injection can help in severe cases.

Surgical release is rarely required for most cases. Soft tissue release is required in subluxated or dislocated cases or in flexion contractures >45 degrees. In severe collateral laxity, reconstruction with a slip of FDS may be considered. PIP arthroplasty or arthrodesis may be indicated in cases with degenerative changes in the joint.
Pilon fractures of the PIPJ: understanding and approach to management

Dr Ter Chyan Tan

PIP Joint 1 - Traumatic Injuries to PIP Joint, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

Pilon fracture is an uncommon intraarticular fracture of the proximal interphalangeal (PIP) joint resulting in poor results in the treatment. Many management options have been available for the last 30 years and there has only been incremental improvements. Much of the understanding of this complex problem requires the understanding of what needs to be restored. The ultimate aim is to achieve a congruent and stable joint to enable early mobilisation and thus a more favourable outcome. The understanding and options for management are presented.
Volar plate arthroplasty / Hemi hamate. When and How

Dr Mark Hile

PIP Joint 1 - Traumatic Injuries to PIP Joint, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

Volar plate arthroplasty advances the volar plate into the fracture defect in the base of the middle phalanx. Necessarily the volar plate is a tight tether and labrum to resist dorsal subluxation. Temporary k wire fixation of the joint is needed due to the relative early stability. Flexion deformity is a challenging issue, particularly in cases more than three weeks from injury.

Hemihamate arthroplasty uses a bone and cartilage graft from the dorsal hamate to recreate a bony volar lip and joint concavity to create stability for immediate mobilisation. It requires precise carpentry to match the graft to the defect, ensuring adequate tilt to create the needed concavity. Exposure is by a shotgun or hyperextension approach to the volar middle phalanx. Care must be taken not to strip off the extensor insertion. The base defect is prepared and measured. A matching hamate graft is marked to match and then harvested by either antegrade or retrograde osteotomy. The graft is then trimmed to fit, and fixed with two or three screws. After reduction and closure, early mobilisation is needed.
Acute Collateral Ligament injuries in the fingers

Prof Roohi Syed Waseem Ahmad

PIP Joint 1 - Traumatic Injuries to PIP Joint, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

There are 19 joints in the hand alone and 14 in the five digits which are especially prone to injury due to laterally applied forces. While fractures presentation is more dramatic, ligamentous injuries go unnoticed particularly in a busy family physician’s clinic, hence present later as instability or reduction in force that can be applied. Proximal Interphalangeal Joint (PIPJ) injuries are particularly are common and may pose a challenge in terms of regaining good function. This lecture deals with the history, examination and simple tricks in managing these ligamentous injuries, from distal to proximal. Please refer to the chapter 15 in the book Disorders of the Hand for a more comprehensive coverage of the topic.
MatOrto PIP replacements

Dr Damian Ryan

PIP Joint 2 - Interphalangeal Arthritis and Arthroplasty, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

MatOrtho PIPR
Arthritis of the PIPJ can be a common and disabling condition but relatively infrequently managed surgically. Silicone arthroplasty can relieve pain and improve function. Condylar arthroplasty has the prospect of greater functional improvement for the long term. The MatOrtho PIPR has the possibility of providing more normal mechanics and long-term function but the procedure is technically challenging. The indications, surgical technique and post-operative management will be discussed.
Vascularized toe joint transfers to the fingers have been performed for more than four decades, but their outcomes are not comparable with implant arthroplasty. Limited range of motion and extensor deficits of about 30 remain major problems with the constructed joints. We observed that the central extensor tendon of the toe is often attenuated proximally in its course on the dorsum of the proximal interphalangeal joint. A tight repair of the toe extensors to finger extensors limits joint motion. We reviewed our surgical techniques with this consideration. Thirty-eight fingers that we followed for 6 to 123 months had active range of motion of the reconstructed proximal interphalangeal joint in the finger of 58 (range 17-76) with an extensor deficit of 18 (range 0-30). We consider that the extensor mechanism and central slip insertion to the middle phalanx must be reconstructed meticulously to improve joint motion and decrease extension lag, and design of a lateral skin flap paddle to better cover vessels and allow extensor repairs.
Denervation Surgery in the Wrist and Small Joints of the Hand

Mr Paul Jarrett

PIP Joint 2 - Interphalangeal Arthritis and Arthroplasty, Eureka Room 1, March 11, 2020, 4:00 PM - 6:00 PM

Surgery to denervate joints has been described over many decades including for large joints such as hips or elbows but is more widespread for small joints in the hand and wrist. Techniques involve ablating individual visible nerves as well as dividing soft tissue planes in which microscopic articular nerve branches travel.

Denervation surgery is especially appropriate in patients who have a joint which has significant pain insufficiently responsive to non-operative treatment yet the joint still has a good range of motion. Denervation by itself will not correct angular deformity or unless the joint is debrided improve the appearance of joint. For the wrist or trapeziometacarpal joint I often undertaken arthroscopic debridement with the denervation.

Denervation produces less reliable improvement in pain compared to most bony procedures but is often only slightly less reliable and yet has a recovery which is usually considerably more rapid compared to bony or arthroplasty surgery. Most commonly the improvement in pre-operative pain is rapid and the improvement is usually binary in that it tends to either produce a good improvement in pain or no improvement. If denervation results in insufficient pain relief, further bony surgery is not precluded. Denervation for more distal joints such as interphalyngeal or metacarpophalyngeal is more reliable than more proximal joints such as the trapeziometacarpal or wrist joints.

Many texts mention the potential for late recurrence of pain; over 15 years I have noted this in only one wrist case which responded to re-denervation.
When is Long Too Long?

Dr Claudia Gschwind1, Dr James P. Ledgard1

1Royal North Shore Hospital, Lane Cove, Australia

Reconstruction 2 - Tetraplegia Surgery, Eureka Room 2, March 11, 2020, 4:00 PM - 6:00 PM

Objective: We present the current facts around upper-limb nerve transfer surgery performed over twelve months after spinal cord injury.

Methods: We review the pertinent physiology and clinical assessment of the recipient muscle in late transfers. We analyse our cases of late nerve transfers.

Results: We present and review the results achieved in our patients with late nerve transfers.

Summary: Late nerve transfer surgery can achieve good functional results in carefully selected cases.
Neurophysiological Assessment for Prediction of Outcomes in Upper Limb Nerve Transfer Surgery in Tetraplegia

Dr Edward Stanley¹, Dr Bridget Hill¹, Professor Mary Galea², Ms Natasha van Zyl¹

¹Austin Health, Heidelberg, Australia, ²University of Melbourne, Parkville, Australia

Reconstruction 2 - Tetraplegia Surgery, Eureka Room 2, March 11, 2020, 4:00 PM - 6:00 PM

Objectives
To determine predictors of outcomes using neurophysiological assessment in traumatic tetraplegics undergoing nerve transfer surgery (NTS) to regain movement in the upper limb.

Methods
A retrospective study investigated relationships between neurophysiological assessment and strength (Medical Research Council grade [MRC]) at 2-years following NTS.

Correlations with regression models were made between MRC and:
(1) motor level of spinal injury at rehabilitation (mean 2 months post injury);
(2) motor level of spinal injury pre-operatively (mean 9 months post commencing rehabilitation);
(3) fibrillations in donor and recipient muscles on pre-operative electromyography (EMG);
(4) recruitment of motor unit action potentials in muscles innervated by donor and recipient nerves on pre-operative EMG;
(5) energy required to stimulate muscle contraction using an intra-operative nerve stimulator applied to donor and recipient nerves;
(6) range of movement (ROM) of the joint following contraction of the donor and recipient muscles as above.

Results
160 nerve transfers were performed in 38 patients (C4-7). As the motor level of injury from time of injury improved, MRC grade increased (coef. 1.4, p=0.008). As the energy required to stimulate the donor nerve increased, MRC grade decreased (coef. -0.425, p=0.007). As the ROM increased upon stimulation of the recipient nerve, the MRC grade increased (coef. 0.808, p=0.001). There is no statistically significant correlation between motor level pre-operatively, fibrillations, motor recruitment and MRC grade.

Summary
The data demonstrates that C4 tetraplegics appear to have poorer outcomes and the potential predictors of strength are the energy required to stimulate donor nerves and the ROM upon recipient nerve stimulation.
Nerve transfers for the restoration of upper limb function in tetraplegia: Expanding on traditional tendon-based techniques

Dr Natasha Van Zyl¹, Dr Bridget Hill¹, Ms Catherine Cooper¹, Ms Jodie Hahn¹, Mr Michael Weymouth¹, Mr Stephen Flood¹, Dr Mary Galea²
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Reconstruction 2 - Tetraplegia Surgery, Eureka Room 2, March 11, 2020, 4:00 PM - 6:00 PM

Background
Loss of upper extremity function after cervical spinal cord injury (SCI) impacts heavily on independence. Nerve transfer surgery offers an exciting new option for re-animation of arm and hand function in tetraplegia.

Methods
This study was a prospective case series, consecutively recruiting people with early, traumatic, cervical SCI referred to a single centre for upper extremity reanimation. Goals were restoration of elbow extension, grasp, pinch and hand opening. Participants were assessed at 12 and 24 months post-surgery. Primary outcome measures were the Action Research Arm Test (ARAT), Grasp Release Test (GRT) and the Spinal Cord Independence Measure (SCIM).

Results
Sixteen participants (27 limbs) with mid level cervical SCI were recruited and 59 nerve transfers performed. At 24 months, there was a significant improvement in ARAT (mean difference -14·36, CI -18·76 to -9·97 p=0·001) and GRT (mean difference – 74·89, CI -96·04 to -53·73 p=0·001). SCIM subscales improved by more than the minimal detectable change (MDC) and the minimal clinically important difference for total SCIM score and ‘mobility in the room/toilet’, and the MDC for self-care. Median triceps strength was grade 3 (IQR 2-3) and digital extensor strength was 4 (IQR 4-4). Mean grasp strength, in a subgroup of participants with nerve transfers, was 3.2kg (SD 1·5). Adverse events were few, with no functional consequences.

Conclusion
Nerve transfer surgery is a safe and effective addition to surgical techniques for upper limb reanimation in tetraplegia. Nerve transfers resulted in significant functional improvement in all standardised outcome measures utilised.
Nerve Transfer Surgery Has Expanded The Therapeutic Options in Tetraplegia

Dr Claudia Gschwind, Dr James P. Ledgard
Royal North Shore Hospital, Lane Cove, Australia

Objective: To demonstrate how nerve transfers have altered the algorithms of surgical treatment of patients with spinal cord injury.

Methods: With over 120 nerve transfers performed at our institution on patients with spinal cord injury, we review functional outcomes over 18 months postoperatively in the patient group belonging to the international classification for surgery of the hand group (ICSHT) 0 to 3.

Results: The results of surgery are critically reviewed with regards to elbow extension, wrist extension, forearm rotation, finger extension, finger flexion and thumb pinch in this patient group.

Summary: Nerve transfers have become indispensable in upper-limb surgery for spinal cord injury and their place in the reconstructive algorithm is becoming more defined.
Purpose. To explore the feasibility of restoration of finger flexion after cervical spinal cord injury.

Methods. Double nerve transfer was conducted in 22 cadaver upper extremities. The donor nerves were the brachialis branch of the musculocutaneous nerve and the extensor carpi radialis brevis (ECRB) branch of the radial nerve. The recipient nerves were the anterior interosseous nerve (AIN) and the flexor digitorum profundus branch of the ulnar nerve (ulnar-FDP). A complete C6 spinal cord injury reconstruction was accomplished in a patient using a double nerve transfer of ECRB to ulnar-FDP and brachialis to AIN.

Results. In the cadaver study, nerve transfers from ECRB to AIN, brachialis to AIN, and ECRB to ulnar-FDP were all feasible. The transfer from the brachialis to ulnar-FDP was not possible. The mean myelinated axon counts of AIN, brachialis, ulnar-FDP, and ECRB were 2,903 +/- 1049, 1,497 +/- 606, 753 +/- 364, and 567 +/- 175, respectively. The donor-to-recipient axon count ratio of ECRB to AIN, brachialis to AIN, and ECRB to ulnar-FDP were 0.24 +/- 0.15, 0.55 +/- 0.38, and 0.98 +/- 0.60, respectively. The distance from coaptation of ECRB to ulnar-FDP muscle entry was shorter than the other nerve transfers (54 +/- 14.29 mm). At 18 months, our clinical case demonstrated restoration of all finger flexion and functional improvement from the double nerve transfer of brachialis to AIN and ECRB to ulnar-FDP.

Conclusions. Restoration of all finger flexion may be feasible by the ECRB to ulnar-FDP and brachialis to AIN double nerve transfer.
Striving for balance

Over the last 35 years, one key goal of the tetrahands service in New Zealand has been to achieve balanced hand function. This has evolved from the early days of introducing tendon transfers for reach, pinch and grasp to the higher expectations resulting from the addition of nerve transfers. Specifically as regards the thumb, a range of technical innovations have been introduced. Some have persisted, such as the distal split FPL tenodesis whereas some have been superceded, such as CMCJ fusion and EPL tenodesis. Reconstructing PIN function has brought with it both opportunities and challenges. Balance is dependent on the context in which we work, both as regards patient presentation and our colleagues in therapy and rehabilitation. Our physician colleagues have been relatively conservative during the introduction of both tendon transfers in the 1980s and nerve transfers in the last decade. Working closely with therapists has been critical to appreciating individual’s needs and optimising both prehabilitation and rehabilitation as surgical techniques change. Patients’ expectations have appropriately increased over the years. As a community of people living with tetraplegia, they have been a key driver of service improvement.
Revolutions in reconstructive surgery for spinal cord injury

Prof Yuan Kun Tu

Reconstruction 2 - Tetraplegia Surgery, Eureka Room 2, March 11, 2020, 4:00 PM - 6:00 PM

Revolutions in reconstructive surgery for spinal cord injury

Yuan-Kun Tu, MD, PhD, FICS
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Various techniques of nerve transfers (neurotizations) have been developed for the reconstruction of shoulder, elbow and hand function after brachial plexus injury. Both intra-plexus and extra-plexus neurotizations methods had been reported to achieve quite acceptable results in the reconstruction for BPI. Based on the knowledge of BPI reconstruction, the surgical approaches to solve the clinical problems of stroke, hemiplegia, tetraplegia, and paraplegia had been developed in the recent years. We report our series of CC7 transfer for hemiplegia, lower extremity neurotization method for stroke, vascularized nerve graft for tetraplegia and paraplegia, and application of stem cell in combination with above methods. A new horizon has been arising for the future.
Performance Related Musculoskeletal Injuries in Musicians: Assessment, Prevention, Management

Dr Aviva Wolff

Hand Therapy A3 - Hand Therapy In Depth Practice Topics 1 (a), Eureka Room 3, March 11, 2020, 4:00 PM - 6:00 PM

Participants will be instructed in how to develop a customized program that is based on scientific principles and current evidence of injury prevention and management. This talk will review the unique risk factors facing musicians and common causes of upper extremity musculoskeletal injury. We will review assessment methods to correctly identify faulty movement patterns and poor practice habits. We will demonstrate how to use movement and functional analysis to identify the source of the problem and develop customized recommendations for a range of instruments and conditions. We will discuss methods to optimize musculoskeletal health and improve performance. We will address ergonomic requirements specific to the instrument and learn how to select the correct exercises and rehabilitation strategies to prevent and manage common injuries in musicians and guide safe return to play.
Overuse and Sporting Injuries in the Elite Paediatric Elbow - a practical approach

Ms Elizabeth Ward

Increased single-sport participation with year-round training, higher intensities at younger ages, and longer competitive seasons are contributing factors to the increased injury rates seen in paediatric athletes. Conditioning and training errors also contribute significantly to the risk and frequency of injury. This session will cover common traumatic and overload injuries in gymnastics with a focus on the elbow, and demonstrate a graded return to training and competition with a programme which moves from non-weight bearing exercise through to partial, full and plyometric exercise progression. Elizabeth will also be exploring crossover of these principles into other sports which require weight bearing or high load through the upper limb in young athletes.
Treating without Pain (Taping for the UL)
Hand pain can be challenging, but approaching it from a slightly different perspective can change our outcomes.

Ms Alison Taylor

Kinesiotaping can offer a different alternative to treating the painful hand. While we look mostly at muscles and joints, we sometimes hit roadblocks when working with stiff or painful fingers. But by adding a more neural perspective, and looking closer at the skin, scar, sensation and swelling (the 4 S’s), we may be able to see a clearer picture of how to address pain. The 4x S’s will give you lots of information related to where the pain is coming from, and some insight into how to treat it. This workshop will be a lecture, lab, demonstration structure. It will aim to present some new perspectives on how to address pain, from different physiological layers. Video evidence will demonstrate how to listen, observe and touch the patient differently. The goal is to teach the participants how to achieve improved outcomes with ROM, pain and function. The class is designed to be fast and furious and fun!
Natural History of the Mobile and Non-mobile Scaphoid Non-Union’
Mr Wolfgang Heiss-Dunlop

APWA Wrist 3 - Scaphoid non union and AVN, Goldfields Theatre/Plenary, March 12, 2020, 8:00 AM - 10:00 AM

A review of the historical literature and a summary of current knowledge regarding the natural history of mobile and non-mobile scaphoid non-unions will be presented.
Costochondral graft for Proximal pole Scaphoid replacement arthroplasty

A/Prof Michael Sandow

Due to the precarious vascular supply, the proximal scaphoid pole is vulnerable to necrosis and collapse. Various management options have been proposed including vascularised grafts, soft tissue or prosthetic replacement and variable extents of carpal fusion.

Methods:

Over the period from 1991 until 2011, 87 patients, in a single surgeon series, have undergone Costo-Osteochondral autograft (COCA) to replace a deficient proximal scaphoid. Patients were contacted by mail or telephone. Subjective questions related to wrist function, satisfaction and the occurrence of further treatment.

Results:

Of the 56 patients with a greater than 10 year follow-up, 40 have responded (71%). 73% reported nil, or mild pain, 91% were satisfied with the outcome and only 4 had undergone further treatment, 1 for radial styloidectomy, 1 underwent partial carpal fusion, and 2 have undergone total wrist fusion. Grip strength and range of motion were generally less than the normal wrist. 91.5% reported no problems with the chest donor site.

Discussion:

While frequently not able to match the function of a normal wrist, patients were generally very satisfied with the outcome, and this option may have advantages over alternate treatments. Other procedures such as partial or total wrist fusion remain an option if the COCA fails to deliver a satisfactory outcome. COCA was frequently performed following often multiple unsuccessful previous procedures, and in virtually all patients has remained the final intervention with a greater than 90% satisfaction level. The COCA provides a durable long term solution to address proximal scaphoid deficiency.
Vascularity of scaphoid is tedious. Scaphoid nonunion happens in 10-25% of all scaphoid fractures. The incidence was even higher in displaced or proximal fractures. Those fracture with greater than 1mm of displacement were associated with 55% incidence of nonunion and 50% rate of avascular necrosis. Although scaphoid nonunion is a common sequelae after fracture, it is not uncommon to encounter final fracture union after a prolonged period of waiting despite the initial XR demonstrated “classical” features of “nonunion”. There seems to have no time definition and differentiation of “nonunion” versus “delayed union”. The difference between “delayed union” and “union” is whether the healing process is still on-going or the healing process has stopped that no remodelled bone bridging across the fracture site. The differentiation does not only depends on the clinical condition and radiological (XR, CT and MRI) appearance, but also strongly relies on the arthroscopic findings. Arthroscope is reliable to differentiate delayed union or nonunion, by directly probing the fracture site for any mobility, gapping, cavity or bleeding, under a magnified view. Formal arthroscopic bone grafting is indicated when non-union is identified arthroscopically. When the fracture site is shown to be stable with bony endpoint and in the absence of gapping or cavity, no fixation is needed and external immobilisation with splinting is given for a few weeks. Sometimes percutaneous screw fixation may obviate the need of external immobilisation. If some healing is evidenced but the fracture is not stable enough, percutaneous fixation can be performed using screws or K-wires, augmented with arthroscopic bone graft procedure, if the patient cannot afford further waiting. Arthroscopy is a reliable and useful tool to help us to establish whether the fracture is a nonunion or not. But the determination of which surgical intervention should be offered in a delayed union is multifactorial and should be individualised.
Arthroscopic bone graft to scaphoid

Prof Young Keun Lee

APWA Wrist 3 - Scaphoid non union and AVN, Goldfields Theatre/Plenary, March 12, 2020, 8:00 AM - 10:00 AM

The natural history of untreated scaphoid nonunion is the progression to carpal collapse resulting in wrist arthritis and chronic painful disability. Therefore, timely surgical intervention by anatomic restoration of a stable scaphoid architecture and its linkage to adjacent bones is the goal before arthritis sets in. Many surgical techniques have been developed to treat scaphoid nonunion such as corticocancellous or cancellous bone graft and various vascularized bone grafting techniques. Various studies have been reported as being variable but somewhat successful results with the open grafting procedure with failure rates of 25% to 45%. Potential problems have been recorded. For example, open grafting with dissection of wrist capsule and ligaments damages the joint and hence leads to increased stiffness of the wrist and hand. Additional surgical trauma may also jeopardize blood supply to the carpal bones. These features continuously challenge surgeons to devise new treatment procedures.

Especially, arthroscopic assisted bone grafting and percutaneous fixation have advantages of minimal surgical trauma to the scaphoid blood supply and its ligament connection and provide a more biological environment for healing scaphoid nonunions. It has been practiced by more and more authors, and recently this can also be a primary choice treatment method for a scaphoid nonunion, even when arthritis is present, if the radiological extent of the arthritis did not progress significantly.
Is there a place for open cancellous and trapezoidal avascular bone graft

Dr Margaret Fok

APWA Wrist 3 - Scaphoid non union and AVN, Goldfields Theatre/Plenary, March 12, 2020, 8:00 AM - 10:00 AM

Scaphoid non-union remains to be a difficult condition to manage. Many treatment options have been described including ranging from debridement and screw fixation, open cortico-cancellous bone graft, pedicled vascularized bone graft and free vascularized bone graft. Recently the use of arthroscopic bone graft has also gained popularity. Yet none of the option appears to be superior than one another. We discuss the current role of using cancellous and trapezoidal bone graft in the scaphoid non-union and highlight its technique, advantages and disadvantages.
In this talk, the current updates of developmental biology and embryology of the hand are discussed. Appreciation of the normal development of the upper limb allows an understanding of why things go wrong. Knowledge of the aetiology of congenital hand differences allow the surgeon to gain a deeper understanding of the condition being treated, and in certain instances, guide management. There is an increasing demand for explanation from parents which would require the surgeon to keep to date and to provide clear explanation for the 'why' instead of just the 'what'. Surgeons are an invaluable source of referral for geneticists and other researchers.

The growing relevance of developmental biology and genetics have allowed the introduction of the Oberg, Manske and Tonkin classification. With increasing updates, the OMT adapt to changes and added categories. The classification allows communication between different specialties.
Syndactyly release without using skin graft: post-operative assessment with a 3D model

Dr Esther Chow

Introduction:
Syndactyly is the 2nd most common congenital hand abnormalities. The aim of this study is to review all syndactyly cases that were treated with a dorsal-winged flap without using skin graft. We also introduce the assessment of a finger web space with a 3D model.

Materials and Methods:
Syndactyly cases treated with the dorsal-winged flap design without skin graft from June 2009 to June 2014 were reviewed. The minimal follow-up was 5 years. Exclusion criteria include: symbrachydactyly, polydactyly and oligodactyly. The patients were assessed objectively (clinical assessment) and subjectively (questionnaire). Two cases with unilateral involvement were assessed by a 3D model to evaluate the 3D shape of the web space and the level of left and right symmetry.

Results:
There were total 7 patients with 9 web spaces operated. None of the case require skin grafting. The average parent’s satisfaction score was 8.4/10. There was one case of scar contracture with web creeping. Two cases of unilateral involvement were assessed with a 3D model. The operated side was converted to a mirror image and was overlapped with the normal side. The level of left and right symmetry was calculated using the difference in overlapped volume and the actual volume. The calculated level of left and right symmetry in these 2 cases were 95.44% and 97.18%.

Conclusion:
The dorsal-winged flap design is a good option for syndactyly release. It can restore normal finger function, create a web space with good cosmetic appearance, while avoiding donor site morbidity.
Surgical Mobilization of Symphalangism of the Hand

Prof Goo Hyun Baek

Paediatrics 1 - Introduction and Complex Differences of the Digits and Limb, Courtyard Room 1 and 2, March 12, 2020, 8:00 AM - 10:00 AM

Symphalangism is an uncommon condition characterized by fusion of the joints of the fingers or toes. There have been several reports on surgical outcomes to make the symphalangism fingers mobile. However, most of the surgical mobilization procedures, in children, have been reported to yield unsatisfactory results. Baek et al reported surgical techniques to make the symphalangism of the hand mobile, based on a new classification 1,2.

Classification of Symphalangism
Grade I (Fibrous Symphalangism): volar skin crease (faint or absent), passive motion (10-20 o), joint space (mild narrowing), phalangeal head in lateral view (round)
Grade II (Cartilaginous Symphalangism): volar skin crease (absent), passive motion (only jerk), joint space (definite narrowing), phalangeal head in lateral view (flat). Grade II can be subclassified into early Grade II, and late Grade II.
Grade III (Bony Symphalangism): volar skin crease (absent), passive motion (none), joint space (fused)

Since 2004, sixty-three grade I and II joints in 36 patients have been operated on and followed up for more than one year. Five out of 63 joints lost motion postoperatively, all of them were late Grade II. The mean gain of active flexion in the remaining 58 joints was 65 (range 20 -100) degrees. The duration of follow-up was a mean of 2.8 (range 1-12) years.

Reconstruction of the donor site in non-vascularized toe phalanx transfer

Dr Hidehiko Kawabata

Paediatrics 1 - Introduction and Complex Differences of the Digits and Limb, Courtyard Room 1 and 2, March 12, 2020, 8:00 AM - 10:00 AM

[Objectives]
Non-vascularized toe phalanx transfer in digital reconstruction in children results in functional and cosmetic improvement but with significant variability. However, it always can cause significant deficits in the donor foot, at least in a cosmetic point of view. We have used an osteochondral bone graft taking from the iliac crest for donor site reconstruction. This paper assessed long-term morbidity in the donor foot using this technique.

[Methods]
Since 1993, we treated 61 children with non-vascularized toe phalanx transfer. Diagnosis in the majority was symbrachydactyly or thumb hypoplasia Blauth IIIB. Age at operation was 1.99 years and follow-up period was 8.2 years on average. We harvested the proximal phalanx of the 4th toe(s) and iliac bone with apophysis of 2/3 thickness, length of which was equivalent to the 4th toe. The stability and alignment of the metatarsophalangeal joint, and the length of the 4th toe relative to the 5th toe were analyzed. Iliac crest deformity was also examined. Parental satisfaction with the donor foot in function and in appearance was assessed using visual analog scale.

[Results]
Stability was good in 94%. Length was proportional in 53%, not proportional in 29%, and equal to the 5th toe in 19%. Malalignment was seen in 6 toes, 3 of which was less than 10 degrees. Mild iliac deformity was seen in 10 cases. VAS score was 96 in function and 80 in appearance.

[Conclusions]
We have found satisfactory preservation of toe function and cosmesis following this technique.
Mobilization of a congenital proximal radio-ulnar synostosis with a vascularized fascio-fat graft - Surgical outcomes of 147 forearms in 115 patients

Prof Fuminori Kanaya

Congenital proximal radio-ulnar synostosis is a rare congenital anomaly characterized by a fixed forearm rotation and the high tendency toward re-ankylosis after separation. We devised a mobilization procedure consisted of a free vascularized fascio-fat graft (FVFG) and a pedicle vascularized fascio-fat graft (PVFG) to prevent re-ankylosis, and a radius osteotomy to reduce the dislocated radius head. The purpose of this study is to compare outcomes of 2 mobilization procedures.

Patients and Methods: We performed mobilization procedures for 104 forearms in 91 patients followed-up more than 2 years after surgery. There were 26 limbs with FVFG, and 121 limbs with PVFG. The mean age at the surgery was 8.1 years (range, 5.1 to 13 years) in FVFG and 7.1 years (range, 4.0 to 14 years) in PVFG.

Mean preoperative forearm ankylosis was 34.8 degrees of pronation in FVFG and 37.2 degrees in PVFG.

Results: Four re-ankylloses were observed among 147 mobilizations. These 4 patients were successfully treated with re-separation. All patients reported improvements in performing some activities, such as catching a ball, accepting objects such as coins, holding a bowl of soup and performing gymnastics. The mean range of active forearm rotation after mobilization was 81.6 degrees in FVFG and 76.9 degrees in PVFG. The average surgery time was 9.8 hours in FVFG and 4.1 hours in PVFG.

Discussion and conclusions: This mobilization procedure prevented re-ankylosis after separation of the synostosis and provided some forearm rotation that improved a child's daily activities. Mobilization with a pedicle fascio-fat graft shortened the surgery time.
Classification

Dr Sarah Tolerton

Paediatrics 1 - Introduction and Complex Differences of the Digits and Limb, Courtyard Room 1 and 2, March 12, 2020, 8:00 AM - 10:00 AM

The Oberg, Manske and Tonkin (OMT) classification was approved by the International Federation of Societies for Surgery of the Hand (IFSSH) Scientific Committee for Congenital Conditions as a replacement of the previously accepted Swanson classification. Based on increasing knowledge of the aetiology of congenital upper limb anomalies (CULAs), the OMT utilises dysmorphology terminology and aims to determine the axis of limb development and part of the limb primary involved. The OMT classification has undergone a number of evaluations and criticisms in the hand surgery literature, with various recommendations suggested and reflected in modified versions. While difficulties relating to the placement of certain diagnoses persist, and the OMT may still fall short in some of the criteria of an ideal classification; it is practical, expandable and modifiable as our knowledge of limb development and clinical genetics increases. Furthermore, the OMT-IFSSH classification facilitates improved interdisciplinary communication and ultimately better patient care.
Microsurgery in Treatment of Vascular Anomalies

Dr Brian Labow

Paediatrics 1 - Introduction and Complex Differences of the Digits and Limb, Courtyard Room 1 and 2, March 12, 2020, 8:00 AM - 10:00 AM

Vascular anomalies of the upper limb include a variety of tumors as well as high-flow and low-flow malformations. These lesions can be a significant source of morbidity to the patient and are in general difficult to treat. Although interventional techniques such as sclerotherapy or embolization are most common, surgery remains an import element of care for many patients. Beyond soft-tissue reconstruction, the hand surgeon is able to apply microsurgery to facilitate bypass or resection of these unusual lesions. This presentation will demonstrate cases where such techniques have been employed.
Managing the Apert Hand: Treatment Options and Outcomes

Dr Brian Labow

Paediatrics 1 - Introduction and Complex Differences of the Digits and Limb, Courtyard Room 1 and 2, March 12, 2020, 8:00 AM - 10:00 AM

Apert syndrome is a rare condition affecting 1:65,000 live births, and uniformly affects craniofacial and skeletal development in the hands and feet. All patients are born with complex syndactyly of the hands and feet, and most of the hand literature has focused on this element of surgical treatment. However, there are other unique features to the Apert hand, some of which may manifest later in childhood. These include short deviated thumbs, phalangeal insufficiency, as well as overlapping digits that may benefit from adjunctive procedures in addition to syndactyly release. This presentation will review the findings and classification of the Apert hand, our preferred technique for syndactyly release, as well as additional interventions we have found useful in treating these patients. Long-term surgical as well as patient reported outcomes will be presented.
Triple muscle transfer – how and why

Prof Yuan-Kun Tu

Plexus 2 - Adult Brachial Plexus Injury and Reconstruction, Eureka Room 1, March 12, 2020, 8:00 AM - 10:00 AM

Triple muscle transfer – how and why
Yuan-Kun Tu, MD, PhD, FICS
Superintendent, Professor in Orthopedics
E-DA hospital / I-Shou university, Kaohsiung Taiwan

Introduction: To evaluate the clinical effectiveness of free triple flaps transfer for total arm type Brachial plexus injury (BPI) reconstruction.
Methods: From 2001 to 2007, 50 patients received FFMT for total arm type BPI. The 1st stage free gracilis-adductor DFFMT and the 2nd stage single graculis FFMT; so called “Triple flaps FFMT”. The average age was 36 y/o. The 1st DFFMT were performed average 15 months after trauma. The 2nd gracilis FFMT was performed average 3 months after the 1st FFMT surgery. The 1st DFFMT was serving as elbow flexor and wrist extensor, while the second gracilis FFMT was serving as finger flexor. Average follow up 2.5 years.
Results: The flap successful rate was 97% (97/100 flaps), with 3 cases required reopen surgery due to venous thrombosis. 84% achieved M3 elbow flexion / M3 wrist extension, and 66% obtained M3 hand grip in 1 year follow up. In 3 years follow up, 88% could have M4 elbow function, and only 72% had M4 hand grip. The reasons for failure are: use of previously used nerve, tendon adhesion, lack of adequate rehabilitation, and inadequate skin coverage. The most significant recovery of motor function happened during the 9 months to 24 months after the triple FFMT surgery.
Discussion & Conclusion: We concluded that triple FFMT for reconstruction of total avulsion type BPI is a worthwhile technique.
The One Army! Therapy input and functional outcomes following FFMT for the complete BPI patient

Plexus 2 - Adult Brachial Plexus Injury and Reconstruction, Eureka Room 1, March 12, 2020, 8:00 AM - 10:00 AM

Hand Therapy for the patient following restoration to their flail limb through FFMT surgeries involve years of intense rehabilitation. Whilst we are committed and focussed on protecting post surgical repairs, maximising passive ROM, maintaining cortical representations for motor control, flooding donors and carefully assisting recipient muscles to reanimate, we also find ourselves informally counselling and offering advice with regards lifestyle choices and return to work opportunities. We are in the unique position to be by their side throughout their recovery and play an integral role in educating them to keep their expectations and life goals in line with realistic outcomes. I will take you behind the scenes of what we do in Hand Therapy sessions and demonstrate the outcomes achieved for some of our flail limb patients (self named 'The One Army!') after intense years of rehabilitation. It will include video footage of meaningful activity outside the clinic environment and will also discuss the results obtained from self rated, patient satisfaction surveys with regards outcomes achieved and priorities for restoration.
The purpose of this study was to present the outcomes of nerve transfers for upper and extended upper type brachial plexus injuries for the elbow flexion.

A retrospective review was done on nerve transfers to restore elbow flexion in patients with upper type brachial plexus injuries from 2005-2014. Treatment outcomes were in terms of elbow flexion, and postoperative pain and FIL-DASH scores.

There was a total of 52 patients with an average age of 30 years (SD, 8.7 years). The average time from injury to surgery was 7.3 months (SD, 3.2 months). Nineteen patients had C56 injuries and 35 patients with C567 injuries.

In 26 patients, the mean difference between the pre and postoperative in the FIL-DASH score was 20.8 (SD, 20.4), the difference was significant (p=0.001). The mean elbow flexion strength was 3.6, (SD, 0.74), with a mean elbow flexion range of 126 degrees (SD, 20.1). In patients with a longer follow-up of more than 24 months (n=28); 92.8% (26/28) had a recovery of elbow flexion strength of ≥ M3, with a range of elbow flexion of 132 degrees (SD, 17.7).

Double nerve transfer seems to result in a significantly stronger elbow flexion strength (≥ M4 ) compared to single nerve transfer (p =0.03).

Nerve transfer procedures can result in good functional recovery of elbow flexion in patients with upper and extended upper type injuries. Those who had double nerve transfer tend to have stronger elbow flexion strength compared to those who had single nerve transfer in longer.
A Comparison of Clinical Outcomes in primary Free Functioning Muscle Transfer and Nerve Transfer for Elbow Flexion of Acute Traumatic Brachial Plexus Injury

Mr Heri Suroto

Plexus 2 - Adult Brachial Plexus Injury and Reconstruction, Eureka Room 1, March 12, 2020, 8:00 AM - 10:00 AM

Purpose: The purpose of this study is to compare the results of primary FFMT and nerve transfer conducted as an initial therapy for acute traumatic Brachial Plexus Injury (BPI).

Methods: This analytical retrospective research featured 40 participating subjects of acute traumatic BPI. The clinical outcome including; (1) shoulder abduction active range of motion (AROM) and motor power, (2) elbow flexion AROM and motor power, (3) pain expressed on a VAS and (4) DASH score of post primary FFMT and nerve transfer on two groups of patients who had undergone surgical intervention were assessed.

Results: Primary FFMT produced clinical outcomes were superior to those of nerve transfer in VAS (3.06 ± 1.11 and 4.45 ± 1.64 with p = 0.006). Nerve transfer proved to be superior in DASH (43.68 ± 17.64 and 58.76 ± 23.25 with p = 0.006 respectively). There were no significancy in the rest clinical outcome. The results were; (1) Shoulder abduction AROM (FFMT 59.17 ± 42.01 and NT 55.00 ± 36.24 with p = 0.76), (2) Shoulder abduction motor power (FFMT 2.67 ± 0.76 and NT 2.5 ± 0.89 with p = 0.69), (3) Elbow flexion AROM (FFMT 75.28 ± 46.38 and NT 97.04 ± 49.21 with p = 0.10), (4) Elbow flexion motor power (FFMT 3.00 ± 1.08 and NT 3 ± 1.34 with p = 0.77)

Conclusions: Primary FFMT has better outcome than nerve transfer in VAS, but nerve transfer has better outcome in terms of DASH.

Keywords: BPI, FFMT, nerve transfer
Update on adult BPI

Dr Kazuteru Doi

Plexus 2 - Adult Brachial Plexus Injury and Reconstruction, Eureka Room 1, March 12, 2020, 8:00 AM - 10:00 AM

Abstract:
Current procedures of double free muscle transfer (DFMT) for restoration of hand function in total brachial plexus injury including two muscle transfers, nerve transfers for reconstruction of shoulder, elbow extension and sensation of hand were briefly described and its modified indication was introduced based on up-date long-terms results.
We have reported several times that the long-term results of DFMT to provide prehension for patients with traumatic total brachial plexus injury. Presently, the number of cases with DFMT exceeds 130 cases. Owing to the increase in number of cases, the conclusion has been changed a little. The current outcome also discloses that one-third of patients with DFMT attained satisfactory finger function (total active finger motion). Additionally, according to our current data, daily use of the reconstructed hand is directly related to the range of elbow flexion, TAM and sensory recovery of the hand. The TAM is also dependent on the patient’s age and body-mass index (BMI). Our current indication of DFMT is based on a limit of patients younger than 39 years with a BMI of less than 23.
In conclusion, although we can’t deny that DFMT surgery is strenuous for both the surgeon as well as the patient and needs long period rehabilitation, the functional possibility of prehension by hook grip which not only needs finger flexion, but also minimal opening of fingers can be restored only by DFMT, not by other procedures: single muscle transfer or nerve transfer only.
Outcome assessment following brachial plexus injury

Dr Bridget Hill

Measurement of outcome that is reliable, valid and responsive to change is central to research and clinical practice. Measurement must also be goal directed, with tools chosen that reflect the outcome for the person with a brachial plexus injury based on the surgical or therapeutic input. This presentation will discuss the international classification of functioning disability and health (ICF) as a framework to select outcome measures from a cross section of domains including impairment, i.e. strength, range of motion and pain, activity / participation and environment. Two new measures developed specifically for people with BPI will be presented:

1. The Brachial Assessment Tool (BrAT) a Rasch deigned patient-report outcome measure of activity that is reliable, valid and responsive for all levels of BPI
2. The Impact of Brachial Plexus Injury Questionnaire a classic test theory designed patient-report outcome measure of the physical and psychological impact of brachial plexus injury
Tendon rebalancing in rheumatoid Arthritis

Dr Damian Ryan

Arthritis 1 - Rheumatoid Arthritis, Eureka Room 2, March 12, 2020, 8:00 AM - 10:00 AM

Tendon Rebalancing in Rheumatoid Surgery
Rheumatoid arthritis remains a disorder that potentially has devastating effect on hand function with pain, swelling, joint destruction and deformity. The incidence of severe deformity has significantly decreased with more effective and aggressive medical treatment, but some patients will be intolerant or resistant to those treatments.

Deformity of the hand is due to uncontrolled synovitis with damage to articular surface, erosion of bone, stretching of soft tissues and interference with tendon function. This allows normal forces across joints to become deforming forces. Tendon imbalance across joints typically cause Z deformity. Management of those deformities will be discussed.
Bony surgery and soft tissue reconstruction in the rheumatoid wrist

Prof Fuminori Kanaya

Arthritis 1 - Rheumatoid Arthritis, Eureka Room 2, March 12, 2020, 8:00 AM - 10:00 AM

In rheumatoid arthritis (RA) patients, the ulnar side of the wrist is most commonly affected with synovitis that destroyed ulnar ligament complex. Typical RA wrist deformity is characterized by volar subluxation of the extensor carpi radialis (ECU) tendon and volar subluxation and supination of the carpal bones that causes dorsal subluxation of the ulna known as caput ulna syndrome. This deformity develops slowly and causes extensor tendon rupture. Volar subluxation of the carpal bones is difficult to reduce by soft tissue procedure alone. Partial or complete wrist fusion can reduce volar subluxation of carpal bones, however, wrist motion is partially or completely lost. In RA patients, even a little motion is important to perform daily activities. Darrach procedure and Sauve-Kapandji procedure solves the distal radio-ulnar problem but volar subluxation of the carpal bones may progress with time. Patients with RA wrists usually referred when their finger extensors are ruptured. I performed Sauve-Kapandji procedure and extensor tendon repair combined with reposition of the ECU tendon. This procedure preserves some wrist motion with relocation of carpal bones especially in well controlled RA patients.
The changing spectrum of rheumatoid surgery

Dr Kevin C Chung

Arthritis 1 - Rheumatoid Arthritis, Eureka Room 2, March 12, 2020, 8:00 AM - 10:00 AM

With the introduction of biologic medications, the experience in caring for the rheumatoid hand is dwindling. I will share clinical and outcomes assessment experience in the care of the rheumatoid patient in optimizing their recovery of hand performance.
With a remarkable advancement in the pharmacotherapy of rheumatoid arthritis (RA), severely handicapped patients are very rare to see. In the clinical practice, more than 50% of the patients are in remission. In the patient with clinical remission, smoldering synovitis so called “silent destructor” is often detected by ultrasonography or by synovial histology in the small joints of the hand. Highly motivated patients, who concern about the appearance of the hand, hope to get a higher level of activities of daily living and quality of life (QOL). A prospective cohort study was performed for the purpose of knowing whether rheumatoid hand surgery affects the patient’s QOL and mental health as well as upper extremity function. A primary hand surgery was scheduled in 119 patients with RA. Synovectomy and Darrach procedure, radiolunate arthrodesis, reconstruction of the extensor tendons, arthroplasty at the metacarpophalangeal (MP) using Swanson implant, fusion at the proximal interphalangeal (PIP) joint, suspensionplasty at the carpometacarpal (CM) joint of the thumb (Thompson method) et al. were performed. As a result, Japanese version of the Stanford Health Assessment Questionnaire (J-HAQ: physical function, QOL), EuroQOL-5 dimension (EQ-5D: QOL), Beck Depression Inventory-II (BDI-II: depression, mentality) at 6 months and at 12 months after surgery improved significantly compared to those just before surgery (p < 0.01). Disease activity score 28- C reactive protein 4 (DAS28-CRP (4)) decreased significantly (p < 0.01). Latest hand surgery with tight medical control is possible to raise QOL and to provide mental wellness for the patient with RA.
Development and implementation of an evidence-based analgesia protocol for overnight admission hand surgery patients at a quaternary referral hand centre

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Free Paper 4 - TFCC, Eureka Room 3, March 12, 2020, 8:00 AM - 10:00 AM

Objectives: To develop an evidence-based, multimodal analgesia protocol to standardise analgesia prescribing for hand surgery patients, greater than 18 years of age, requiring admission overnight at The Sydney Hospital Hand Surgery unit.

Methods: An audit of analgesia prescribing for all adult post-operative hand surgery patients, requiring overnight admission was performed (n=130). A working group comprised of hand surgeons, anaesthetists, junior medical officers and clinical nursing staff was then formed to review the literature and practice conventions at our institution with the aim of developing a standardised analgesia protocol outlining optimal pre-operative, intra-operative, ward-based and discharge analgesia for hand surgery patients requiring overnight admission. The audit was repeated following implementation to assess compliance.

Results: A protocol was developed consisting of a pre-operative long acting block (regional or digital), intra-operative long-acting NSAID (Parecoxib), post-operative regular paracetamol and patient-requested opioid analgesia (Oxycodone). Designated discharge dosing of opioid analgesia and escalation algorithms for pain not controlled by the protocol were also developed. An audit assessing implementation showed a 70% increase in regular paracetamol prescription, an 8% decrease in patient-requested analgesia use in the post-operative period and a 13% decrease in analgesia prescribed on discharge. 94% of patients who participated in a questionnaire (n=53) stated that their post-operative analgesia was adequate.

Summary: The development of an evidence-based protocol for analgesia prescribing with adjunct escalation protocols for hand surgery patients at Sydney Hospital requiring admission overnight post-operatively, has resulted in standardisation of prescribing in the unit, decreased patient-requests for analgesia and decreased opioid prescribing on discharge.
Objectives: The current study investigated the anatomical features of the distal ulna, particularly the styloid process, to determine the correlation between the attachment of the radioulnar ligament and the styloid process.

Methods: We investigated the morphological features of the distal ulna of 12 cadaveric wrists using micro-computed tomography (micro-CT). We also visualized and measured the distribution of the cortical bone thickness. We histologically analyzed three specimens in the axial plane. We macroscopically analyzed seven specimens to examine the radioulnar ligament attachment to the styloid process.

Results: The distal ulna has the ridge on the dorsoradial aspect of the styloid process, which corresponded to the radioulnar ligament attachment. Micro-CT images after data processing revealed that the ridge of the styloid process corresponded to cortical bone thickening. Histologic analyses showed that the radioulnar ligament was attached to the middle and tip of the styloid process via the fibrous cartilage, with gradual changes in direction from dorsal to palmar.

Summary: Our study demonstrated that the radioulnar ligament was attached to the ridge on the dorsoradial of the styloid process, which was confirmed by the cortical bone thickening and the histology at the attachment sites. Our findings may provide the anatomical basis for the accurate diagnosis for the radioulnar ligament attachment on the styloid process.
Pain perception during the phases of manual reduction of distal Radial fractures using a periosteal block

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Free Paper 4 - TFCC, Eureka Room 3, March 12, 2020, 8:00 AM - 10:00 AM

Series of patients with distal end radius fractures who underwent closed manipulative reduction(CMR) using periosteal nerve block(PNB) and its efficacy in pain lowering effect during CMR is determined.

Methods:19 patients grouped based on the Frykman classification(FC). Reduction was done using a PNB(10ml of 2% lignocaine) injection. The severity of pain was recorded utilising Visual Analog Score(VAS) at 5 phases: 1)Before the injection, 2)After 15 minutes of analgesia infiltration in a resting position, 3)During minimal motion and manipulation, 4)During full manipulation and reduction of the fracture fragments and 5)Post procedure. The VAS scoring was grouped as painless(VAS=0), mild pain(VAS between 1-3) and painful(VAS 4 and above).

Results:19 patients included with a median age of 53 years (range 18-88 years) where 11(58%) males and 8(42%) females. Twelve(63%) patients sustained the fracture following a fall and 7(37%) patients following a motor vehicle accident. Group II(FC) had the highest number of patients at 7(36%) patients. It was significant reduction in pain for all phases . In different fracture configurations, there was no significant difference in pain reduction.

No patients had VAS 4 and above in phase 2, 3 and 5. Phase 4 was most painful, where 4(21%) patients had VAS 0, 12(63%) patients had a VAS between 1-3 and 3(16%) patients had a VAS 4. 16 out of 19 patients(84%) had no or minimal pain during the most painful phase.

Conclusions:PNB is new effective procedure providing good and satisfactory analgesia during CMR. It does not have the side effects and complications over sedation.
Simple, novel technique to create silicone vessels for microsurgical training

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Objectives
Microsurgical training requires dedicated practice. Numerous models have been developed, each with their own strengths and limitations. Our aim is to develop simulation vessels that are cost-effective, suitably realistic, simple to set up and store, with no biological hazards or regulations for their use.

Methods
Liquid silicone is first injected into a white straw. A 14G cannula needle is coated with liquid silicone and then inserted into the white straw. It is secured on both ends with black luer tip caps to ensure concentric placement. The vessel is left to set for approximately 4 hours, after which the silicone vessel can be easily removed from its mould. 25 medical students, trainees and qualified surgeons from a range of specialties reviewed the silicone vessels in comparison to a biological model. Ease of set up and storage, availability, cost-effectiveness, hygiene and realism was assessed on a 10 point Likert scale.

Results
Silicone vessels scored better than the biological model in all aspects except for realism. All the reviewers felt that the silicone vessels were of sufficient fidelity for day-to-day practice. The strengths of the silicone vessels are its practicality and low cost compared to biological models, and its realism compared to readily available substitutes described in the literature.

Summary
Silicone is a safe, inexpensive, widely available material, and can be used to create vessels for microsurgical practice. Silicone vessels are easy to set up and store, realistic enough for frequent practice, and are a practical alternative compared to biological models.
Arthroscopic TFCC repair- outcome in 42 patients

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Objectives
Triangular fibrocartilage complex (TFCC) injuries remain among the most common causes of ulnar-sided wrist pain. Treatment historically consisted of open exploration and repair; however, recently, arthroscopic-assisted and all-arthroscopic techniques have gained popularity. Our aim was to assess the outcome of all arthroscopic TFCC repair in terms of pain relief and early return to daily activities.

Methods
42 patients between July 2014 to Aug 2018 were selected for all arthroscopic TFCC repair. 10 were acute repairs within 6 weeks and remaining 32 were chronic repairs (10/42 did not remember the event of injury). 22/42 had DRUJ instability whereas others had ulnar sided wrist pain with difficulty in routine activities. Only Palmsers type 1b were included in the study. 3 patients with associated scapholunate injury were excluded. Wrist traction tower (Smith and nephew) was used. 3-4 portal was used as viewers and 6R as working portal. After TFCC debridement one outside–inside-outside transosseous stitch was used for the first 10 patients and a longitudinal capsular stitch was added along with transosseous stitch for the next 22 patients. Suture material used was 2’0 PDS. Post op above elbow splinting for 3 weeks and below elbow intermittent splinting for 3 weeks was done followed by physiotherapy for 4-6 weeks. Follow up ranged from 1 yr to 4 yrs.

Results
AROM and pain relief was satisfactory in all patients. DASH improved from 33 to 10.5 points and PRWE improved from 62 to 30 points.

Summary
All Arthroscopic TFCC repair has given consistently satisfactory results and early return activities.
The purpose of this study was to classify the patients according to the time of surgical treatment after trauma and to compare the treatment results to clarify the efficacy of surgical treatment in patients with old traumatic TFCC tears.

We reviewed 81 patients who underwent repair of TFCC Palmer 1B lesion between March 2011 and September 2017. Patients who received surgical treatment within 6 months after trauma were designated as group A (n=41), and those who received surgical treatment after 6 months were designated as group B (n=40). We measured postoperative clinical outcomes, such as range of motions (ROM) of wrist, the visual analogue scale (VAS) for pain, grip strength and Quick Disabilities of the Arm, Shoulder and Hand (Quick DASH) score and compared them between two groups.

Both two groups showed an overall improvement in wrist motion in all planes after surgery, except extension. A comparison of the clinical results between the two groups demonstrated that ROM of supination-pronation (group A: 163, group B: 149, p=0.037) and grip strength (group A: 75 lb, Group B: 63 lb, p=0.017) was better in the early repair. However, there were no statistical differences in ROM of flexion-extension (group A: 127, group B: 129, p=0.163), VAS for pain (group A: 1.8, group B: 2.1, p=0.489), Quick DASH score (group A: 11, group B: 13, p=0.430).

Not only in acute traumatic TFCC tears, but in old TFCC tears, satisfactory results can be obtained through surgical treatment – open or arthroscopic TFCC repair.
Does Injury Mechanism Affect TFCC Lesion Type?

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Free Paper 4 - TFCC, Eureka Room 3, March 12, 2020, 8:00 AM - 10:00 AM

Objective
Assessment of whether TFCC lesion type can be predicted based on injury mechanism.

Methods
Records of all TFCC repair surgeries undertaken between August 2018 and July 2019 by a single surgeon were examined. The radiocarpal lesion was classified as Class 1: intradisc, Class 2: radial border, Class 3: peripheral, and Class 4: degenerative. The DRUJ stage was based on the state of the RU ligament as Stage 1: fibrillation or slit, Stage 2: partial, Stage 3: elongation, and Stage 4: complete tear. Injury mechanisms were classified as single high grade trauma, single low grade trauma, repetitive stress, and unidentified.

Results
139 patients (84 male, 55 female) were operated on during the period. 20 had high grade trauma, 50 had low grade trauma, and 29 were a result of repetitive stress. 16 could not identify an event or activity.

Solitary Class 3 lesions, treated by capsular repair, accounted for 60-72% in the trauma groups but less than half in the unidentified group. Class 4 degenerative lesions, treated by ulnar shortening, were more prevalent in the repetitive stress or unidentified groups. In all three trauma groups, a similar proportion (24-28%) involved fovea lesions and required open or arthroscopic transosseous suture. An inability to identify a cause of injury did not necessarily indicate lesser lesions: a third had complete RUL tears.

Summary
Injury mechanism does not seem to be an indicator of lesion type. We recommend routine exploration with a DRUJ scope for all cases to determine treatment strategy.
Ultrasound evaluation of tendon disorder during hand therapy: Two case reports

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Hand Therapy B1 - Tendons, Sovereign Room, March 12, 2020, 8:00 AM - 10:00 AM

Introduction:
Recently, ultrasound evaluation has become common for superficial musculoskeletal structures in the field of orthopedics in Japan. However, there are few case reports describing ultrasound evaluation during hand therapy focusing on tendon disorders.

Objectives:
We will present two case studies detailing the use of ultrasound in tendon rehabilitation at our clinic.

Methods:
Ultrasound evaluation was used to determine gap length, presence of adhesions, and gliding patterns in two patients who had sustained traumatic hand injuries. One patient had sustained multiple fractures to his forearm, the other a flexor tendon rupture in his index finger.

Results:
The use of ultrasound helped with therapy management and goal setting. It guided treatment and helped achieve a successful outcome for both patients.

A 44-year-old male patient sustained multiple fractures to his forearm. After the second surgery, wrist contracture and limited thumb ROM were observed. Ultrasound evaluation revealed short gliding and adhesion tissue in the flexor pollicis longus (FPL). The wrist and thumb ROM improved after 5 months of hand therapy. FPL gliding also showed improvement on ultrasound. A 34-year-old male patient with a flexor tendon zone I rupture in his index finger was treated with 4-0 nylon sutures. We assessed the sutured tendon once a week by ultrasound. Twelve weeks after surgery, he recovered a good range of motion. The longitudinal view by ultrasound showed the tendon fibrillar pattern was in normal alignment.

Summary:
Ultrasound evaluation is useful for hand therapy to evaluate the tendons and identify potential problems with their rehabilitation.
Is relative motion extension splinting non-inferior and more cost-effective compared to dynamic extension splinting for extensor tendon repair in zone V-VI: A randomised controlled trial

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Hand Therapy B1 - Tendons, Sovereign Room, March 12, 2020, 8:00 AM - 10:00 AM

OBJECTIVES:
Relative motion extension (RME) splinting is a new method of rehabilitation for extensor tendon repair that is simpler and easier than the well-established dynamic extension (DE) splinting. To date no studies have directly compared the two.

METHODS:
This assessor-blinded, statistician-blinded, and partially participant-blinded pragmatic randomized controlled trial randomised 37 participants (94.6% male, mean age (SD) 39.5 (18.0) years) with extensor tendon repair in zones V-VI to either RME or DE. Total active range-of-motion (TAM%), Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH), Health-related quality of life (EQ-5D), Grip strength (Str%), Patient-reported satisfaction with outcome (SatO), complication rates, and cost-effectiveness were compared between groups at 6- and 12-weeks post-surgery. Non-inferiority analysis was carried out at the 5% level of significance, following the intention-to-treat principle. The trial was prospectively registered (ACTRN12615000425594)

RESULTS:
Preliminary results, adjusted for mechanism of injury (sharp vs other), concomitant injury (none vs any), and multiple-digit involvement (1 vs >1), demonstrated non-inferiority of TAM% (unadjusted differences -0.46; 95% CI 7.9, -8.8; adjusted 4.7; -17.4, 8.01) and Str% (unadjusted 10.5; 30.5, -9.4; adjusted 18.7; 40.8, -3.5) at 12 weeks. QuickDASH, EQ-5D, and SatO did not rule out clinically significant inferiority. Serious adverse events occurred for 5 participants in RME group (4 attributable to non-splint related events) and 1 participant in DE.

SUMMARY:
Our results indicate that RME may be non-inferior compared to DE for extensor tendon repair in zone V-VI involving one or two digits. We will present cost-effective findings in addition to clinical findings.
A surgeon-therapist team will discuss surgical and rehabilitation approaches that maximize the outcomes of flexor tendon repairs.
Postoperative hand therapy management of zones V and VI extensor tendon repairs of the fingers: An international inquiry of current practice

Ms Melissa Hirth

Hand Therapy B1 - Tendons, Sovereign Room, March 12, 2020, 8:00 AM - 10:00 AM

Introduction: Evidence supports early motion over immobilization for postoperative extensor tendon repair management. Various early motion programs and orthoses are used, with no single approach recognized as superior. It remains unknown if and how early motion is used by hand therapists world-wide.

Purpose of the Study: To determine if there is a preferred approach and identify practice patterns for constituents of International Federation of Societies for Hand Therapy (IFSHT) full-member countries.

Methods: Participation in this English-language Electronic Web-based survey required respondents to have postoperatively managed at least one extensor tendon repair within the previous year. Approaches surveyed included programs of immobilization, early passive (EPM), and early active (EAM) with motion delivered by resting hand, dynamic, palmar/interphalangeal joints free (IPJs), or Relative Motion extension (RME) orthoses.

Results: There were 992 individual responses (887 eligible) from 28 IFSHT member countries. The order of most used program was EAM (83%), EPM (8%), and immobilization (7%). The two most used orthoses for delivery of EAM were RME (43%) and palmar/IPJs free (25%). The RME orthosis was preferred for earlier recovery of hand function and motion. Barriers to therapists wanting to use the RME/EAM approach related to preference of surgeon (70%) and clinic (24%).

Discussion: In practice, many therapists select from multiple approaches to manage zone V and VI extensor tendon repairs. Therapists believed TAM achieved with the RME/EAM approach was superior to the other approaches.

Conclusion: The RME/EAM approach was identified as the favoured approach.
Objective
Early mobilisation has shown superior outcomes to immobilisation following flexor tendon repair. However, rupture rate is higher for FPL compared with finger flexors (Elliott 2012). There are limited published studies specific to FPL. (Sirotakova & Elliot 1999). This randomised pilot prospectively compared the outcomes of EAM with IM.

Materials and Methods
During 2016-2018 consenting participants who underwent a primary FPL repair were recruited. Surgery technique was standardised and participants randomised into EAM or IM group. Reviews were undertaken by a blinded assessor at 3 months post-op. The primary outcome was range of interphalangeal joint of the injured thumb using Buck-Gramcko score II (BG II). Secondary outcomes were White score, key pinch, grip strength, Quick-DASH, Patient Evaluation Measure (PEM) 2 and 3, modified Sollerman and complications, including rupture rate.

Results
The 3 months post op results for 36 participants (EAM n=18), (IM n=18) were: BG II (% excellent & good): EAM 61% (n=11/18), IM 67% (n=12/18); White (% excellent & good): EAM 44% (n=8/18), IM 44% (n=8/18); key pinch (mean kg): EAM 6.3, IM 6; grip (mean kg): EAM 31.8, IM 28.9; Quick-DASH (mean): EAM 27.1, IM 27.1; PEM2 (mean %): EAM 66.8, IM 66.4; PEM3 (mean %): EAM 76.5, IM 73.1; modified Sollerman (mean score): EAM 10, IM 10. There were no ruptures reported in either group.

Conclusions
This pilot revealed no statistically significant difference in outcomes between EAM and IMM and no ruptures in either group. The limitations of the pilot study and author’s findings will be discussed.
Reconstruction for chronic SL with DIC stabilized by RASL vs SwiveLock.

Prof Keiji Fuijo

Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

Interosseous SL Reconstruction for Chronic Scapholunate Dissociation augmented DIC stabilized by RASL vs SwiveLock as internal splint

Staged 3 or 4 of Scapholunate dissociation according to 5 questions is good candidate for reconstruction. Interosseous SL reconstruction as internal splint such as RASL and SwiveLock fixation would be hypothesized to maintain SL reduction and achieve engraftment and analyzed their results.

Partial DIC was transferred to dorsal portion of SL ligament. 12 patients were fixated by RASL using double thread screw, and 6 patients were fixed using fiber tape with SwiveLock as internal fixation. 12 cases of RASL were analyzed averaged followed up for 32.4 months. 6 cases of Swieve Lock system were analyzed averaged followed up for 15 months. The 3D kinematic analysis was performed after operation.

10/12 of RASL patients returned to previous occupation. 2 cases were converted to SwiveLock because of screw loosening. Breakage of double thread screw was occurred in 1 case. Postoperatively SL angle is reduced from 69 degrees to 40 degrees. SL gap is also reduced from 4.1 to 1.8 mm. There was no carpal collapse or progression to SLAC. 6/6 of SwieveLock patients returned to previous occupation. There was no progression of SL gap except for 1 case. SL angle is reduced from 72 degrees to 40 degrees. SL gap is also reduced from 5.3 to 1.2 mm. According to 3D analysis, normal scaphoid motion center axis is dorsal scaphoid. Distance between scaphoid apex and motion axis are different among normal, RASL, SwiveLock. Kinematics of SwiveLock was closer to normal than that of RASL.
Dynadesis: Treatment of Dynamic Scaphoid Instability, A 20-year Minimum Prospective Outcome Study

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Objective: To report on a prospective, 20-year minimum (range 20-27 years) study of a surgical treatment (Dynadesis) for dynamic scaphoid instability (DSI).

Method: Using a combination of dorsal and volar components, Dynadesis provides dynamic stabilization to the scaphoid by supporting the volar distal ligaments while simultaneously exerting a direct extension force on the scaphoid. Dorsal: Provides the scaphoid with an independent extension force by passing the extensor carpi radialis longus (ECRL) through a hole in the reduced distal scaphoid. Volar: Augments the volar distal scaphoid ligaments by creating a dynamic checkrein by anchoring the ECRL to the flexor carpi radialis, that tightens synchronously and simultaneously with contraction of the ECRL.

Results: Twenty patients (21 wrists) were treated with Dynadesis and followed for 20+ years. The average grip strength improved by 17 pounds and the average wrist flexion-extension loss was 3°. Wrist x-rays showed no radio-carpal arthritis. Functional outcomes were assessed using the Mayo Wrist Score. 81% reported excellent to good results with an average score of 89. Patients reported 90% improvement in pain with 76% reporting no pain. 100% of patients were satisfied with their results and would recommend the procedure.

Summary: We conclude that Dynadesis is an effective long-term treatment for patients with DSI (Garcia Elias stages I-III). We further confirm that long-term satisfactory results can be achieved and wrist osteoarthritis can be avoided without sacrificing wrist motion by using Dynadesis to treat DSI. Correct patient selection based on clinical staging and arthroscopic findings is essential to successful treatment.
The dorsal lunate bare area: clinical significance, identification, and management

Prof Mark Ross1,2,3, Dr Gregory Couzens1,2,4, Dr Scott Wolfe5

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Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
There is increasing interest in the importance of the dorsal capsular ligaments in stabilising the proximal row of the carpus, in relation to partial and complete intrinsic ligament injuries.

Methods
The attachment of both the dorsal intercarpal and dorsal radiocarpal ligaments to the dorsal aspect of the lunate was previously assessed in cadaveric dissections. We will discuss the imaging and arthroscopic findings, both in normal anatomy and in patients with disruption of this extrinsic capsular connection to the dorsal lunate.

Results
We previously confirmed the consistent and robust capsular connections to the dorsal lunate through cadaveric dissections. We examined MRI and arthroscopic assessments of these capsular connections in ligamentous injuries of the wrist and have documented the normal and the abnormal appearances where connections to the dorsal lunate have been disrupted.

We propose a technique for arthroscopically assisted reconstruction of the dorsal capsular attachment to the dorsal lunate. We propose the term RADICL procedure (repair/augmentation of dorsal intercarpal ligament). We will also discuss the need to consider re-attachment of this capsular disruption when performing any open intrinsic ligament reconstructions.

Summary
Growing evidence suggests that the extrinsic capsular ligaments may play an important role in proximal row stability. This warrants a more rigorous assessment of these capsular ligaments and their attachments to the proximal row. We propose that the extrinsic capsular ligaments should no longer be called the secondary stabilisers but rather the extrinsic stabilisers of the proximal row.
AIM reconstruction for scapholunate insufficiency - arthroscopic, isometric, modular. An anatomical study.

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Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
The dorsal scapholunate, volar STT, DIC attachment to lunate and long radiolunate ligaments have been characterised as critical stabilisers for proximal row stability.
We have designed an arthroscopic reconstruction incorporating elements from the Corella, ANAFAB and RADICL reconstructions with an additional mini-open STT reconstruction. The purpose of the design is to allow reconstruction of the four critical stabilisers, to improve isometricity of the dSL and vSTT ligaments and allow modularity.

Method
The design of the reconstruction is outlined and the rationale.
The reconstruction has been performed in two cadaveric specimens and found to be very feasible.

Results
The results are a proposed surgical technique.

Summary
The AiM reconstruction has been found to technically possible and applicable to clinical use.
Anatomy of the dorsal scapholunotriquetral ligament complex

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Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
Controversy surrounds the anatomy of the dorsal ligament complex of the wrist. The precise insertion points of the dorsal radiocarpal (DRC) and dorsal intercarpal (DIC) ligaments are debated. We describe the frequency and dimensions of the insertion sites of the DRC, dorsal scaphotriquetral ligament (DST) and DIC on the lunate.

Methods
Fourteen cadaveric specimens, average age 70.6, were imaged to confirm anatomy and alignment of the proximal carpal row. Wrists with arthritis or carpal malalignment were excluded. The DRC and DIC ligaments were visually inspected, photographed and measured in situ.

Results
The conjoined triquetral insertion of the DIC-DST and DRC measures 89.6±6.2 mm². The DST represented an inseparable deep subsection of the DIC, and had strong attachments to the lunate 65.0±28.3 mm², and scaphoid ridge 67.4±26.8 mm². The DRC consistently inserted on the lunate proximal to the DIC-DST over a smaller surface area, 29.3±27.6 mm². The DIC-DST is intimately integrated with the dSLIL.

Summary
We demonstrate a consistent insertion of both the DIC and DRC on the lunate, confirming Viegas’ findings. The DST was intimately related to the DIC. This may be better identified as the “dorsal scapholunotriquetral” ligament (DSLT). We believe that the DSLT represents the insertion of the DIC on the three bones of the proximal carpal row. The dorsal lunate ligament insertion zone is an important anatomic landmark to be respected in wrist surgery. Finally, unlike Viegas, we found the DIC had a consistent extension across the midcarpal joint to the trapezoid.
The biomechanical property of the capitohamate (CH) ligament is equivalent to the SL ligament. We reconstructed torn SL ligament using the bone-CH ligament-bone substitute.

Methods: Since 2008, 17 wrists of 16 patients with an age of 36 years (range 25 to 75) underwent this procedure with at least 1-year follow. There were 16 male and 1 female, 12 rights, 3 left and 1 bilateral wrists. Fifteen wrists indicated dissociation of SL joint gap more than 3 mm and two indicated complete SL ligament disruption with severe DISI deformity. K-wires were removed 8 weeks after the surgery and active ROM exercise began. We evaluated pain (VAS), wrist motion (angle), radiographic characteristics, such as SL gap (mm), SL angle, and modified Mayo wrist score.

Results: VAS was improved to postoperative 77 from preoperative 12. We obtained average wrist extension/flexion of 74/60 degrees. There was no ossification of reconstructed SL. SL gap was improved average 4.8 mm to 2.1 mm and SL angle was changed from 67 to 55 degrees. Modified Mayo wrist score was improved to 77 points postoperatively from preoperative 47. Clinical outcome was 8 excellent, 6 good and 3 fair with modified Mayo-wrist score.

Summary Points: We obtained excellent radiographic and clinical results of complete disruption of the SL ligament by reconstruction using bone-CH ligament-bone substitute.
ANAFAB - Anatomical Volar and Dorsal Repair for Scapho-lunate dissociation

A/Prof Michael Sandow

Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

The ANAFAB is a reconstruction to address scapholunate dissociation using an anterior and posterior approach with a hybrid synthetic tape/tendon weave between the trapezium, scaphoid, lunate and radius: an anatomical front and back (ANAFAB) repair. This repair is based on published kinematic evidence - the Stable Central Column Theory of Carpal mechanics.

This technique used a hybrid of a synthetic tape (Labral Tape, Arthrex, FL, USA) and tendon strip, without temporary Kirschner (K)-wire stabilization. Through the anterior incision, a double strand of the synthetic tape was attached to the anterolateral facet of the trapezium using an anchor. This tape, supplemented with an approximately 3mm diameter distally based strip of FCR tendon, was passed from the trapezium to the scaphoid tuberosity, transosseously to the dorsum of the scaphoid, transosseously from posterior to anterior through the lunate and then anteriorly to the radial styloid. Tension was applied to the tape and tendon construct to reduce the intercarpal joints, and it was then secured with an interference screw inserted from the posterior radius. All transosseous drill holes were 3mm in diameter. (woc.com.au/ANAFAB)

Patients were immobilized in a cast for 6 weeks, but no stabilizing wires were used. Ten patients have undergone the reconstruction and were assessed at a minimum 24-month follow-up. They achieved excellent realignment of the carpus, a postoperative median scapholunate gap of 3mm and a recovery of more than 75% of grip strength and range of motion. No patient required secondary surgery or treatment related to the carpal stabilization.
Proprioception in Rehabilitation of Low Grade Scapholunate Ligament Injuries of The Wrist

Mr Ben Bugden

Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

A stable and pain-free wrist is required for the performance of activities of daily living.

A wrist is stable when the ligaments, joint capsule, bony articulations and sensory motor system are intact.

In low grade scapholunate ligament injuries of the wrist literature indicates that conservative treatment incorporating sensorimotor (proprioception) rehabilitation may benefit this patient population.

This talk will review the literature for sensorimotor assessment and treatment of the wrist with a focus on low grade scapholunate ligament injuries.
Tailoring Treatment to Occupational Needs and Individual Pathology: The Interplay of Research and Practice for Wrist Biomechanics and Function

Dr Aviva Wolff

Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

In this brief presentation, the role of the wrist in upper extremity function and occupation will be highlighted through a review of kinematic studies of wrist biomechanics and function. Relevant findings will be highlighted to demonstrate how identification of patient expectations, self-identified functional limitations, individual occupational needs and individual pathology can be used to customize surgical and rehabilitation approaches for arthritic wrist conditions.
Post-operative rehabilitation of S-L repair

*Mrs Christina Harwood*

Combined Hand Therapy 1 - Scapholunate Ligament Injuries, Assessment, Conservative and Operative Management, Rehabilitation, Goldfields Theatre/Plenary, March 12, 2020, 10:30 AM - 1:00 PM

Which orthosis should patients wear post-op, and how many weeks should they keep it on? Is a DTM orthosis essential or is a wrist orthosis adequate? When should they start AROM and what exercises should be included. Can they ever return to heavy loading? A summary of the current literature will be used in addition to the speaker’s own experience to discuss the questions of rehabilitation post SL ligament repair.
As a reconstructive surgeon, some of us have been privileged to experience an age of enlightenment, a true revolution from darkness to light in one lifetime. But where are we now and where are we going?

Our explanations of “successful” attachments of body parts has progressed from miraculous, apocryphal, and probable to reality commensurate with advances in our scientific knowledge. The concurrent mastery of microvascular anastomosis and the sophisticated elucidation of skin vasculature heralded new reconstructive opportunities for the successful reattachment of body parts, for complex free tissue transfer and ultimately transplantation, the theoretical ultimate in reconstruction.

Health and Safety workplace reforms have reduced trauma so that the demand for replantation and its secondary reconstructions such as toe transfers is now rare. Over enthusiasm for microsurgical free tissue transfer is rebalancing and many equivalent defects are preferably repaired by better matching, simpler flaps based on pedicles and perforators. The transplant revolution has not come. Rates of transplantation are slowing, perhaps reversing, because of longer term complications and greater awareness of the critical need for patient compliance. At the same time prostheses are becoming more competitive.

The circle is forever turning and abandoned procedures such as lymphovenous anastomosis, scoffed at in their time, magically work again in the hands of the new believers. Toe transfers that “shouldn’t be done” in congenital hands now “function well”. Nerve transfers, described in 1906, are all the rage. The new frontier of stem cell-driven tissue engineering and salamander-like limb regeneration is still a land of hope but of less hype. As it always has been, enlightenment and progress are a complex amalgam of increased understanding and belief, not always based on science but spurred on by enthusiasm of entrepreneurs and the want to believe. The wheel of reconstructive hand surgery needs all of this input to continue to rotate and bring downstream riches.

This talk traces some of the steps in this fascinating wheel of fortune.
Outcome of Management of Hand Tumor

Prof Krishna Priya Das

BSMMU, Dhaka, Bangladesh

Background:
Tumors in the hand are relatively uncommon but 95% are benign and most surgeons encounter them infrequently. Tumors occurring in the hand and forearm often have unique growth patterns and potential for metastasis that may be different from those seen elsewhere in the body. Secondary metastatic tumour in hand are very rare (0.1%).

Method:
This prospective study was done from January 2004 to December 2018. We found 220 hand tumors in the hand unit department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Out of 220 patients, we found 190 benign hand tumor & tumor like condition and 30 malignant tumors. Out of 20 malignant tumor - synovial sarcoma was 14, osteosarcoma 04, fibrosarcoma 04, Ewings sarcoma 2, merkle cell tumour 01, chondrosarcoma 03 and pleomorphic rhabdomyosarcoma 01.

Results:
Out of 30 malignant tumors, all patient were treated with excision and chemo+ radiotherapy successfully but 6 patients were referred to higher centre due to recurrence and deterioration of hand function. Out of all the benign tumor, most of the cases recovered fully after excision but in neurofibroma with macrodactyly cases only partially relieved the symptoms.

Conclusion:
Hand tumor is uncommon and malignant tumor is very rare. But always keep in mind for early detection of malignant tumor because advanced malignant hand tumor management is very difficult even after amputation with multidisciplinary approach. Prognosis grim in malignant tumors but the long disease free interval is reported after adequate excision.
Three-dimensional printed custom-made endoprosthetic reconstruction after en-bloc resection in giant cell tumor of distal radius

Ms Vanasiri Kuptniratsaikul, Mr Pobe Luangjamekorn, Mr Pravit Kitidumrongsook, Mr Wittavat Chenboonthai

1King Chulalongkorn Memorial Hospital, Bangkok, Thailand

Objectives: Giant cell tumors of the distal radius treatment, especially at Campanacci grade II/III, are remarkably challenging in order to get an excellent outcome. En-bloc resection creates a substantial defect that commonly involve the articular area of the wrist joint. We propose a reconstruction technique with a custom-made distal radius prosthesis and evaluate early postoperative outcomes of 2 patients treated with this surgery.

Methods: Two patients diagnosed with giant cell tumor of distal radius with extensive articular invasion were included in this study. Three-dimensional printing techniques were used to design and form a custom-made distal radius prosthesis after preoperative prototyping with thin-slice computed tomography scan. After En-bloc resection and prosthetic replacement, both patients were evaluated based on clinical, radiological examinations, and complications.

Results: The mean resected length of radius was 5.5 cm before prosthetic reconstruction. At 6 months follow-up, average range of motion was 20° dorsiflexion, 10° palmar flexion, 10° supination, and 60° pronation. The postoperative radiography showed the distal part of the implant imitating the articular surface of the wrist joint. Average union time was 2 months. No complications were seen during this short-term follow up, such as wound complications, periprosthetic fracture, infection, or tendon ruptured from the implant.

Summary: Three-dimensional printed custom-made prosthetic reconstruction are an innovative and reasonable method that provided desirable outcome without postoperative complication. This surgical technique primary advantage is the anatomical reconstruction while avoiding donor-site morbidity. Further follow-up is needed to verify the long-term functional outcome and efficacy of this promising surgical technique.
Imaging of tumors, Red Flags

Dr Marcus Pianta

Imaging appearances of hand and wrist tumours can be extremely variable. This presentation identifies features that suggest an aggressive or high grade lesion and discusses characteristics that should flag a lesion for further evaluation. How similar pathology results can relate to varying radiology appearances is also briefly reviewed.
Adjuvant therapy for hand sarcomas

Dr Lisa Orme

Tumours 1 - Malignant tumours of the hand, Courtyard Room 1 and 2, March 12, 2020, 10:30 AM - 1:00 PM

Malignancies of the hand are rare in children and histologies differ to those see in adults. A selection of bone and soft tissue sarcomas will be discussed including Ewing sarcoma, rhabdomyosarcoma and desmoid tumour, focusing on pathophysiology, recent advances, current management, and future perspectives.
Vascularized fibula graft for long bone reconstruction after tumor resection

Dr Emmanuel Estrella

The purpose of this study was to present the outcomes of vascularized fibula grafting for long bone reconstruction after tumor resection.

A retrospective review of patients diagnosed with benign aggressive or malignant extremity tumors with post-oncologic long bone extremity defects reconstructed with vascularized fibula grafts was undertaken from 1993 to 2008 to determine clinical outcome, bone union and functional outcome. A total of 25 patients were included and eight had benign-aggressive tumors while 17 had malignant tumors. The average follow-up was 41 (SD, 32) months. Results showed a union rate of 84% (21/25). Revision surgery was done on seven patients (28%) to achieve union. Three patients had infections (12%), and only 2 grafts had fractured (8%).

The average length of the fibular graft was 18.22 ± 3.5 cm. Final union time for the grafts to unite was 10.4 ± 4.1 months. The average functional score using the Musculoskeletal Tumor Score in 20 patients was 83.4% (SD, 10.4).

In summary, the use of vascularized fibula autografts for long bone defects after tumor resection represents a valid option of reconstruction. Union rates are high and complication rates are manageable. Among the factors investigated, only graft union was significantly associated with the MSTS score. Patients whose graft united tend to have an MSTS score of 13.8 percentage points higher than those patients who had non-unions.
The Management of Malignant tumors of the hand

Prof Jihyeung Kim

Tumours 1 - Malignant tumours of the hand, Courtyard Room 1 and 2, March 12, 2020, 10:30 AM - 1:00 PM

Background: Malignant tumors occur very rarely in the hand. The purpose of this study is to present the clinical outcome of the patients who were diagnosed as malignant tumors in the hand and underwent surgery excision of the tumors.

Methods: From January 2000 to February 2019, eighteen patients with malignant tumors of the hand underwent surgical excision of the tumors in our institution. The average age at the time of surgery was 49 years. Among them, malignant melanoma was the most common (6 cases, 33%), followed by epithelioid sarcoma (5 cases, 28%) and squamous cell carcinoma (2 cases, 11%). The primary sites were thumb in four cases, little finger with/without ring finger in three cases, palm in nine cases, and dorsal side of the hand in three cases.

Results: Nine patients underwent amputation and the other nine underwent wide excision for the initial surgery. Of the latter nine patients, surgical wound was repaired using flap in three patients and skin graft in one patient. Using Kaplan-Meier survival curve analysis, the median survival time was 153 months.

Conclusions: When we have a plan to excise soft tissue mass, we need to evaluate the characteristics of the mass using ultrasonography or MRI. For the surgery of the malignant tumor of the hand, we should prepare the reconstructive surgery of the tendons and possibility of the flap surgery or skin graft. After surgery, we should consult medical oncologist and radiation oncologist if the patient needs adjuvant chemotherapy or radiation therapy.
Principles of tumour reconstruction in the hand

Dr J. Alexa Potter

Tumours 1 - Malignant tumours of the hand, Courtyard Room 1 and 2, March 12, 2020, 10:30 AM - 1:00 PM

Sarcomas represent a unique reconstructive challenge for the hand surgeon. The recurrence rate and survival from these tumours are dependent on clear resection margins. Given the proximity of multiple functional structures in the hand, tumour extirpation usually necessitates complex reconstruction to allow limb salvage with adequate function. An understanding of the various surgical options allows for both optimal planning of resection and reconstruction with good functional outcomes.
Objectives
Pollicisation of the index finger is an established procedure for treatment of congenital anomalies of the hand including Type IIIB-V congenital thumb hypoplasia, five fingered hands and ulnar dimelia. Comparing results is challenging due to disparate methods, timing and conduct of assessment. While functional performance following pollicisation is well reported in the literature, we aim to provide further insight into the patient and parent satisfaction with functional and aesthetic outcomes following surgery.

Methods
One surgeon performed 102 pollicisations in 88 patients between 1991 and 2016. Patient-Reported Outcome Measures (PROMs) were distributed to patients ≥8 years old and their families including the Patient Scar Assessment Scale, Function/Cosmesis Visual Analog Scale (VAS), ABILHAND-Kids, QuickDASH, and PedsQL (8-12 and 13-18 years) or SF36 (18+). Questionnaire scores were calculated and compared to available age-related normal values.

Results
At recruitment (January 2018), 78 patients (94 pollicisations) were ≥ 8 years old (median 18 years; range 8.2 - 36.1 years). Questionnaires were returned by 35 patients (45 pollicisations) with a median age of 15 years (range 8.3 - 31.8 years). Questionnaire scores were comparable to available age-related normal values. Questionnaire scores for which no normal values have been reported are included for comparison with current and future study populations.

Summary
Despite recognised functional limitations following pollicisation surgery, the majority of patients and their parents are satisfied with the aesthetic and functional outcomes. The development and application of consensus PROMs including patient and parent satisfaction is necessary for ongoing assessment and optimisation of congenital hand surgery.
OBJECTIVES
Metacarpal osteotomies are performed to correct deviation deformity in thumb polydactyly. We describe our experience of a suture-only technique of metacarpal osteosynthesis, without the use of K-wires.

METHODS
13 Wassel type IV thumbs and 1 type V thumb were corrected. Surgeries were performed at a mean age of 19 months (range 7 to 40). The mean follow-up was 33 months (range 7 months to 7 years).

Metacarpal bone fragments were sutured with Vicryl 5/0 or PDS 4/0. K-wires were not used. Soft bulky dressings were kept for 3 weeks.

Thumb X-rays were obtained at 1 and 2 weeks postoperatively to assess for bony displacement, and at 6 weeks to assess bony union. Charts were reviewed retrospectively for measurements of pre- and postoperative MPJ alignment. 10 patients were available for assessment with the JSSH score.

RESULTS
The MPJ alignment was anatomical (≤ 5° deviation) in 6 of 14 cases. The mean pre- and postoperative MPJ alignments were 28° (range 10 to 45°) and 8° (range 0 to 25°) respectively. There were no wound infections. Bony union was achieved at 6 weeks without displacement of the metacarpal fragments. One patient was scored (JSSH score) as excellent, 6 good and 3 fair.

DISCUSSION
The suture-only technique provides a strong and stable method of bony fixation for metacarpal osteotomies. The postoperative MPJ deviation in this series is comparable with other long term studies. We find that a soft bulky dressing is sufficient to splint the thumb.
Fanconi anemia and hypoplastic thumb

Dr Takehiko Takagi¹, Dr Sho Yanagisawa², Dr Atsuhito Seki¹, Dr Shinichiro Takayama¹, Dr Charles Goldfarb³

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Paediatrics 2 - The Thumb, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
Thumb hypoplasia is rarely associated with Fanconi anemia (FA), a severe blood disease. We evaluated patient data, including blood data from the time of surgery, to understand diagnostic tools for an early diagnosis of FA.

Methods
We investigated the prevalence of FA in 113 patients with thumb hypoplasia treated. We collected demographic data including age at initial surgery, gender, height, body weight, Manske classification for thumb hypoplasia, and blood data from the time of surgery. The patients with thumb hypoplasia and FA were compared to the group with thumb hypoplasia without FA.

Results
FA was present in five patients with eight affected thumbs. Seven of eight hands underwent surgeries at an average of 3.2 years of age. None of our patients were diagnosed at the time of surgery; the average age of diagnosis was 4.4 years. Of the five patients, all were of a short stature, and four patients had café au lait spots. The blood tests obtained prior to the initial surgery showed that the red blood cell and platelet counts were decreased in all five patients.

Summary
It is important to consider the possibility FA in patients with thumb hypoplasia. Short stature and café au lait spots should prompt consideration of a complete blood count to assess for low red blood cell and platelet counts which may also be found in FA patients. If these tests are concerning, patient referral for formal diagnostic assessment for FA may allow an earlier diagnosis and treatment for FA.
Satisfaction with Appearance in Children with Index Pollicizations for Thumb Hypoplasia

Brinkley Sandvall¹, Sara Atkins¹, Mr Bruce Johnstone¹, Mr Anthony Penington¹, Mr David McCombe¹, Christopher Coombs¹
¹The Royal Children’s Hospital, Melbourne, Australia

Paediatrics 2 - The Thumb, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
While literature analyzing functional outcomes after pollicization is robust, reports on appearance of the pollicized digit and hand are relatively sparse. The purpose of this study was to determine satisfaction with appearance in children with index pollicizations for thumb hypoplasia. Additionally, we compared outcomes by age and degree of radial longitudinal deficiency (RLD) and assessed impact on socialization.

Methods
Twenty-seven pollicized digits in 18 patients were evaluated at an average of 7.5 years after surgery. Patients, parents, surgeon, and independent assessors completed a 10-point Visual Analog Scale to assess happiness with appearance of the thumb and hand. Patients and parents also completed questions about socialization.

Results
The median patient-reported score was 9 (IQR 7-10), parent-reported 8 (IQR 8-9.75), and surgeon-reported 6 (IQR 5-8). Perceptions varied with age, with children 12 years and older tending to report and receive lower scores. In spite of this trend, differences between age groups were not statistically significant. Surgeon-reported appearance of the static hand versus the hand in use diverged based on severity of RLD, with types 1+2+3+4 RLD receiving poorer ratings compared type 0 RLD. Patients and parents reported mild noticeability to others and no difference in socialization. This was true regardless of age.

Summary
Satisfaction with appearance of pollicized digits and hands among patients, parents, and surgeon is quite high, albeit tempered during teenage years. Differences in appearance with use were often due to nontraditional patterns of use and compensations which became apparent with tasks. A positive outlook for socialization is supported.
What my Professors taught me on radial polydactyly

Darryl Chew

Paediatrics 2 - The Thumb, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

Paediatric hand surgeons are most familiar with Harry Wassel and his classification of radial polydactyly. Lesser known, however, is the Flatt classification. With more and more authors acknowledging the latter, this is a lesson on how one should “give proper attribution to coauthors and mentors”.

K-wires are routinely used to fix osteotomies when the skeleton is realigned. Many an unhappy look on the parents’ faces drove the search for a different technique. This gave birth to a new innovation - “stitching the bone”.

The line drawings seen in published papers do not always tell the truth. Joint surfaces often are not congruent after bones are combined in the Bilhaut-Cloquet procedure. Expect that joint mobility will be reduced. Except that a skilful surgeon would carefully carve and contour, much like the Italian sculptors do. This makes thumb reconstruction truly “a work of art”.

These are but some of the things my Professors taught me.
Blauth IIIB thumb hypoplasia is usually treated with pollicization of the index finger. In Asian countries, however, the parents are often concerned about the number of digits and may not consent to pollicization of the index finger. We are using non-vascularized toe phalanx transfer to create the first metacarpal and to stabilize the carpometacarpal joint of the thumb, so that we can salvage the thumb in type IIIB thumb hypoplasia.

We retrospectively reviewed 12 non-vascularized toe phalanx transfers in 12 children with Blauth type IIIB thumb hypoplasia. Stability and mobility of the thumb, lateral pinch power, and %thumb ray length was evaluated. Outcomes were also assessed using Functional Dexterity test and the Visual Analogue Scale for daily use of the operated thumb and for overall parents' satisfaction.

Age at operation ranged from 0.9 to 11 years. The follow up period was 7.6 years. Ten out of 12 cases underwent secondary reconstruction. All cases except one acquired good carpometacarpal stability. Thumb opposition was possible up to the little finger in 7, up to middle finger in 2, and not possible in 3 cases. The mean lateral pinch strength was 18% when compared to the contralateral normal side. The length of the thumb was 57% on average. Time required to complete the FDT was 220% of the contralateral side. VAS for appearance and function of the thumb was 76 and 70 respectively.

Thumb reconstruction with non-vascularized toe phalanx transfer provided satisfactory results in function and appearance in Blauth IIIB thumb hypoplasia.
The psychosocial impact of congenital hand and upper limb differences on children

Ms Lucy McDougall\textsuperscript{1}, Professor Tony Penington\textsuperscript{1,2,3}, Professor Christopher Coombs\textsuperscript{1,2,3}, Ms Joanne Kennedy\textsuperscript{3}

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Paediatrics 3 - What information do we need to make decisions, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

OBJECTIVES: To explore the concerns of children born with a congenital hand or upper limb difference (CHULD), including the psychosocial impact and positive aspects of living with a CHULD.

METHODS: Children aged 5 to 16 and their parents were recruited from the Australian Hand Difference Register (AHDR). Qualitative semi-structured interviews were conducted face-to-face with parent-child dyads. Interviews were audio-recorded, transcribed verbatim and coded. Thematic analysis was undertaken, with phenomenology the methodological framework.

RESULTS: 8 interviews were carried out (5 girls, 3 boys). Key themes included appearance, positive attributes, functional limitations and adaptation, social interaction and support. The degree of psychosocial impact was variable. Children as young as 5 years had unique and meaningful opinions about their CHULD. Some wished to alter their hand appearance, while others showed acceptance and even liked their scars. Children preferred independence, which encouraged functional adaptation. Around surgery is a time when unsolicited questioning tends to increase stress for children with CHULDs. Planned responses were a positive coping mechanism utilised by all children. Parents were sometimes unaware of the psychosocial impact of CHULDs.

SUMMARY: Despite stressors, children with CHULDs cope well, adapting socially and functionally. Children have meaningful opinions at young ages, which may differ from their parents. Health professionals should engage children in the decision-making process, and future research should include children as active participants. Extra psychosocial support may be required around the time of surgery. Positive outcomes should be emphasised when counselling families to provide hope and reassurance for future challenges.
Outcome measurement: What are we looking for?

Dr Richard Lawson

Paediatrics 3 - What information do we need to make decisions, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

The International Consortium for Health Outcomes Measurement (ICHOM) is a non profit organisation which aims to develop “Standard Sets” of outcomes measures which will allow valid comparisons between the outcomes of treatment at different institutions. The aim is to then take this data, make it accessible and transparent, and thereby to encourage underperforming institutions to improve, ultimately improving the standard of care for paediatric hand surgical patients around the world.

Drs McCombe and myself have been part of an ICHOM international working group aimed at establishing a Standard Set of core outcomes for Congenital Hand and Upper limb Malformation (CHULM) treatments. This is a challenging area for many reasons including the diversity of conditions treated and the involvement of both patient and carer in patient centred outcomes. The set was published in 2019 and a number of centres have begun implementing these outcome measures.

This talk will discuss the process of forming the ICHOM Standard set for CHULM, the current state of the project and the current status of implementation of the Standard Set. It will also touch on other current approaches to outcome measurement in paediatric hand surgery.
Shared Decision Making in congenital hand surgery: Is it the way it works or looks? Parent and youth’s perceptions of appearance and function

Dr Emily Ho

Paediatrics 3 - What information do we need to make decisions, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

The aim of congenital hand surgery is to improve the function and aesthetic appearance of the upper extremity to optimize the child’s ability to perform and participate in activities that are required and meaningful to their life situation. Parental and child report is essential to provide information regarding the child’s upper extremity function from a variety of environmental contexts that a single clinical observation cannot capture. Both physical and psychosocial factors should be considered since there are functional and aesthetic reasons for pursuing surgery. This presentation will discuss qualitative research that explores shared decision making between families and clinicians that elucidates functional and appearance-related concerns. Thematic results will be described that show how function and appearance-related concerns are intertwined and that differentiating function and aesthetic goals is critical to understanding the family’s expectations for treatment outcome.
Cosmetic considerations in childrens Hand surgery

Prof Chris Coombs

Paediatrics 3 - What information do we need to make decisions, Eureka Room 1, March 12, 2020, 10:30 AM - 1:00 PM

There are many challenges in children born with hand differences. Besides the management of the child, the family unit and of course the hand difference, striving to achieve the most functional outcome, one must also consider the appearance of the reconstruction. Attention to detail will result in superior outcomes. Placement of scars, skin grafts, positioning of digits and attention to soft tissue dimensions will result in superior outcomes. Examples will be presented to highlight important points.

Dr Claudia Gschwind, Ms. Jayne L. Yeomans
Royal North Shore Hospital, Lane Cove, Australia

Objective: To allow upper-limb surgeons interested in treating spastic disorders to learn how to use botulinum toxin as a therapeutic modality or as a pre-operative planning tool.

Methods: The technique of how to inject botulinum toxin and dosage and location in recipient muscles will be discussed.

Results: Some illustrative clinical cases are presented.

Summary: Upper limb surgeons engaging in the treatment of spastic conditions will be introduced to the application of botulinum toxin.
A study on psychosocial status of patients with global brachial plexus injury –Ganga Hospital Experience

Dr Hari Venkatramani, Dr Taurn Chabra, Dr Praveen Bhardwaj

Ganga Hospital, Coimbatore, India

Objectives: The purpose of the study was to study the psychosocial status of patients with global brachial plexus injury (BPI) and analyze factors influencing it.

Methods: Retrospective analysis of 49 patients with global BPI with minimum one year follow-up. Factors influencing it like function restored, age, education, time since injury, pain, involvement of dominant hand, associated injuries to other limbs, occupation, family support were studied. Depression was measured with Beck depression inventory score and Short form-12 score was used to assess mental and physical health. All parameters were correlated with psychological status. Descriptive statistics were reported as mean (SD) for continuous variable. Chi-square at 5% level of significance was used to find statistical significance. Fisher’s exact test is expected when cell count is less than 5. Data was statistically evaluated with IBM SPSS. Statistics for windows, version 20.0, IBM

Results: Though age is not statistically significant but clinically there is more trend towards depression between age 16-26 years. Education status also is not statistically significant; pain is statistically significant factor (p < 0.016) in relation to depression. Dominant hand involvement has more depression as compared to left limb involvement. There is no significant association between associated injuries along with global brachial plexus injuries. DASH score also does not correlated with depression scores. SF-12 mental component score had statistically significant association with mental status.

Summary: Global brachial plexus injury significantly affects the psychosocial status of a patient and neuropathic pain is the most significant factor affecting psychology.
Preventing tissue necrosis in hand infection

Prof Duncan Angus Mcgrouther¹, Dr Robert Yap¹, Dr Yong Chiang Kang¹, Dr Sze Ryn Chung¹
¹Singapore General Hospital, Singapore, Singapore

Free Papers 5 - Miscellaneous Brachial Plexus, Cerebral Palsy, Eureka Room 2, March 12, 2020, 10:30 AM - 1:00 PM

Preventing tissue necrosis in hand infection

Objectives
Abscesses, osteomyelitis and necrotizing fasciitis are different manifestations of tissue necrosis which is partly due to the invading organism and their toxins but the necrosis is also partly due to endogenous neutrophil degranulation. The need for drainage has been long appreciated but the role of dilution of exogenous and endogenous harmful molecules is a more recent concept. We describe our experience of continuous catheter irrigation in the management of infection in all potential spaces in the hand.

Methods
We describe our experience in 50 recent cases of hand infections treated by minimally invasive drainage and continuous irrigation using pump drivers. Physiological fluid has been delivered through paediatric feeding catheters or modified intravenous cannulae inserted into a variety of fascial spaces including flexor tendon sheaths, MP and PIP joints, subcutaneous and web spaces, midpalmar space and space of Parona. During irrigation active motion is encouraged. Irrigation is continued for 2-5 days until culture confirms that the patient is on an appropriate antibiotic.

Results
There has been a marked reduction in extent of debridement and return visits to theatre. Clinical outcomes are improved in comparison with historical experience.

Summary
We describe the technique of continuous catheter irrigation in the management of a variety of hand infections. The aim is to reduce tissue necrosis due to dilution of harmful exogenous toxins and neutrophil degranulation.
COMPARISON OF PRE OPERATIVE GRIP STRENGTH AND ELBOW FLEXION RECOVERY FOLLOWING OBERLIN TRANSFER IN UPPER EXTENDED BRACHIAL PLEXUS PALSY.

Dr Praveen Bhardwaj
1Ganga Medical Centre And Hospitals Pvt Ltd, Coimbatore, India

Objectives
The study aims at demonstrating the relationship of pre-operative grip strength with the post-operative elbow flexion recovery and identifying the factors correlating positively with improvement in elbow flexion following Oberlin transfer in patients with C5-C6 injuries and C5-C6-C7 injuries.

Methods
Data of 152 patients who underwent Oberlin transfer at our hospital between August 2013- August 2017 was collected retrospectively. This included the 31 patients with ‘weak’ hand who could be followed up for a minimum of one year. Of these, 29 patients had pre operative grip strength of less than 10kgs. Grip strength, pinch strength, power of elbow and finger flexion, and endurance were noted post-operatively. Functional scoring was done with DASH score. Statistical analysis was done with ANOVA and t-test analysis.

RESULTS
24 out of 31 patients (77.4%) recovered useful elbow flexion (MRC>=3). There was no statistically significant correlation between pre-operative grip strength with the functional outcome (p value – 0.068). Lateral pinch strength was found to be positively correlating with improvement in elbow flexion.

Summary
Good functional results could be achieved with Oberlin transfer even in patients with injuries extending beyond C5-C6 and 'weak' hand. We recommend, the intra-operative electrical stimulation of median and ulnar nerves (with 1mA current) and their response, as a guide to proceed with Oberlin transfer when distal contractions are noted or with other nerve transfers where no response is seen. Further studies are required to define the critical value of lateral pinch strength associated with improved elbow flexion recovery.
Elbow Flexion Deformity in Children with Birth Brachial Plexus Palsy- Analysis of its Cause and Prevention

**Dr Praveen Bhardwaj**¹, Dr S Raja Sabapathy
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Free Papers 5 - Miscellaneous Brachial Plexus, Cerebral Palsy, Eureka Room 2, March 12, 2020, 10:30 AM - 1:00 PM

**Objectives**
The study had two research questions:
Is the triceps weakness a cause of EFD?
Does the shoulder deformity and co-contractions contribute to it?

**Methods**
We analyzed 113 consecutive children with BBPP at their presentation to clinic for the presence of EFD. These children were assessed to analyze the cause or contributory factors to the deformity.

**Results**
We noted that 90/113 patients had elbow flexion deformity (79.7%) and in 48 children (42.5%) it was more than 30 degrees. The presence of shoulder abduction limitation, co-contractions of biceps-shoulder abductor and biceps-triceps significantly correlated with the presence and severity of elbow flexion deformity (p=<0.001, 0.002 and <0.001 respectively). Overall, the weakness of elbow extension significantly correlated with the presence of elbow flexion deformity (p=0.01). 46/113 children with motor power of 4 or 5 had an average of 30.11 degrees of deformity. The elbow flexion deformity was significantly lesser in 20 children who had early correction of the shoulder deformity.

**Summary**
- Elbow flexion deformity was noted in 79.7% of children who visited hospital.
- Children with weak triceps tend to have elbow flexion deformity more often, however, even the children with good triceps power could have elbow flexion deformity (46% in this series).
- Children with limited shoulder abduction and co-contractions between biceps and triceps and biceps and shoulder abductors are at risk of developing elbow flexion deformity.
- Early correction of the shoulder deformity may reduce the severity of elbow flexion contracture in these children.
Brachial plexus injury is a severe peripheral nerve injury affecting upper extremities, causing functional damage and physical disability. The most common cause is a traffic accident. BPI incomplete type is affected C5 C6 or C5 C6 C7. The patients are not able to flex the elbow – extend the elbow (for C5 C6 C7) and also abduct the shoulder joint.

Neurotization is the gold standard for therapy. To overcome the inability flexion the elbow is neurotization to musculo cutaneous nerve. Neurotization to the muscle branch to biceps of the musculocutaneous nerve from the ulnar nerve, fascicle to the FCU. Later neurotization to the muscle branch to brachialis of musculocutaneous nerve from the median nerve, fascicle to the FCR.

We overview modified Oberlin procedure in brachial plexus injury patients at Rumah Sakit Ortopedi Prof. dr. R. Suharso Surakarta Middle Java Indonesia from January 2015 – December 2018. 19 patients brachial plexus injury upper type, 13 men and 6 women, mean age is 30.3 years old, common age is at productive age. Average starting flexion the elbow is 6.8 months, with the motoric power (BMRC) are 3, 4 and 5.

Neurotization is the gold standard therapy for Brachial plexus injury, and is a new hope for overcome inability flexion the elbow.

Keywords: Brachial plexus injury, incomplete type, neurotization, modified Oberlin

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Outcome of Flexor Carpi Ulnaris to Brachioradialis transfer for restoration of forearm supination

Dr Praveen Bhardwaj
2Ganga Medical Centre And Hospitals Pvt Ltd, Coimbatore, India

Introduction: Lack of active supination is quite a disabling problem for patients with paralytic forearms, especially of the Indian Subcontinent, to perform social activities that require active supination of forearm and eating.

Methods: A total of twelve patients with deficiency of supination of dominant forearm due to various etiologies with good hand function underwent the procedure of transfer of flexor carpi ulnaris tendon to brachioradialis tendon in order to restore active supination. Six patients were birth brachial palsy patients while four patients were adult brachial plexus injury patients who underwent nerve transfers but had lack of supination. Assessment of the patients was done by noting range of motion of active and passive supination and functional abilities of the patient using the scoring system by Anderson GA for a minimum three years follow-up period.

Results: Our study revealed good to excellent outcome (with scores seven and above) in all patients with a resultant gain of 81 degrees in active supination with no significant change in forearm pronation.

Conclusion: In patients with good hand function and in whom Flexor carpi ulnaris tendon is not required for any other reconstructive surgery, procedure of flexor carpi ulnaris to brachioradialis transfer is a reliable surgery in order to restore active supination. This allows the patients to eat and carry out social activities without limiting forearm pronation, thus being an excellent surgery with satisfactory results for the patients and parents.
Decision Making in Birth related brachial plexus injuries - Where is the controversy?

**Dr BHARATH KADADI**

*Bengaluru Hand Centre And Manipal Hospitals Bangalore, Bangalore, India*

Objectives
Neonatal brachial plexus palsy has an incidence of 1 to 2 per 1000 live births making this a frequent occurrence. Those infants who do not have spontaneous recovery by age 3 months will have permanent limited range of motion, less strength, and a decrease in size and girth of the involved extremity. Although there is enough literature as to the timing of nerve repair, there exists controversy about the exact indications and timing of exploration. It is common in our scenario to see patients with OBPI presenting at 18 months and above. The options for these children are limited. The treatment options for children born with shoulder and elbow dislocations is limited. The objective is to develop a protocol and address the controversies in the management.

Methods
A total of 155 cases from Jan 2008 to June 2016 were evaluated and treated. 42 cases of primary nerve procedure, 66 cases of muscle transfer, 27 cases of combined nerve and muscle transfers was performed by the same surgeon. The surgery chosen was based on the timing of presentation and preoperative mallet and Toronto scores. 20 patients refused surgery. Those who refused surgery were also followed up. Minimum follow up was 2 years.

Results
There was improvement in mallet and Toronto scores in all operated patients.

Summary
The controversies in the management of these children in terms of timing, options in delayed presentations, decision making in partial palsies, age limit for nerve grafting and nerve transfers has been discussed with illustrations and a protocol developed to fill the lacunae regarding controversies.
New strategy for adult total arm-type brachial plexus reconstruction using two-stage free functioning muscle transfer

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Objectives:
In the present study, we introduce a new treatment strategy using a single gracilis free functioning muscle transfer (FFMT) to restore elbow and finger flexion as a first-stage surgery. After a longer observation period, the second stage surgery with wrist and finger tenodesis or restoration of finger/wrist extension with another single gracilis FFMT then was performed.

Methods:
The study included 14 male and 4 female patients, who suffered from a total arm-type BPI. All patients received a first-stage surgery with a gracilis FFMT to restore elbow flexion and finger flexion and multiple nerve transfer, including phrenic nerve to suprascapular nerve, intercostal nerves to radial nerve, to restore shoulder and elbow extension function. After 1.5 to 2 years observation, further second FFMT or tenodesis was performed to restore hand extension function as second stage surgery.

Results:
There were 83.3% of patients obtained a ≥M3 shoulder recovery, 94.4% of patients obtained a ≥M3 elbow flexion recovery, 61.1% of patients obtained a ≥M3 elbow extension recovery, and 72.2% of patients obtained a ≥M3 hand flexion recovery.

Summary:
Our treatment strategy provides a comparable result in treating total arm-type BPI with limited donor site complications. Simultaneous restoration of elbow flexion, finger flexion at the first-stage surgery, followed by a longer interval before the second stage surgery may provide a more ideal approach to achieve the prehensile shoulder, elbow and hand function.
Comparison between with or without axillary nerve neurotization for the management of upper brachial plexus palsy

Prof Krishna Priya Das

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Objectives / Interrogation: Restoration of elbow flexion & shoulder abduction is the aim in the treatment of upper brachial plexus injury. Intraplexus surgery is the mainstay of treatment but most of the time is not possible. Our objective is to assess the result of neurotization for the management of upper brachial plexus palsy.

Methods: From January 2014 to June 2019, we have operated 48 cases of upper brachial plexus palsy cases, duration >3 months with C5, C6 ± C7 root avulsion or disruption close to the foramina. Age <60 years old. SAN to SSN transfer and double fascicular neurotization of MCN was done in all cases. Axillary nerve neurotization was done in 16 cases out of 48 patients.

Results and Conclusions: Among 48 patients, 45(93.75%) was male & 3(6.25%) was female, with the mean age of 24.8 years, mean time from injury was 4.8 month & mean follow-up was 18 months (range 6 to 48 months). With double fascicular neurotization of MCN(Oberlin-II), Grade M4 elbow flexion was restored in 45(93.75%) cases remaining 3(6.25%) patient elbow flexion power was M3 and age of those patients was >45 years. We achieved mean shoulder abduction 90° (range 50° to 110°) in those patients who are treated only SAN to SSN neurotization procedure but neurotization of SSN and axillary nerve case mean shoulder abduction was 110°(900-1700). Our results elbow flexion and shoulder abduction were muchly improved in neurotization of axillary nerve.

Keywords: Axillary nerve, fascicular, neurotization.
Blind technique of marginal osteophyte excision for mucous cysts accompanied with Heberden’s nodes

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Objectives
Excision of the dorso-lateral osteophytes and capsule of DIPJ including the stalk of the cyst has been a standard technique of treatment for the mucous cysts accompanied with Heberden nodes. Although curative effect of the technique is reliable, skin incision has to be changed in consideration of the size and the location of the cyst, for avoiding a risk of skin necrosis over the DIPJ. For standardizing the procedure not influenced with the character of the cyst, blind lateral approach through small incision is devised.

Methods
From 2007 to 2019, blind technique of marginal osteophyte excision was conducted for 33 cases (36 fingers) of the mucous cysts accompanied with Heberden nodes. The patients consisted of 9 men and 24 women and their mean age was 64.3 years. Operation was performed under local anesthesia. The small skin incision (3-5mm) on the lateral side of the DIP joint is made. The dorso-lateral osteophytes and capsule of DIPJ is curetted blindly through this small incision. When jelly-like liquid is drained out and tense of the cyst is reduced, the stalk of the cyst is enough broken and the operation is finished with single skin suture. The mean follows up period was 17.6 months.

Results
There was no case of the recurrence in all cases.

Summary
The blind technique for treatment of mucous cysts is quite simple. It does not need to consider the skin incision according to the variety of character of the mucous cyst in each case.
Pepper potted composite fingertip grafts; a working technique

Dr Louise Thomas¹, Mr Duncan Bayne¹
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Objectives
Following distal paediatric fingertip amputation composite grafts have been used for their reconstruction. Unfortunately most composite grafts fail or at best partially survive to function as a biological dressing whilst healing. A cause of full thickness graft failure is bleeding and sub graft haematoma the senior author hypothesised that this may also be the mechanism of failure seen with composite grafts given their appearance at wound checking.

The aim of this study was to increase composite fingertip graft take by using a novel approach to prevent haematoma accumulation under the graft.

Methods
All paediatric patients presenting with a fingertip amputation who had adequate fingertip preservation underwent a composite graft using our pepper pot technique. The graft was minimally defatted and fenestrated through full thickness of the graft using a 2mm punch biopsy to produce “the pepper pot” appearance. The graft was attached loosely with 5.0 vicryl rapide interrupted sutures and a standardised dressing was applied. Patients took oral antibiotics until reviewed at two weeks post-operatively.

Results
Six patients between the ages of two and fourteen were included in the study. All of the pepper pot composite grafts had 100 per cent take with no evidence of haematoma at review two weeks post-operatively.

Summary
We describe an innovative technique for the composite graft for fingertip injury. The pepper pot composite graft technique was highly successful in our case series and offers a viable alternative to standard composite grafting.
Strategy for the parrot beak deformity of nail

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Objectives: “Parrot beak deformity of nail” is a morphologic change of the nail plate characterized by excessive forward curvature. Hand surgeons often encounter it after fingertip injuries, but appropriate methods for parrot beak deformity has not been established. In our approach, the reconstruction process has been divided into three steps: skin flaps, nail bed grafting and bone grafting. We choose all or some of three steps for each type of injury. We report our strategy for the parrot beak deformity of nail. Methods: Fourteen parrot beak deformities were treated according to our strategy between 2010 and 2019. Of the all patients, 12 were male and two were female. Their ages at surgery ranged from 16 to 58 years. Six in the 14 are thumbs. Results: We performed skin flaps for all the cases. The skin flaps were extended palmar flap advancement or reverse digital artery flaps. Nail bed grafting were performed in nine cases harvested from their great toes, and bone grafting were performed in 10 cases harvested from their second toes. All of the skin flaps and bone grafting were survived. In only one case, we needed nail grafting two times. Nail deformities were improved in all cases, and there was no complain of morbidity at the donor sites. Summary: Parrot beak deformity of nail is variable in degree of the deformity. We suggest that it’s the most optimal strategy for parrot beak deformity to choose from the three steps according to degree of their deformities.
Total joint replacement (TJR) arthroplasty for base of thumb arthritis: A systematic review

Dr Dasun Ganhewa, Dr. Rui Wu, Dr. Michael Chae, Dr. George Miller, Dr. Vicky Tobin, Prof. Julian Smith, Prof. Warren Rozen, A/Prof. David Hunter-Smith

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Free Papers 6 - Finger Tip Injuries, Osteoarthritis, Eureka Room 3, March 12, 2020, 10:30 AM - 1:00 PM

Objective:
The current review evaluates the complication and failure rates of total joint replacement (TJR) for base of thumb arthritis.

Method:
Performed according to PRISMA guidelines. All articles reporting on TJR were included, except case reports. Complication and failure rates were derived as per the Australian Orthopaedic association national joint replacement registry; to show complication and number failed per 100-implant years. Implants with higher than anticipated failure rates were identified if failure exceeded twice the overall combined failure rate.

Results:
A total of 47 articles were included, (1 article was level I, 9 level III, 37 level IV), 18 different TJR and 2352 arthroplasties performed in 2231 patients were identified, 67% female, and 60% on the dominant hand. The mean age of the patients ranged from 54 to 71 years. The mean length of follow up ranged from 12 to 228 months.

Complication rate per 100-implant years were: Aseptic loosening (0.143), Dislocation (0.045), Persistent pain (0.020), Peri-prosthetic fracture (0.012), Foreign body reaction (0.005), Implant subsidence (0.005), Fracture of implant (0.004), Infection (0.003), Subluxation (0.002), Osteolysis (0.002), and Periprosthetic ossification (0.002). The overall combined failure rate of TJR was 0.238 per 100 implant-years.

Summary:
The evidence supporting the use of TJR arthroplasty can be improved by means of prospective studies with long term follow up and implant registries. The most common complications leading to implant failure were aseptic loosening, dislocation and persisting pain. Implants identified as having higher than anticipated rates of failure should be avoided or used with caution.
Finger tip reconstruction with composite graft and cross finger flap in type IV amputations

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Objectives / Interrogation: Finger tip amputations remain a challenge to the reconstructive hand surgeon to restore the lost nail bed. Reimplantation is ideal but may not be possible in all occasions of amputation at terminal phalangeal level.

Methods: A novel method of finger tip reconstruction was performed using a composite graft of nail bed and sliver of terminal phalanx with a cross finger flap. The procedure was carried out in a series of patients and the results were analysed.

Results and Conclusions: We would like to present our indications for the procedure, technical considerations of the reconstructive surgery and discuss the results and functional outcome of this reconstructive option.
Outcomes and impact of fingertip amputation injuries in a local tertiary hospital in Singapore

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Free Papers 6 - Finger Tip Injuries, Osteoarthritis, Eureka Room 3, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
Fingertip amputation injuries are common with treatment of these injuries by conservative or surgical means. These relatively small injuries also result in a high economic burden due to loss of productivity and disability.

The aim of this study is to demonstrate the outcomes and the economic burden of three different treatment options for fingertip amputation injuries.

Methods
This is a prospective study of patients who received treatment for fingertip amputation injuries at a tertiary hospital in Singapore. Patients were randomly assigned to receive treatment with either semi-occlusive dressing, acellular dermal matrix or locoregional flap coverage.

The clinical and functional outcomes, demographic data, occupation and cost of treatment were collected and an estimation of economic costs was performed.

Results
There were 30 patients and 30 digits, with 10 patients in each treatment modality. All were male, 75% were foreign workers. The average follow-up was 12 weeks.

Patient who received acellular dermal matrix took the longest time to heal and had the longest return of sensation, whereas patients who received locoregional flap coverage was the fastest at an average of 2 weeks.

Functional outcomes and return to work revealed no significant difference between groups. Costs of treatment was higher in the surgical intervention group, although the economic burden remained high for all 3 groups. Cost analysis will be presented.

Summary
In conclusion, fingertip injuries are common and although the outcomes are acceptable, these injuries result in significant economic burden. Semi-occlusive dressing is a treatment modality that can potentially reduce healthcare costs.
Surgery for Trapeziometacarpal Joint Osteoarthritis: A Systematic Review and Meta-Analysis on Efficacy and Safety

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Objectives:
The primary objective was to assess the safety and efficacy of trapeziometacarpal surgical interventions and therein, evaluate whether any superiority exists among the available interventions.

Search Methods:
A systematic search of MEDLINE (2014-2019), EMBASE (2014-2019), CINAHL (2014-2019) and CENTRAL (2014-2019) databases was carried out. Abstracts were screened for relevant studies. Randomised controlled trials were only considered.

Main Results:
Eight studies were included in the quantitative synthesis. The procedures evaluated are: Trapeziectomy (T), trapeziectomy with ligament reconstruction (T + LR), trapeziectomy with ligament reconstruction and tendon interposition (T + LRTI), trapeziectomy with allograft suspension (T + ALS) and joint arthrodesis (A). Low-moderate quality evidence suggests that T + LRTI yields better range of movement (palmar abduction) when compared with (T) alone; (SMD 0.61, 95% CI 0.22 to 1.00, random-effects, P = 0.002). Comparing adverse events showed that arthrodesis carries a greater risk of adverse events when compared with T + LRTI; (RR 0.33, 95% CI 0.17 to 0.61, random-effects, P = 0.0005). In addition, T + LRTI is preferred over arthrodesis by patients (OR 0.29 95% CI 0.09 to 0.95; P = 0.04). This difference was no seen in the other comparison groups.

Conclusion:
It is difficult to declare with any degree of certainty which procedure offers the best functional outcome and safety profile. Results suggest T + LRTI yields good postoperative range of movement. Arthrodesis demonstrated an unacceptably high rate of moderate-severe complications and should be considered with careful consideration.
Gender and age differences in thumb carpometacarpal joint kinematics: a quantitative four-dimensional computed tomography study

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Free Papers 6 - Finger Tip Injuries, Osteoarthritis, Eureka Room 3, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
To examine the effect of gender and age on the kinematics of the normal thumb carpometacarpal joint during opposition and abduction.

Methods
The thumbs of 16 healthy subjects evenly distributed across two age and two gender groups were scanned during the motions of abduction and opposition using four-dimensional computed tomography. The rotational kinematics of the first metacarpal were described relative to the trapezium using helical axis of motion variables. Joint proximity was analysed by calculating minimal inter-bone distances between the trapezial and metacarpal articular surfaces. Ligament recruitment was modelled using the minimum path lengths between insertion sites.

Results
Joint proximity patterns was found to not vary with gender or age. Ligament recruitment at the thumb carpometacarpal joint also did not appear to vary with gender or age. These findings suggest additional pathological factors other than female gender and older age predispose to thumb carpometacarpal joint osteoarthritis.

Summary
This study examined the effect of gender and age on normal thumb carpometacarpal joint motion, while also providing a normative baseline for future evaluation of arthritic and surgically-treated joints.
Clinical outcomes of thumb metacarpophalangeal joint arthrodesis with the XMCP™ intramedullary fusion device

Dr Libby Anderson1,2,3, Dr Benjamin Hope1,2, Ms Louise Lee1, Ms Ruby Strauss1, Dr Gregory Couzens1,2,4, Prof Mark Ross1,2,3

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Free Papers 6 - Finger Tip Injuries, Osteoarthritis, Eureka Room 3, March 12, 2020, 10:30 AM - 1:00 PM

Objectives
Several techniques are available for thumb metacarpophalangeal joint (MCPJ) arthrodesis. We hypothesised that the Extremity Medical XMCP™ Intramedullary Fusion Device (Extremity Medical, Parsippany, New Jersey, USA) yields reliable and satisfactory results.

Methods
22 thumbs (21 patients) underwent MCPJ arthrodesis with the XMCP™ device for various diagnoses including osteoarthritis (n=9), post-traumatic arthritis (n=5), rheumatoid arthritis (n=4), psoriatic arthritis (n=2) or systemic lupus erythematosus (n=2). Mean age at surgery was 64 years (range 49 – 84). Patients with follow-up equal or greater than 5 months (n=17) were assessed for pain and satisfaction, Patient-Rated Wrist and Hand Evaluation (PRWHE), QuickDASH and Global Rating of Change (GRC) before surgery and at an average of 23 months (5 – 60) post-surgery. Range of motion, grip and pinch strength were recorded before surgery and at 19 months (5 – 60) post-surgery. Data are reported as mean (standard deviation).

Results
Pain decreased from 39/100 (25) to 15/100 (17) and satisfaction increased from 15/100 (18) to 89/100 (16). PRWHE and QuickDASH improved from 52 (22) to 23 (19) and from 47 (18) to 27 (23) respectively. Median tip-to-tip and lateral pinch strength increased from 1.7 kg (1.1) to 3.3 kg (1.9) and from 2.7 kg (1.6) to 4.3 kg (2.5). Range of movement was satisfactory maintained. Complications were limited to one patient who underwent a partial fusion for pre-existing SLAC wrist one year after thumb fusion.

Summary
The data indicate that this device is safe and effective but confirmation will require longer term follow-up.
Arthroscopic trapezial hemiresection and suspensionplasty for trapeziometacarpal osteoarthritis with dorsal dislocation

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Free Papers 6 - Finger Tip Injuries, Osteoarthritis, Eureka Room 3, March 12, 2020, 10:30 AM - 1:00 PM

(Objectives) To present the medium term functional and radiological outcomes of arthroscopic partial trapezial resection and tendon suspension arthroplasty for trapeziometacarpal (TMC) osteoarthritis with joint subluxation or dislocation.

(Methods) Since 2010 to 2018, we have conducted arthroscopy assisted surgery for 120 consecutive patients with symptomatic TMC osteoarthritis. Of these patients, there were 10 patients who had more than 50% of TMC joint subluxation or dislocation in dorsal direction. Treatment consisted of arthroscopic trapezial hemiresection and partial abductor pollicis longus (APL) tendon suspension by pulling out the tendon into the second metacarpal base. At a minimum of 6 months and 4 years after surgery, Disabilities of the Arm, Shoulder, and Hand (DASH), pinch strengths, thumb subluxation ratio by lateral x-ray, and thumb range of motion (ROM) were evaluated.

(Results) Average follow-up period of 10 patients was 56 months. Preoperative subluxation ratio averaged 72 % (range: 50-110%), immediate post-op ratio was 30 % in average (range: 5-45%), and the ratio at final follow-up (averaged 5.8 years, ranging 4-7 years) averaged 22 % (range: 2-35%). Postoperative functional outcomes of DASH and pinch strength improved significantly, and thumb ROM was not significantly improved compared to the preoperative value.

(Summary) Arthroscopy assisted minimum invasive surgery provided a feasible medium-term functional outcome for TMC osteoarthritis with joint subluxation or dislocation. Adequate reduction of joint subluxation was possible to achieve by preserving capsuloligamentous structures in arthroscopic procedure and tendon suspension effect.
Comparison of Functional Outcomes in Limited Carpal Fusions and Proximal Row Carpectomy.

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Wrist 4 - Limited Wrist Fusions. Pearls and Pitfalls. How To Get Them To Work., Goldfields Theatre/Plenary, March 12, 2020, 2:00 PM - 3:30 PM

Posttraumatic or degenerative conditions of the wrist have a serious functional impact on patients daily activities and quality of life. Proximal row carpectomy or different types of limited wrist fusions are methods preserving mobility of the wrist joint.

We are presenting a retrospective study of the results, evaluating outcomes of several types of the open carpal surgeries, performed in Microsurgery Centre of Latvia. Patients were recruited from January 2014 till December 2018. We have performed 75 surgeries (20 female and 55 male patients), 29 - 75 y.o. - 9 proximal row carpectomies, 22 scaphoid resections following four corner fusions, 22 scaphoid resections following luno-capitate fusion and 22 different combinations of resections and fusions.

The follow-up period was 1 to 5 years. The results of treatment were assessed with X-ray examinations, subjective evaluation using Patient-Rated Wrist Evaluation (PRWE) score, Modern Activity Subjective Survey of 2007 (MASS07) score, Lyon Wrist Score and DASH score. Grip/Pinch/Tripod-Pinch strength and range of motions were also measured.

Results. Patients with proximal row carpectomy have better overall range of motion than patients with limited carpal fusions. Patients with luno-capitate fusion have higher risk of complications - we have found 4 cases of nonunions and 2 cases of hardware migration requiring secondary surgery. In four corner fusion group we have found only 1 complication resulting in revision.

Summary. Overall subjective and objective results (including PRWE, DASH and Lyon wrist scores) revealed better results with proximal row carpectomy and four corner fusion than other surgeries.
Dart Throwing Motion: A clinical comparison of four-corner-fusion to radio-scapho-lunate fusion using inertial motion capture

**Dr Sina Babazadeh**, Mr Kevin Eng, Mr Ferraby Ling, Dr Trieu Pham, Dr Nhan Nguyen, Professor Pubudu Pathirana, Professor Richard Page

1 Australian Orthopaedic Research Group, Kew East, Australia, 2 Deakin University, Geelong, Australia, 3 Barwon Health, Geelong, Australia

**Wrist 4 - Limited Wrist Fusions. Pearls and Pitfalls. How To Get Them To Work.**, Goldfields Theatre/Plenary, March 12, 2020, 2:00 PM - 3:30 PM

Objectives:
To determine the normal range of dart-throwing motion (DTM) and compare the postoperative range of DTM between patients undergoing radioscapoholunate (RSL) fusion and four-corner (4CF) fusion using a unique inertial measurement device.

Methods:
A unique validated intertial measurement device was used to initially measure range of DTM in healthy control patients and subsequently in patients who had previously undergone RSL fusion and 4CF. DTM was measured in both unrestricted (throwing a dart at dart-board) and restricted (elbow and shoulder restricted using a custom made block) motion.

Results:
Twenty-four volunteers (28 wrists), five RSL fusions and 10 4CF were assessed. There was a significant difference in between the control group and both surgical groups (P=0.001). There was no significant difference in DTM between surgical groups (p=0.222). There was no significant difference in range of motion between the operated and non-operated wrists of the surgical groups (p>0.089).

Summary:
Patients undergoing 4CF and RSL fusion are expected to have decreased DTM range of motion compared to healthy control patients, however their range of motion is not significantly worse than their contralateral wrist and both operations result in a similar level of stiffness.
The European Board of Hand Surgery (EBHS) Diploma Examination - history, evolution and current state

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Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

Objectives
To give an overview of the EBHS diploma examination in hand surgery.

Methods
The European Board of Hand Surgery (EBHS) diploma examination grew out of the FESSH (Federation of European Societies for Surgery of the Hand) diploma exam. This latter was first held in Paris in 1996. FESSH, founded in that year, sought from its inception to establish and develop a common assessment for all hand surgeons across Europe. The examination was intended to be a mark of excellence. The EBHS was established in 2010 when the Union Européenne des Médecins Spécialistes (UEMS) recognised hand surgery as a speciality in its own right. The running of the exam then passed to the EBHS.

Results
Passing the diploma demonstrates a significant achievement in the study of hand surgery and may be helpful in applying for jobs. A number of Australian hand surgeons have successfully passed the examination.

Summary
This paper will discuss the format of the examination, including the most recent developments, explain eligibility and give some tips on passing.

The presentation will give an insight to anyone from the Asia-Pacific region who is interested in sitting the exam, either as a standalone venture, or as part of a period of study in Europe.
Examining microsurgical skills in simulated training platform versus vascular anastomosis in rat vessels in a laboratory setting

Dr Wendy Teo¹, Dr Jin Xi Lim¹, Ms Khadijah Yusoff¹, Dr Amitabha Lahiri¹, Dr Alphonsus Chong¹,²

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Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

Objective:
Residents must acquire microsurgical skills via repeated simulated practice to achieve vascular patency in patients. The aim is to establish a correlation between microsurgical suturing using our novel training platform and vascular anastomosis of rat vessels.

Methods:
77 participants of the five-day Microsurgery Training Course in our institution were included. On Days 3 to 5, the participants were asked to place 9 sutures in a prefabricated 4mm elastic strip on our platform; and anastomose 4 rat femoral vessels. An assessor examines and scores their skills, with the former being MicroTrainer Assessment Score and the latter, the Vessel Assessment Score. Patency is defined as having blood flow after 10 minutes.

Results:
There is a strong positive correlation between Microtrainer Assessment Score and Vessel Assessment Score (Day 3 r=0.471, p=0.00; Day 4 r=0.580, p=0.00 and Day 5 r=0.560, p=0.00); between vessel patency rate and MicroTrainer Assessment Score (Day 3 r=0.463, p=0.00; Day 4 r=0.384, p=0.001 and Day 5 r=0.441, p=0.00); and between vessel patency rate and Vessel Assessment Score (Day 3 r=0.541, p=0.00; Day 4 r=0.556, p=0.00 and Day 5 r=0.765, p=0.00)

Summary:
The strong correlation between vessel patency and the assessment scores validate the efficacy of the scoring system in predicting patency rate. The positive correlation between both assessment scores demonstrates that individuals who perform well on the Microtrainer also excel with vessel anastomosis, i.e. the nature and complexity of the tasks for both the Microtrainer and vessel anastomoses are similar, with the same skill set required.
Teaching hand anatomy in the modern era

A/Prof Quentin Fogg

Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

Contemporary anatomy education, especially amongst surgeons, gets a bad rap. In the majority of cases, the level-appropriate anatomy taught early at medical/allied health school achieves a very high standard. It is often multi-modal, emphasises clinical relevance, and actively encourages application. Real challenges exist in bringing this knowledge to higher levels as experience and more narrow interests develop. Using the hand as an example, a successful model for the augmentation of base knowledge, development of technical skills, and engagement with clinical anatomy research will be outlined. Of particular note is the Graduate Diploma of Surgical Anatomy for early career clinicians aspiring to specialist surgical training. The power of level-appropriate education, the laboratory as a core technical skill training ground, and the advantages of career-long engagement with anatomy will be demonstrated. It is hoped that you'll look differently upon your local medical/allied health school, challenge your trainees to build their skills and knowledge, and be knocking on the door of your nearest anatomy department as soon as possible. The future of clinical anatomy education and research is exciting!
The Use of technology for surgical education in developing countries: work of BFIRST and BSSH

Mr Wee Lam

Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

In this talk, the strategies of the British Society for Surgery of the hand (BSSH) and British Foundation for International Reconstructive Surgery and Training (BFIRST) will be discussed, including visits, online mentoring, fellowships and self-learning. 3D technology will also be discussed and its role in education.
Tips from the editor

Prof Toshiyasu Nakamura

Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

The first issue of the Journal of Wrist Surgery was published in August 2012, with 1 editorial, 2 forewords, 1 perspective, 5 special focus sections, 2 procedure, 1 original article, 1 case report, and 1 wrist and carpal anatomy papers. With great and tremendous efforts of Dr. David Slutsky, the former Editor-in-Chief, the journal soon was listed in Pubmed and recently is indexed in Emerging Sources Citation Index. Since beginning, more than 200 papers including special focus section, perspective and clinical anatomy papers were published and now the journal is recognized one of the target journal for wrist investigators. It has now been an official journal of International Wrist Arthroscopic Society (IWAS) and affiliated journal of Asia Pacific Wrist Association.

Submission numbers were 136 in 2016, 122 in 2017, and 122 in 2018. In 2019, we had 115 submissions. Authors’ distributions are widely in North and South America, Europe, and Asia-Pacific. Total full text HTML and PDF downloads of the articles in 2018 were more than 33000, comparing with approximate 10000 in 2014, 13000 in 2015, 17000 in 2016 and 20000 in 2017. We also received more than 100 citations in 2018.

In this presentation, I would like to present how to wrist and submit the adequate manuscript to the Journal and to show common pitfalls in submission, editing and revising process for authors.
What is needed for good research?

Prof Goo Hyun Baek

Surgery 1 - Education and Hand Surgery, Courtyard Room 1 and 2, March 12, 2020, 2:00 PM - 3:30 PM

There are three important parts of ‘research’ – authors, editors and readers. Authors are trying hard to publish research works as scientific articles in the journal of good reputation. Certain authors may aim at ‘Nobel prize’ or ‘game changer’. However some of the authors are desperate for seeking job, promotion, and research grant. Editors want high quality articles of Level I or II evidence, to get high impact factor (IF). Case reports are seldom accepted in many Journals because they are not cited frequently. When all the articles in the journal can be accessed freely, the IF of them increase sharply. However the authors have to pay several thousand dollars to the Publisher. Readers need unbiased new knowledge from the articles for their patients and career.

It is obvious that the articles published in high quality journals, which need good research facilities and sufficient funds as well as qualified researchers, provide more reliable and recent information. However in certain countries, good quality of research cannot be conducted because of their poor socioeconomic environment. I personally think that those authors in poor circumstance do need publication of their works in the journals even they are Level III or IV studies which are the good researches in their situation. Editor’s decision is better be generous and kind to them. Readers should understand the authors’ situation. For good research, I think three elements are required - diligent and sincere authors, editors with fairness and generosity, and readers with keen eyes and warm heart.
Thumb CMCJ arthroscopic fusion

Dr Esther Chow

Arthritis 2 - CMC Osteoarthritis, Eureka Room 1, March 12, 2020, 2:00 PM - 3:30 PM

Introduction
The thumb carpometacarpal joint (CMCJ) osteoarthritis is one of the most common pathology in the hand with controversial treatment options. The aim of our study is to prospectively evaluate the effectiveness of arthroscopic fusion for the treatment of Eaton stage III thumb CMCJ osteoarthritis.

Materials and Methods
This study prospectively recruited all cases with Eaton III thumb CMCJ osteoarthritis treated with arthroscopic arthrodesis from January 2015 to December 2017. The patients were evaluated objectively with grip strength, pinch strength, range of motion and Kapandji score. Subjective evaluation includes Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire and the visual analog scores (VAS) for pain. Radiographs were reviewed.

Results
There were total 13 patients with 15 arthrodesis performed (2 cases with bilateral surgery done). The average age was 62.2 with M:F = 2:11. The pre-treatment pain score (VAS) was average 6.3. There was improvement of pain score as early as at post-op 3 months (VAS 2.8, p<0.001) and continue to improve with time. There was improvement of grip strength and pinch strength at 12 months (p<0.001). The Dash score showed improvement as early as at 3 months (p=0.01). There was no significant change in the range of motion of the thumb and the Kapandji score. There was no major complication. There was one case of pseudoarthrosis (6.7%)

Conclusion
Arthroscopic arthrodesis is a feasible treatment option and provides excellent pain relief, restore thumb strength and stability, retain thumb mobility, and hence improvement in hand function.
Proprioceptive Management CMC OA

A/Prof Anne Wajon

Arthritis 2 - CMC Osteoarthritis, Eureka Room 1, March 12, 2020, 2:00 PM - 3:30 PM

The CMC joint is a synovial joint; as such, degeneration of joint cartilage and subchondral bone, impaired ligament function, inadequate reflex control of periarticular muscles or disturbed innervation, may all contribute to the development of OA.

This presentation will discuss the importance of proprioceptive management for CMC OA, where proprioception is considered to be a combination of the complex neurosensory and neuromuscular systems providing joint position sense, kinesthesia and joint reflex control.

It will apply the work of Mobargha, Hagert and Ladd, among others, who have recognised the proprioceptive potential of the CMC joint. They identified the proprioceptive and stabilising role for the CMC joint provided by the dorsal ligaments, both by being richly innervated with mechanoreceptors and resisting dorsal translation through ligamento-muscular reflex patterns. Additionally, they provided evidence that the first dorsal interosseous muscle (DI) promotes joint congruity by reducing dorsoradial joint translation.

Proprioceptive management of CMC OA incorporates an approach to patient education and exercise that ensures stability and precision during motion. It endeavours to enhance conscious proprioception awareness, conscious neuromuscular control, as well as unconscious neuromuscular control, to prevent disproportional loads during ADL.
Arthroscopic CM Arthroplasty with Suture-Button Suspensionplasty - more than 2 years f/U

Prof Keiji Fuijo

Arthritis 2 - CMC Osteoarthritis, Eureka Room 1, March 12, 2020, 2:00 PM - 3:30 PM

Arthroscopic CM Arthroplasty with Suture-Button Suspensionplasty

Middle term follow-up

Surgical techniques for CM arthroplasty have developed as arthroscopic partial resection of trapezium with mini Tight Rope (TR) suspension method. The aim of current study is to introduce our surgical technique and evaluate the results.

Our technique is shaving only subchondral trapezium and beak osteophyte completely in order to medialization to 1st metacarpus. TR is inserted from 1st metacarpal base just volar APL attachment to 1/3 of 2nd metacarpus. 42 cases were operated. Averaged age was 60.8 y.o. and mean follow-up periods was 30.2 months. Palmar abduction angle and radial abduction compared to contralateral side before and after operation respectively. VAS, Pulp pinch, and DASH were evaluated 3 months after operation and 6 months after operation respectively regarding clinical evaluation. Trajectory (distance between proximal joint space to TR insertion point divides length of second metacarpus) on lateral XP regarding XP evaluation.

Postoperative palmar abduction and radial abduction were 91.5% and 93.5% respectively. Postop, 3 months after operation, and 6 months after operation of VAS were 72.2±20.5, 19.3±15.7 (p < 0.05), 14.3±18.0 (p < 0.05) respectively. Postop, 3 months after operation, and final F/U of Pulp Pinch (kg) were 3.1±1.7, 3.6±1.1 (p=0.41) 4.0±1.3 (p=0.15) respectively. Postop, 3 months after operation and 6 months after operation of DASH were 40.1±18.8, 27.7±21.6 (p=0.12), 21.2±27.2 (p < 0.05) respectively. Trajectory was 0.35±0.08. 3 months after operation. Although there was no correlation between trajectory and postoperative ROM (r=0.28), there were weak negative correlation between Trajectory and V.A.S. (r=0.39).
Sparing the trapezium

Dr Alejandro Badia

Resectional arthroplasties of the thumb carpometacarpal joint, including the famed LRTI and a myriad of modifications, have become the standard for treatment for the painful basal joint. While many patients do well, the dilemma remains when the failed resection patient presents for follow-up. Revision suspensions or even complex fusions may be necessary which defeat the original purpose of surgery: a painless, stable, but mobile thumb. Techniques such as arthroscopic partial resection, still vastly underutilized, allow preservation of the trapezium, the pillar support of the thumb. Implant arthroplasty also allows for trapezial preservation and is an ideal option for the lower demand patient. Therefore, it is perhaps only painful pantrapezial disease that warrants the complete resection of this carpal bone.
Motion and force analysis in keyboard playing

Dr Michael Mak

Occupational Disorders 1 - The Musician's Hand, Eureka Room 3, March 12, 2020, 2:00 PM - 3:30 PM

MUSCLE FORCE OPTIMIZATION IN PIANO PLAYING – A BIOMECHANICAL ANALYSIS

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INTRODUCTION
Piano playing at the performance level places a high demand on forearm and intrinsic muscles. In piano literature, technically advanced pieces require intensive muscular contractions over an extended period of time. This can lead to fatigue and may result in playing related musculoskeletal disorders of the hands. As fatigue is related to the total muscle force exerted, one should aim to minimize the total muscle force required to produce a note and optimize the use of the stronger extrinsic digit flexor muscles during key-strike. We hypothesize that tendon and thus muscle forces differ between varying finger postures during key strike from relatively flexed to extended. The aim of this study is to find the finger posture that results in the optimization of muscle forces.

METHODS
Nine key strike positions of the index finger were established, from relatively extended to flexed joint positions. Five amateur pianists with no hand prior hand injuries or symptoms were recruited. They were asked to perform a simulated keystrike on a wooden block with the right index finger, with extension of the interphalangeal joints. Then without moving the finger away from the key, they were asked to adopt the most flexed key strike posture in a continuous motion. This was recorded with an optical motion analysis system (Vicon, UK). Nine finger positions at equal intervals within this motion were derived for each subject and the mean joint angles for each position obtained.

The fingertip force $P$ was estimated to be 8.9N, which was derived from Harding’s study [1]. All the tendons involved in force production of the finger consisted of the long flexors and extensors and the intrinsic tendons. Dimensions of the metacarpal and phalanges were taken from the cadaveric study by An [2]. Instantaneous moment arms of all the tendons contributing to finger force production were calculated for different joint angles by differentiating the tendon excursion, derived from the models of Landsmeer, with respect to the joint angle [2].

The tendon forces were then obtained by solving joint equilibrium equations [1):

- DIPJ: $FDP\cdot LU\cdot (db)\cdot TE\cdot (da)\cdot P(L1\sin(\theta)O) = 0$
- PIPJ: $(FDS)(df)+(FDP\cdot LU)(dc)\cdot ES\cdot (dd)\cdot UB\cdot (de)\cdot P[L1\sin(\theta)O+L2\sin(\theta)O+\theta 1]) = 0$
- MCPJ: $(FDS(dl)+(FDP\cdot LU)(dh)+LU(dk)+UL(dj)+UL(dl)\cdot P[L1\sin(\theta)O+L2\sin(\theta)O+\theta 1]+L3\sin(\theta)O+\theta 2] = 0$

Where $P$ is the fingertip force and L1-3 are the lengths of the distal, middle, and proximal phalanges respectively.

Two optimization criteria were applied separately, yielding two sets of solutions. They were minimization of total muscle stress, in which total muscle stress (equal to force divided by PCSA); and maximization of the sum of the FDS and FDP tendon forces.

RESULTS AND DISCUSSION

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When the total muscle stress was minimized, the position with the least tendon force exerted is the most extended position. There is an increase in FDS and FDP tendon force with more extended positions, with the highest in position 1 (Table 1).

When the tendon forces of FDP and FDS were maximized, their forces increase as the finger is more extended and are highest in position 1. The FDP force in the fully extended position is 6.3 times that of the maximally flexed position. The FDS force is also higher in extended positions. The results of this study show that an extended finger position results in less overall muscle stress, and confers an optimal use of the long forearm muscles.

With a more flexed finger position, the extensor muscle (TE and ES) and intrinsic muscle forces (radial interosseous (RI), ulnar interosseous (UI) and lumbrical (LU)) tend to increase, and the flexor tendon forces tend to decrease in both optimization models.

Figure 1: Tendon forces under the two optimization criteria.

CONCLUSIONS
This study therefore supports the adoption of a more extended finger position in piano playing. This would likely reduce fatigue by minimizing the total muscle stress through maximizing the use of the strong extrinsic flexors. This conclusion needs to be confirmed by in-situ measurement of the actual muscle forces and finger motions during piano playing, using non-invasive techniques.

REFERENCES
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"Hand Surgery in Musicians: Unique conditions and special considerations in diagnosis and management"

Mr Warwick Wright

Occupational Disorders 1 - The Musician's Hand, Eureka Room 3, March 12, 2020, 2:00 PM - 3:30 PM

Musicians present a unique challenge to the hand surgeon. Clinical assessment often needs to involve consultation including the instrument to enable demonstration of the specific impact of the condition on performance. Particular consideration needs to be given to range and independence of movement, sensation of working surfaces and stability of digital pulp. When surgery is indicated, delay should be avoided to minimise progression of pathology and the development of inappropriate compensatory mechanisms. Minimally invasive modalities are particularly useful in reducing scarring and stiffness. The importance of education of musicians cannot be understated. They may have misinformed concepts of their disease, hence providing concise and clear anatomical and pathological detail is critical.
Rehabilitation for Common Musician's injuries

Mrs Karen Fitt

Occupational Disorders 1 - The Musician's Hand, Eureka Room 3, March 12, 2020, 2:00 PM - 3:30 PM

An overview of management techniques unique to treating musicians, such as ergonomics, psychologically informed practice, good habits and return to playing. Videos and images of musicians will be used to demonstrate the principles presented.
Musician Injury Prevention: How do we close the gap between what we know and what we do?”

Dr Aviva Wolff

Occupational Disorders 1 - The Musician's Hand, Eureka Room 3, March 12, 2020, 2:00 PM - 3:30 PM

Musician health and wellness, a fundamental requirement for safe, effective and optimal musical performance, is not guaranteed. Performance related musculoskeletal disorders (PRMD) affect between 60-90% of all musicians, and have serious consequences on musculoskeletal health, performance ability and the overall healthcare burden of musculoskeletal injury. The high prevalence of PRMD in musicians can be prevented and reduced via health-education programs designed to address risk factors and practice habits. Despite the awareness of risk and the substantial consequence of non-adherence, implementation of health-education programs is complex and challenging and is rarely offered in music institutions. This talk will emphasize the gap between evidence and practice and present practical clinical, educational, and research strategies to address successful adoption of musculoskeletal health and injury prevention programs.
Surgical Assessment and Considerations in Musician’s Hand

Dr Juitem Shih

Occupational Disorders 1 - The Musician’s Hand, Eureka Room 3, March 12, 2020, 2:00 PM - 3:30 PM

Musicians are a unique group, requiring hand control and skills at the highest levels. Each instrument had its own special need of fingers and the musician must be controlled. A surgeon who is conscientious and understanding of the patient and his needs and who is capable of assessing correctly the anatomic and physiologic pathology is most likely to make the proper decision in advising for or against a surgical component of the overall treatment plan.

It is a collaborative field of both nonsurgical and surgical specialists devoted to understanding and treating injuries that frequently complicate musical practice and performance in Taoyuan area. From Jan. 2013 to Dec. 2017, we collected 98 instrumental musician and assess any injuries over upper extremities, there were 50 cases with stringed instruments, eighteen cases with wood-wind instruments, ten cases with brass-wind instruments, ten cases with percussion instrument, and also ten cases with piano. In our series, seventy-seven cases (76.4%) had experienced upper limb injuries during training or practices period. Ten cases (12.2%) had received operation for disease or injuries. The injuries complicating musical practice and performance is very high, and should be need avoid these damages when practice daily including education, change the program of practice, muscle training, and therapy. We also treated some cases of musician’s dystonia with deep anesthesia combine with transcranial stimulation and they also get improvement and back to original performances.
The Impact of Therapeutic Camp on Children with Congenital Hand Differences

Mrs Amy Lake
Texas Scottish Rite Hospital For Children, Dallas, United States

Abstract

Background
The goal of this study was to evaluate the efficacy of hand camp by investigating camp participation and outcomes on self-esteem, physical function, participation in activities, and relationships with peers.

Methods
Forty patients with a congenital hand difference seen in hand clinic between the ages of 10 and 14 were eligible to attend hand camp. Participation involved completion of questionnaires at 3-time points: prior to camp (Pre-Camp Questionnaires), immediately following camp (Immediate Follow-Up Questionnaires) and 6-months after camp (Final Follow-Up Questionnaires). The questionnaires administered included: a Camp Demographic Form, Patient Reported Outcomes Measurement Information System (PROMIS), Rosenberg Self-Esteem Scale (RSES), and Camp Expectation Questionnaire based on the established camp objectives/goals.

Results
Thirty-six patients were included in the final cohort (22 females, 14 males). Average age of the patients was 11.17 years (range, 10-14). Patient diagnoses included: central deficiency, transverse deficiency, radial longitudinal deficiency, ulnar longitudinal deficiency, and overgrowth syndromes. Patients demonstrated significant improvement on both Upper Extremity Function and Peer Relation domains on the PROMIS: The results of the RSES found a statistically significant improvement in patient’s self-esteem between pre-camp and immediate follow-up.

Conclusions
Peer relationships, upper extremity function, and self-esteem improved immediately following hand camp. Upper extremity function scores and self-esteem scores continued to improve significantly throughout the 6-month follow-up period. The authors of this study believe that research related to therapeutic camping experiences is an integral aspect when identifying best-practice interventions to increase positive quality of life outcomes for children with congenital hand differences.
Participation in home, school and community activities in children 11-17 years with Type II/IIIA Hypoplastic Thumb: A qualitative study

Ms Rose Biggins¹,², Ms Ann Underhill²

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Hand Therapy B3 - Paediatrics, Sovereign Room, March 12, 2020, 2:00 PM - 3:30 PM

Existing research in Type II/IIIA Hypoplastic Thumb has focused on surgical procedures, objective measures of strength, range of motion and stability, and inclusion of patient reported outcome measures. However, the impact on everyday activities, and the daily experience of children with this condition is not well reported.

Objectives
1. To explore the experience of adolescents with Type II/IIIA Hypoplastic Thumb to gain insight into participation in home, school and community activities, and
2. To identify facilitators and barriers perceived to impact children’s participation.

Methods
A cross-sectional study using semi-structured interviews was implemented following institutional ethic approval. Participants were recruited over a 3 month period in 2019. Interview questions sought to capture children’s perception of potential issues (pain, upper limb function) influencing participation, and to understand how activity engagement may have been helped or assisted. Interviews were audio-recorded and transcribed verbatim. Thematic analysis was undertaken to identify common patterns and responses.

Results
Interviews were completed with three participants (2 female, age range 13-17 years). Preliminary findings are: 1) the impact of the thumb condition varied; 2) participants demonstrated mixed responses to the thumb difference 3) alternative techniques, including technology, facilitated engagement and 4) weakness, maintaining grasp and pain were perceived as barriers to activity participation.

Summary
These preliminary findings suggest weakness, maintaining grasp and pain were barriers to participation. Exploring alternative techniques and strategies as well as the provision of education should be the focus for future clinical practice. Further research in this area is required to increase our knowledge.
Post-operative Hand Therapy following a Long Head of the Triceps Transfer in Children with Amyoplasia

Mrs Amy Lake¹
¹Texas Scottish Rite Hospital For Children, Dallas, United States

Hand Therapy B3 - Paediatrics, Sovereign Room, March 12, 2020, 2:00 PM - 3:30 PM

ABSTRACT: Children born with Amyoplasia Multiplex Congenita (AMC) who have elbow extension contractures usually require assistance in performing ADL’s that require reaching their hand to their face, head, and upper body. For tasks involving the UE, the elbow is the key to functional independence. Children born with AMC may benefit from selective surgeries to enhance functional independence and improve quality of life. Home Therapy and splinting following these surgeries is an important part of gaining motion and improving function. This talk will review the rehab and splinting following an elbow release to gain passive elbow flexion, and a long head of the triceps transfer for active elbow flexion in children with AMC.
Pediatric Post Operative Tendon Management

Ms Jill Peck-Murray

Hand Therapy B3 - Paediatrics, Sovereign Room, March 12, 2020, 2:00 PM - 3:30 PM

A comparison of adult and paediatric hand injuries and review of latest published information on early motion protocols with suggestions for designing protocols for paediatrics.
An overview of CP and OBPP

A/Prof Bruce Johnstone

Hand Therapy B3 - Paediatrics, Sovereign Room, March 12, 2020, 2:00 PM - 3:30 PM

The management of the upper limb in cerebral palsy is often complex and challenging. Effective treatment requires a multidisciplinary approach involving paediatricians, occupational therapists, physiotherapists, orthotists and upper extremity surgeons. Interventions are generally aimed at improving function and cosmesis by spasticity management, preventing contractures and correcting established deformities. Treatment objectives vary according to each child and vary from static correction of deformities to improve comfort, positioning and ease of care, to improvements in dynamic muscle balance to augment hand function. I will present an overview of the relevant surgical options. The process of selecting candidates for surgery will be discussed, including details of the relevant assessment tools and outcome measures. A discussion of clinical service delivery will also be presented, including the pathway of care, pre-operative and post-operative management and functional rehabilitation.

The obstetric brachial plexus palsy clinic at RCH was established in 1989 by Mr Keith Mutimer, plastic surgeon and Jane Bartlett physiotherapist. It has grown into a state of the art service now staffed with three plastic surgeons, an orthopaedic surgeon and a large team of physio and occupational therapists. Care of our patients will be outlined including the current model of service delivery.
Paediatric sensory evaluation after nerve injury:  
pearls and pitfalls

Dr Emily Ho

Hand Therapy B3 - Paediatrics, Sovereign Room, March 12, 2020, 2:00 PM - 3:30 PM

Evaluating motor and sensory function after an upper extremity peripheral nerve injury is critical to diagnose the location, extent of nerve injury, and evaluate functional recovery with and without intervention. In young children, the approach to this evaluation and the outcome measures used need to be both reliable and feasible. This presentation will describe the pearls and pitfalls of evaluating young children after an upper extremity peripheral nerve injury through a critical review of currently used tests of sensory and motor function and research on psychometric properties of common outcome measures.
Achieving optimal upper limb function is a priority in the management of children with congenital hand differences. Hand therapists play an important role in conducting clinician-reported outcome assessments to determine functional impairment and potential for reconstructive surgery. This presentation will describe a systematic approach to evaluating infants and toddlers with congenital hand differences built on the foundation of three main principles: Anatomy and biomechanics, Napier’s prehensile and Erhardt’s developmental prehension frameworks, and the WHO ICF definition of function.
Young children are more prone to have scald or burn injuries on hands while they explore around the surroundings. Research indicated that young children between 1-3 years are more susceptible to accidents like scalds or burns. Managing burns on young children’s hands are challenging. Complications of scarring might cause web space contracture, flexion contracture of finger joints, hyperextension of MCP joints, thumb deformities etc. Reconstructive surgeries might need to be repeated during the development of children once contractures and deformities are developed. Splinting programme, massage, stretching exercise, pressure therapy are conservative management adopted for management of scars. Yet, in children, there are lots of precautions and contra-indications for implementing the programme. This presentation will focus on clinical management of burnt hands based on past research findings and understanding of aetiology of scar formation and its biomechanics.
Chronic pain, What is real

**Dr Kevin C Chung**

Combined Hand Therapy 2 - CRPS and Hand Pain, Goldfields Theatre/Plenary, March 12, 2020, 4:00 PM - 5:30 PM

Complex regional pain syndrome is a vexing problem that we face. Rather than relegating our patients to the pain specialists, we have a critical role in caring for these patients to assure appropriate management. This presentation strives to reach a consensus in the coordinated care of patients with chronic pain syndrome.
CRPS is evolving. There is a developing realisation that chronic pain management techniques are being used to treat patients who have primary diagnoses missed by referring clinicians. A short discussion of how to find the diagnosis, and methods to successfully operate avoiding post-operative exacerbation of chronic pain shall be discussed.
The role of hand surgeons and hand therapists in early identification of CRPS and other pain syndromes

Dr Emily Ho

Combined Hand Therapy 2 - CRPS and Hand Pain, Goldfields Theatre/Plenary, March 12, 2020, 4:00 PM - 5:30 PM

Hand surgeons and hand therapists play a critical role in the early identification of children at risk of developing a pain syndrome after an upper extremity injury. Early identification is important because of the known rapid decline in physical, psychological, and/or social functioning in these children when proper management is not provided due to the multidimensional nature of pain. This presentation will describe the characteristics of children at risk of pain syndromes after an upper extremity injury and will outline one approach to evaluating upper extremity pain in children.
Getting back on track: hand therapy interventions for CRPS

Miss Zoe Milner

Complex regional pain syndrome (CRPS) is a painful and functionally debilitating condition associated with both sensory and motor abnormalities. Patients with CRPS present significant challenges to both medical and allied health clinicians. Current literature suggests early rehabilitation improves function and reduces pain, yet the type of rehabilitation remains uncertain.

Graded motor imagery (GMI) has the strongest evidence for improving CRPS symptoms through a “top-down” approach, addressing deficits from a cortical aspect. There is also evidence supporting physical therapy combined with oral medication for this patient cohort. However, despite sensory perception deficits being well described and a significant component of CRPS, the evidence is strongly orientated towards motor retraining.

This presentation will explore clinical interventions to assist getting your patients back on track with their rehab. This will include strategies to address the key components of CRPS (including sensory perception deficits), with a focus on early rehabilitation.
Collateral ligament reconstruction of chronic proximal interphalangeal joint instability using a half slip of the flexor digitorum superficialis tendon; case series.

Dr KangWook Kim, Dr JinHo Kim

Seouldaejeong Hospital, Cheonan, South Korea, Yeson hospital, Bucheon, South Korea

Free Papers 7 - PIP Joint, Dupuytren's Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Background
Chronic instability of proximal interphalangeal joint (PIPJ) is rare. In such cases, usually it requires surgical treatment, but there is no consensus on proper management.

Purpose:
To evaluate the clinical outcomes of collateral ligament reconstruction of chronic PIPJ instability using a slip of the flexor digitorum superficialis (FDS) tendon.

METHODS:
We retrospectively reviewed 6 patients who had collateral ligament reconstruction of chronic PIPJ instability using a distally based half slip of the FDS tendon. The mean age at the time of surgery was 45 years (range, 35-61 y). To evaluate the results, we compared preoperative and postoperative range of motion, instability. We obtained VAS pain and DASH scores at the final follow up. Average follow-up was 25 months (range, 8-38 month).

RESULTS:
There is no significant change of the range of motion after surgery. The average angle of lateral instability improved after surgery from 16 degree to 2 degree. The mean VAS pain scores were 0.3 points and the DASH scores were 6.3 points

CONCLUSIONS:
Collateral ligament reconstruction using a half slip of the FDS tendon for chronic PIPJ instability obtains joint stability without change of range of motion.
Long term results after volar plate interposition arthroplasty for post-traumatic osteoarthritis of digits

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Free Papers 7 - PIP Joint, Dupuytren’s Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Objectives: This study is to evaluate the long-term outcome of volar plate interposition arthroplasty (VPIA) for post-traumatic osteoarthritis in proximal interphalangeal (PIP) joints and metacarpophalangeal (MP) joints.

Methods: We identified patients receiving VPIA for post-traumatic osteoarthritis in PIP joints or MP joints between January 2004 and December 2008. All procedures were performed by a single senior surgeon. The subjective outcomes were evaluated through visual analogue scale (VAS) and Michigan Hand Outcomes Questionnaire (MHQ), while the objective assessments included finger appearance, radiographic joint alignment, active range of motion, and stability under manual stress.

Results: The median period of follow-up was 12 years (range: 10-15 years). The median score of VAS improved from 6 preoperative to 0 at the follow-up evaluation (P = 0.004), and the median score of MHQ was 88 at present. The active arc of motion improved from 15° preoperative to 50° in median (P = 0.004). All joint showed stable and marked remodeling of the contour of the joint surface was detected in radiograph.

Summary: At the minimum 10-year follow-up, volar plate interposition arthroplasty provided pain relief, stability maintenance, and functional preservation. We suggested VPIA may be a reliable therapeutic option for post-traumatic osteoarthritis in PIP joints and MP joints.
Ratio of Dislocation Types of the Proximal Interphalangeal Joint of the Fingers: A New Classification System for Initial Therapy

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Free Papers 7 - PIP Joint, Dupuytren's Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Objectives: We proposed a new system named the sagittal, coronal, axial, rotational and fracture (SCARF) classification. The purpose of this study was to verify that this classification would contribute to management of PIP joint dislocations at the initial therapy. We determined ratios of five factors in PIP dislocations with SCARF by interpreting radiographs and assessed the interobserver and intraobserver variability.

Methods: In total, 68 fingers in 67 consecutive patients were studied. The SCARF classification is composed of five factors: sagittal plane displacement is rated by dorsal (D), volar (V), or neutral (N); coronal plane displacement, by ulnar (U), radial (R), or neutral (N); axial force, by compression (C), traction (T), or no (N); rotational displacement, by supine (S), prone (P), or neutral (N); and fracture concomitance, by minus (−) or plus (+). The row of the five characters explains each condition of PIP joint dislocations. Interobserver and intraobserver variability was determined after six orthopedic surgeons independently classified the same radiographs twice.

Results: All 68 dislocations were classified into 14 types, unless fracture concomitance was considered. The most common type was DUNN (35%). In interobserver analysis, mean kappa coefficient for each factor was 0.63, 0.75, 0.68, 0.33, and 0.84, respectively. In intraobserver analysis, that was 0.73, 0.79, 0.71, 0.41, and 0.81, respectively.

Summary: Even other than hand specialists can specify the type of every PIP dislocation by using the SCARF classification and will have better understanding of the disorder. It would contribute to management of PIP dislocations at the initial therapy.
The Anatomical Variation of The Distal Articular Surface of The Hamate

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Free Papers 7 - PIP Joint, Dupuytren's Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Background and Objective

The proximal inter-phalange joint fracture-dislocation is one of the most common injury and difficult to treat in the upper extremity. The hemi-hamate arthroplasty had been suggested to use for treating this particular case of severe involvement with reportedly good results in short term period. However, some reported the development 50% of osteoarthritis in long-term results. The major cause was the anatomical mismatch of the joint surface which resulted in abnormal load bearing, biological failure, and chondral damage. Our objective is to study the anatomical variation of the distal articular surface of the hamate which is suggested to replace the volar lip of middle phalangeal base.

Methods

The study was performed in 70 embalmed cadavers. All wrists had no evidence of previous trauma or injury. The direct measurement was carried out using digital goniometer, digital Vernier Caliper and ruler. The indirect measurement was performed by program imageJ.

Results

The mean angle of articular ridge between the 4th and the 5th metacarpal bones were 85.54 degree (SD 3.54, range 76.36-98.89) and 94.51 degree (SD 3.57, range 81.11-103.64), respectively.

Conclusion

The ridge at the distal articulation of the hamate was not perpendicular to its dorsal surface. There was some deviation of this ridge at the average of 5 degrees.

To prevent the mismatching of the graft and late osteoarthritis in using the hemi-hamate arthroplasty procedure, we suggested that the distal articular ridge of the hamate should be taken into account and should be carefully evaluate during harvesting the bone graft.
Arthoscopic resection of recurrent wrist ganglia

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Free Papers 7 - PIP Joint, Dupuytren's Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Objective:
for recurrent wrist ganglia, arthroscopic resection was relative contraindication. According to experience, arthroscopic ganglion resection showed satisfying results even in recurrent cases. We want to evaluate the clinical outcomes of recurrent wrist ganglion cysts resected arthroscopically and to identify their safety and efficacy

Methods:
From Jun. 2011 to Feb. 2017, 25 recurrent wrist ganglion were treated with arthroscopic resection in a single center. 6 of the 25 patients underwent local anesthesia, and tourniquet was never inflated in all patients. A systemic examination of the radiocarpal joint was conducted following a sequence from radial to ulnar, and volar to dorsal. Patients’ demographic data and clinical outcomes were collected retrospectively. During follow-up, patients were asked for pain reduction and returning to work. All patients could be reached after a mean follow-up of 49.7 months.

Results:
23 of the 25 patients were satisfied with the result after operation, only 2 patients suffered from residual pain after arthroscopic resection. VAS and DASH score were reduced, and Mayo wrist score were improved after operation with statistical significance, p value < 0.001. 3 of the 25 patients showed recurrence later. 3 stiffness and 1 extensor tendinitis was noted after the operation, no significant complication was present. Most patients had good recovery, 3 feeling fair recovery, 1 still painful, and 1 lost of record

Summary:
The results of study suggested that recurrent wrist ganglion was no longer a contraindication to arthroscopic resection, while an acceptable outcome was achieved and safety being confirmed
Surface Bone Tumours (SBT) of the upper limb: Resolving a diagnostic dilemma

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Objective
Surface bone tumours (SBT), also known as juxtacortical tumours of bone often clinically mimic their intramedullary counterparts creating a diagnostic dilemma. In the literature, there is evidence suggesting that they may well be a continuum. We share a case series of SBTs and illustrate our experience in the diagnosis and management of these tumours.

Methods
We retrospectively consolidated all the patients with SBT diagnosis based on clinical records and evaluated their presenting history, clinical examination, investigations (laboratory, radiological and histological tests), treatment and follow up from our centres.

Results
13 patients from our centres were diagnosed with upper limb SBTs. 7 underwent surgical excision and had histologically proven SBTs (1 Bizarre Parosteal Osteochondromatous Proliferation (BPOP), 1 Florid reactive periostitis, 1 periosteal chondroma, 4 osteochondromas). One of the challenges we faced was with diagnosis; it was difficult to be certain that the lesions were periosteal in origin and the periosteal involvement was not secondary to an intramedullary tumour. Also, benign SBTs can closely resemble its malignant counterpart e.g. periosteal chondroma and juxtacortical chondrosarcoma or parosteal osteosarcomas, and it is crucial to distinguish between them pre-operatively.

There were no recurrences in our series (except the histologically BPOP, who presented to us having had a prior excision). All patients returned to their pre-operative activity and had good range of motion in the affected joints.

Summary
Through this case series, we highlight the clinical conundrum that surgeons often face, distinguishing features that help differentiate SBTs from intramedullary tumours, and their relevant management.
Two-stage treatment of severe Dupuytren’s contracture

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Free Papers 7 - PIP Joint, Dupuytren’s Tumour, Courtyard Room 1 and 2, March 12, 2020, 4:00 PM - 5:30 PM

Objectives. Major problems arise in the treatment of patients with severe forms of Dupuytren’s disease. To reduce the risk of complications, a number of surgeons proposed a two-step method for the treatment. At the first stage, an external fixator is applied for the slow gradual extention of the deformed finger. At the second stage, a typical partial fasciectomy is performed.

Methods. We use an Ilizarov’s mini-apparatus assembled from the standard set. In addition, at the first stage, simultaneously we perform a needle aponeurotomy for partial reduction of deformation. Gradual distractions are carried out to complete (or almost complete) extension of the finger. At the second stage, the frame is dissembled and a partial fasciectomy is performed. The staged method was applied in the treatment of four patients aged from 44 to 72 years. The deficit of extension ranged from 140 to 205 degrees. A complete or almost complete extension was achieved. In all cases, the wounds were closed without tension. Wound healing was uneventful. Ischemic disorders were not observed.

Results. The post op results were evaluated in the period from 4 months to 2 years. The deficit of active extension after treatment decreased to averaged 38.6 degrees (from 30 to 55 degrees). At the same time, the passive extension in two cases recovered completely, in two cases, the deficit was only 10 degrees.

Summary. The staged treatment of severe forms of Dupuytren’s contracture using the standard Ilizarov’s mini-apparatus and needle aponeurotomy at the first stage is effective and safe.
Isolated capitate shortening osteotomy for Lichtman stage IIIB Kienböck’s disease

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Wrist 5 - Kienbock's Disease, Eureka Room 1, 2 and 3, March 12, 2020, 4:00 PM - 5:30 PM

OBJECTIVES
Capitate shortening osteotomy (CSO), which is usually indicated for Kienböck’s disease up to Lichtman stage IIIA, was used for advanced Kienböck’s disease (stage IIIB). Here we report the treatment outcomes.

METHODS
We included four consecutive patients (mean age, 51 years) who underwent CSO for advanced Kienböck’s disease (stage IIIB) between 2011 and 2018 (mean follow-up period, 2.4 years). Osteotomy was performed at the junction between the medial and distal thirds of the capitate, and capitohamate fusion was not performed. The total arc of motion of the wrist joint, grip strength (percentage) of the healthy side, pain according to the Mayo wrist score, lunate height index (LHI), carpal height index (CHI), radio-scaphoid angle (RSA), and osteoarthritis progression were investigated preoperatively and at the final observation.

RESULTS
The total arc of motion of the wrist joint improved from 88° to 115° and grip strength improved from 27% to 78%. Preoperative pain was severe in all four patients, but it was mild in one and absent in three patients at the final observation. LHI, CHI, and RSA preoperatively and at the final observation were 0.34 and 0.33; 0.52 and 0.50; and 62.4 and 63.0, respectively. Osteoarthritis progression was observed in two patients.

SUMMARY
With CSO, lunate collapse progressed slightly; however, pain relief was adequate. Osteoarthritis progression may cause poor long-term outcomes; therefore, it is necessary to determine whether the pain-relieving effect after an osteotomy is maintained in the long term.
Clinical Outcome of Lateral Wedge Osteotomy of the Radius in Advanced Stages of Kienböck's Disease

Prof Goo Hyun Baek

Wrist 5 - Keinbock's Disease, Eureka Room 1, 2 and 3, March 12, 2020, 4:00 PM - 5:30 PM

Radius osteotomies showed favorable clinical outcome in Kienböck's disease. However, few articles have been published on the long-term outcome of lateral wedge osteotomy of the radius in patients with advanced stages of Kienböck's disease.

Eleven patients with Lichtman stage IIIB/IV Kienböck's disease (group A; mean follow-up period, 86.1 months; range, 48 to 163 months) and 14 patients with Lichtman stage IIIA Kienböck's disease (group B; mean follow-up period, 85.1 months; range, 49 to 144 months) underwent radial wedge osteotomy. Radiological changes of the lunate and radiocarpal joint were compared between two groups after osteotomy. The DASH scores were evaluated preoperatively and at the final follow-up. The Nakamura Scoring System (NSSK) was used for comprehensive understanding of radiological and clinical outcomes.

Nine patients of group A and 11 patients of group B showed radiological improvement in the lunate regarding sclerosis, cystic changes, or fragmentation. No patients showed progression of arthritic changes. The wrist flexion/extension angle, grip strength, and DASH score were significantly improved in both groups, but intergroup difference was not statistically significant at the final follow-up. The mean NSSK was 21.6 (range, 15 to 27) in group A and 21.8 (range, 15 to 26) in group B.

Radial wedge osteotomy yielded excellent radiological and functional outcomes in patients with advanced stages of Kienböck's disease and these results were comparable to those of Lichtman stage IIIA disease. This technique could be a useful alternative to salvage procedures in the treatment of Lichtman stage IIIB/IV Kienböck's disease without severe radiocarpal arthritis.
Early Active Mobilization After Surgical Repair and Reconstruction of Injured Extensor Tendon of Hand and Forearm.

**Prof Krishna Priya Das**

BSMMU, Dhaka, Bangladesh

**Tendon 2 - Extensor Tendon Reconstruction, Eureka Room 3, March 12, 2020, 4:00 PM - 5:30 PM**

Objectives / Interrogation: Extensor tendon injuries are very common injuries in hand & forearm, which inappropriately treated can cause severe lasting impairment of hand function of the patient. Our aim is to assess the results of extensor tendons repair / reconstruction followed by early active mobilization.

Methods: This prospective randomized study was conducted in the Department of Orthopaedic Surgery, BSMMU, Dhaka for duration of January 2014 to December 2018. Eighty (80) patients of extensor tendon injuries in zone V-VIII were selected. 60 patients were treated with repair only and 20 patients who were presented lately treated with reconstruction (grafting) of the extensor tendons with soft tissue coverage also. Early active mobilization protocol was followed in all cases. Extensor tendon was repaired by Doyle proposed technique. Mayo Wrist Score and Dargan criteria were used for evaluation of final result at 6th months.

Results and Conclusions: Mayo Wrist Score and Dargan criteria were used for evaluation of final result at 6th months. Results:

Most of the patients were in 3rd decade. Male and right hand injury were predominant in both groups. More than one third, (35.0%) patients were factory worker. Majority (85%) patients had glass cut injury. 35(43.75%) patients had Zone VI injury and 20(25%) patients were in Zone-VII and remaining 25(31.25%) patients were in zone VIII group.

Complications developed in 8(10%) patients.

Satisfactory outcome was 91.66% in repair 85% in reconstruction group at 6th months that was statistically significant (p<0.05)

Keywords: Extensor tendon, Repair, Reconstruction, Early Active Mobilization.
Reconstruction of the Extensor Tendon of the Proximal Interphalangeal Joint (PIPJ) using a distally based slip of Flexor Digitorum Superficialis (FDS) - Modified Stack Reconstruction

Dr Karen Smith

Tendon 2 - Extensor Tendon Reconstruction, Eureka Room 3, March 12, 2020, 4:00 PM - 5:30 PM

Objective
In 1971, H Graham Stack described a case report using FDS as a distally based tendon transfer to reconstruct the central slip of the extensor mechanism of the PIPJ. We present a prospective series of 7 patients who underwent this procedure.

Method
The surgical technique was a modification of that originally described as only one distally based slip of FDS was used; this being passed via a drill hole at the base of the middle phalanx to its dorsum, before being inserted into the extensor mechanism over the proximal phalanx. Immediate protected mobilization followed.

Results/Conclusions
Follow up averaged 18 months (3-48)
In 5 patients with simple central slip injuries, the mean gain in active extension was 66 degrees with a mean loss of 22 degrees of flexion.
In the 2 patients with major trauma, improvement was less; the active PIPJ extension gained was 28 and 21 degrees respectively with both patients each losing 15 degrees of flexion; but due to improvement in the arc of movement surgery, was considered, by the patients to be worthwhile.

In conclusion; this technique provides a strong reconstruction suitable for early mobilization, with satisfactory early results. Better in simple central slip defects, the technique is robust enough to use in severe injuries, even those with loss of intrinsic function, but a more modest outcome should be expected.
Boutonniere deformity, when to operate and how

Dr Donald Lalonde

Tendon 2 - Extensor Tendon Reconstruction, Eureka Room 3, March 12, 2020, 4:00 PM - 5:30 PM

The key to successful management of boutonniere deformity in 2020 is not surgery, in my opinion. It is relative motion flexion splinting RMFS. Most cases of acute or chronic boutonniere respond well to RMFS without surgery. However, if you are going to operate, which I would not recommend as the first choice, then RMFS is essential in post operative rehabilitation. I will show a video of a procedure performed by Egemen Ayhan of Turkey managed by Zeinep Tuna the hand therapist. He uses the Snow technique of a retrograde extensor tendon flap to reconstruct the extensor hood. He does the surgery awake and tests the repair by simulating a relative motion extension splint. The patient starts wearing the splint and using the hand 3-5 days after surgery and wears the splint 2-3 months till the finger is stable. I have not tried this surgery, but the videos created by Dr Ayhan and Zeynep Tuna are outstanding. I have not performed surgery for this problem since I started successful management with RMFS.

With acute boutonneries, we go directly to RMFS if the pencil test shows that MP flexion delivers PIP extension. With chronic boutonniere, we start with Serial casting till we get the best possible PIP extension, then move to RMFS. A paper coming out by Wyndell Merritt and Don Lalonde in March 2020 in PRS has illustrations and videos showing the whole thing.
Extensor tendon anatomy and its implications for reconstruction

Dr Anthony Beard

Tendon 2 - Extensor Tendon Reconstruction, Eureka Room 3, March 12, 2020, 4:00 PM - 5:30 PM

Extensively studied over centuries, the complex anatomy, function and balance of the extensor apparatus is reviewed. The controversial ligaments of Landsmeer and the Rhombus of Windslow are considered. Why the metacarpophalangeal joint hyperextends after surgery on the proximal phalanx and how this can be minimised is discussed. Surgical approaches breeching the apparatus further imbalance the system. The delicate balance when compromised results in Swan neck or Boutoniere deformity, knowledge of the components of the extensor mechanism can be utilised to restore function.
Repaired extensor tendons on the hand can return to work shortly after surgery

Dr Donald Lalonde

Tendon 2 - Extensor Tendon Reconstruction, Eureka Room 3, March 12, 2020, 4:00 PM - 5:30 PM

A relative motion extension splint keeps the injured finger more extended at the metacarpophalangeal joint than the adjacent uninjured fingers. When the repaired finger extensor digitorum communis tendon is placed in 15 to 20 degrees greater extension at the metacarpophalangeal joint than its neighboring uninjured finger extensors, it has more slack than the other tendons due to the quadriga effect. This is easily seen in the clinical setting in the awake patient. Place a sterile tongue blade beneath the proximal phalanx of a repaired digit and on top of adjacent fingers to simulate a relative motion extension splint. Then ask the patient to flex and extend after placement of a single 6-0 nylon suture repair of the tendon. It will be seen that the single 6-0 nylon suture holds the tendon together without rupture using this simulated splint despite full flexion and extension. This also reassures the surgeon that splint protection will be adequate to safely allow early protected movement after surgery. A more formal secure repair is then performed, and the patient is splinted in the user-friendly functional orthosis for 6 weeks. The relative motion extension splint not only holds the tendon repair in a slack position with the finger in full flexion but also decreases the excursion of the repaired tendon. This explains how relative motion splinting eases rupture-free earlier range of motion, with an average return to work time of 17 days compared with 3 to 4 months with immobilization.
Wide awake tendon surgery

Dr Yung-Cheng Chiu

Surgical 2 - WALANT, Goldfields Theatre/Plenary, March 13, 2020, 7:00 AM - 10:00 AM

Tendon surgery is technique demanding because tendon gliding should be ensured with adequate suture strength after surgery. Tendon surgery now can be performed under local anesthesia without tourniquet (WALANT), by injecting epinephrine mixed with lidocaine, to achieve bloodless surgical field due to vasoconstriction. Therefore, tendon re-rupture rates can be decreased because gapping of sutures can be examined with active full ROM during operation. Therefore, tenolysis and re-rupture rates can be decreased after surgery. We also applied WALANT technique in tendon transfer and tenolysis surgery with great success. It gets more direct feedback with the patient being awake, the digits or the hand can move actively to determine correct tension of the transfer.

From 2016, we routinely applied this method in our department when doing primary flexor and extensor tendon repair, tenolysis, and tendon transfer, and found this approach makes tendon surgery easier and more reliable outcome.
Proximal forearm and elbow fractures with WALANT

Dr Amir Adham

Surgical 2 - WALANT, Goldfields Theatre/Plenary, March 13, 2020, 7:00 AM - 10:00 AM

Wide-awake local anesthesia and no tourniquet (WALANT) provides an alternative that does not subject patient to the adverse effect of general anesthesia. It has been reported to be effective in hand and distal forearm surgery in providing analgesia and causing minimal blood loss. In this procedure, surgery is performed with the patient in a fully conscious state where tumescent anesthesia is injected into the surgical site without application of tourniquet. We will discuss on how we perform WALANT for proximal forearm and elbow fractures.
Corrective Osteotomies For Digital Overlap In Phalangeal And Metacarpal Fracture Malunion Under Wide Awake Local Anesthaesia

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Surgical 2 - WALANT, Goldfields Theatre/Plenary, March 13, 2020, 7:00 AM - 10:00 AM

Objective:
To determine the efficacy and safety of performing corrective osteotomies for digital overlap deformities under wide awake local anaesthesia no torniquet technique (WALANT).

Methods
5 patients with digital overlap (scissoring) underwent corrective osteotomy under WALANT. There were 3 male patients. Average age of all patients was 40 years. There were 3 phalangeal malunions and 2 metacarpal malunions. All underwent extensor tenolysis prior to osteotomy. 1 phalangeal malunion required PIPJ arthrolysis and flexor tenolysis. 1 closing wedge osteotomy and 4 derotation osteotomies was performed. The patients were followed up till union of the osteotomy. The average follow up was 16.5 months.

Results
Correction of scissoring was achieved operatively and maintained at final follow up in all patients. Preop total active motion (TAM) averaged 191 (range 140-235) and postop TAM averaged 237 (190-275). The average motion gain was 46 (range 10-70) degrees and 22% (range 4-41) respectively. Grip strength improved in four patients. Preop grip strength averaged 12kg/F (range 4-16) and postop averaged 21.3kg/F (range 10-36). In 4 of the patients, complete union of the osteotomy sites was observed at final follow up. In the remaining patient, bridging callus was seen at the last follow up at 3 months.

Conclusions
Corrective osteotomies of phalangeal and metacarpal malunion under WALANT is a safe and effective means of correcting digital overlap. Concomitant tenolysis allows motion gains to be realised following restoration of rotational alignment. The use of angular stable implants and closing wedge osteotomies eliminate the need for bonegrafting and facilitate the procedure under WALANT.
Surgical Excision of Benign Soft Tissue Tumor of the Hand under Wide Awake Local Anesthesia no Tourniquet

Dr Kee Jeong Bae

Surgical 2 - WALANT, Goldfields Theatre/Plenary, March 13, 2020, 7:00 AM - 10:00 AM

Background:
Wide Awake Local Anesthesia no Tourniquet (WALANT) hand surgery had been popularized in tendon surgery, nerve decompression, arthritis surgery and even fracture reduction and fixation. However, although many hand surgeons performed WALANT surgery for excision of benign soft tissue tumor, the clinical results has not been reported yet. We aimed to present the clinical results of surgical excision of benign soft tissue tumor of the hand under WALANT.

Methods
We indicated the tumor excision under WALANT for soft tissue tumors that located proximal to proximal interphalangeal joint, which made applying finger tourniquet difficult. We prepared 40ml of buffered 1% lidocaine with 1:100,000 epinephrine. The 10ml of mixture was injected 30 minutes prior to the surgery into the proximal, medial, lateral and distal portions of the mass, respectively.

Results
Nine patients with benign soft tissue tumors of the hand underwent excision under WALANT from 2018 to 2019. There were 7 women and 2 men, and the mean age was 52.4 years and ranged between 35-61 years. The diagnosis was 3 ganglion cysts, 2 giant cell tumor of tendon sheath, 2 lipoma, 1 fibroma and 1 schwannoma. All soft tissue tumors could be excised curatively. No patient reported discomfort during surgery. After mean 9.5 months follow-up, there was no evidence of recurrence in all patients.

Conclusion
The favorable clinical results suggests that benign soft tissue tumor of the hand could be effectively and safely excised under WALANT.
WALANT Indications and technique

Dr Donald Lalonde

Surgical 2 - WALANT, Goldfields Theatre/Plenary, March 13, 2020, 7:00 AM - 10:00 AM

3 major innovations which have greatly improved safety and cost in Canadian surgery
1. WALANT (Wide Awake Local Anesthesia No Tourniquet) has eliminated sedation for most hand surgery
2. In 2019, local anesthesia of large areas of the body should not hurt more than one little pinch at the beginning of the injection.
3. Evidence based field sterility outside the main operating room is proven safe for hand surgery. Epinephrine in the finger is safe, which means the tourniquet is no longer necessary for most hand surgery. Sedation is no longer required for most hand surgery because modern local anesthesia injection should not hurt in 2020, and because there is no tourniquet. This has enabled us to move a lot of our hand surgery out of the main operating room; carpal tunnels, tendon repairs, finger K wiring, etc. All of this has made hand surgery much cheaper, safer, and much less garbage producing for the benefit of our oceans.
A great benefit is to be able to see freshly repaired flexor tendons move without gapping (rupture) and with properly vented pulleys to prevent the need for tenolysis.
We can also test active movement in Kwired finger fractures to see that they are stable enough to tolerate early protected movement after surgery.
Intraoperative patient education has been a game changer to decrease post operative complications, especially in trauma surgery. The surgeon can help the patient think through how life will change the week after surgery to help get a better result.
Plate osteosynthesis is recommended for unstable fractures of the distal radius. Because the plate fixation is usually performed under general anesthesia with the use of a tourniquet, the patients with high risk due to extensive comorbidities are unable to receive surgery. The use of wide-awake local anesthesia with no tourniquet (WALANT) is becoming an popular alternative for elective hand surgeries, it has several advantages, including simplifying the preparations for surgeries, lowering the risk of general anesthesia, and saving time in the postoperative recovery room. Furthermore, it may reduce medical costs of preoperative evaluation of general anesthesia, shorten hospitalization days, decrease opioid agent consumption, and save medical resources.

Nowadays, the WALANT technique for open reduction and internal fixation of distal radius fractures was reported in succession. But there are still a few publications exist related to this fracture management. This presentation summarizes the application of local anesthesia no tourniquet in distal radius fractures management with current evidence and researches.
Thoracic outlet syndrome (TOS) is complex pathology that refers to the compression of the neurovascular structures traversing the superior aperture of the chest. Thoracic outlet syndrome is one of the most misdiagnosed and controversial conditions.

Methods: Since 2006 we surgically treated 61 patients thoracic outlet syndrome. During 14 years our diagnostic as well as treatment approach to these patients have changed substantially. Most of patients during early years were treated by Atasoy approach - transaxillary 1st rib resections followed by supraclavicular neurolysis of the brachial plexus and anterior and middle scalenectomies. In contrast to our earlier practice, now most of the patients are treated by supraclavicular approach and most of the patients undergo pectoralis minor myotomy as well. Today as a part of conservative treatment as well as diagnostic tool we employ ultrasound guided scalene block with 40 mg Triamcinolone. This manipulation provides also vector of prognosis of prospective postoperative result. Our ergotherapy protocol includes at least 6 months of nerve stretch and floss exercises as opposed to 6 weeks in our earlier protocols.

Results: in 2007 we reported that 66 % of the patients improved. In 2013, we reported that 73% of patients had overall improvement. Our current cumulative data, that shall be presented, are much less optimistic.

Summary: In 14 years period, surgical management of TOS patients, preoperative evaluation, conservative treatment as well as screening criteria has been changed substantially. Our surgical approach evolved from more aggressive to much more conservative and may include scalenectomy alone.
Endoscopic Anatomy of the Carpal Canal

Mr Jeffrey Ecker¹, Ms Courtney Andrijich¹
¹Jeff Ecker Hand and Wrist Microsurgeon, Claremont, Australia

INTRODUCTION
In 2011 at Australian Hand Surgery Society Annual Scientific Conference at Bunker Bay we presented a prospective study of 50 cases of supraretinacular endoscopic carpal tunnel release. Since this time, we have performed a further 1509 supraretinacular endoscopic carpal tunnel releases. The purpose of this paper is to share with you the endoscopic anatomy of the carpal canal.

METHODS
All supraretinacular endoscopic carpal tunnel releases were recorded on video and any interesting anatomical variations encountered were documented on a database.

RESULTS
Dissections will be shown of recurrent motor branches traversing abnormal muscles, the retinaculum, cross communications between the ulnar nerve and median nerve, aberrant vessels and muscles. Analysis of 989 cases demonstrated 166 anatomical variations of the motor branch where it was traversing abnormal muscle or originating in an unusual location. There were 51 vascular abnormalities and 74 cross communications between the median nerve and ulnar nerve.

DISCUSSION
Supraretinacular endoscopic carpal tunnel release is a simple procedure when there are no anatomical variations. This presentation will demonstrate how anatomical variations, flexor tendons, nerves and the carpal canal can be visualized during supraretinacular endoscopic carpal tunnel release.
An Approach to the Patients with Neurogenic Thoracic Outlet Syndrome According to Their Clinical Scenarios

Dr Kee Jeong Bae³, Dr Goo Hyun Baek¹, Dr Hyun Sik Gong², Dr Ji Sup Hwang¹, Dr Jihyeung Kim³, Dr Yohan Lee³
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Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

The purposes of this study were to 1) suggest our diagnostic approach to the patients with neurogenic thoracic outlet syndrome (TOS), and 2) to describe the outcome of 19 cases of surgical release of brachial plexus.

Patients suspected for neurogenic TOS between January 2012 and January 2018 at our institute were reviewed. During the study period, a routine clinical protocol was applied to these patients (n = 91) for diagnosis of neurogenic TOS and determination of surgical management. To assess surgical outcome, pain score in VAS and DASH score which were evaluated before and after surgery were collected. Satisfaction to surgery was assessed according to Derkash’s classification as excellent, good, fair, and poor.

Twenty-nine patients were diagnosed as neurogenic TOS and 19 supraclavicular decompressions of brachial plexus were performed. The mean age was 36 years (range, 15-62). All cases were followed up for more than one year (range, 1-5.3 years). Pain score in VAS improved from 3.6 (range, 0-7) to 0.8 (range, 0-3). DASH score improved from 38.4 (range, 11-81) to 17.1 (range, 0-70). According to Derkash’s classification, eight patients (42%) rated their recovery as excellent, four patients (21%) as good, five patients (26%) as fair, and two patients (11%) as poor.

We could diagnose 29 patients as neurogenic TOS among 91 patients who might have neurogenic TOS using our approach based on their clinical scenarios. Among them, 19 patients underwent surgical decompression of the brachial plexus through supraclavicular approach and their outcomes were favorable.
In situ decompression of the ulnar nerve for patients with failed cubital tunnel surgery

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The purposes of this study were to 1) to document surgical outcomes of in situ decompression of ulnar nerve in failed cubital tunnel surgery, and 2) to identify preoperative factors associated with unfavorable surgical outcome.

Patients who received revision cubital tunnel surgery between January 2001 and December 2017 at our institute were reviewed. Change in numbness in visual analog scale (VAS) and Disabilities of the Arm, Shoulder and Hand (DASH) score were evaluated. Postoperative state was assessed using Wilson and Krout grading system and level of satisfaction. We analyzed preoperative factors to find associations with unfavorable surgical outcome.

Seventeen revision cubital tunnel surgeries from 15 patients were subjects of this study. Mean VAS score was 2.2 (range, 0 ~ 6), while it was 4.8 (range, 2 ~ 7) before revision surgery. Mean DASH score was 12.8 (range, 5.0 ~ 46.6) while it was 30.9 (range, 18.1 ~ 66.7) before revision surgery. Based on Wilson and Krout classification, cases were classified into follows: 2 excellent, 9 good, 5 fair and 1 poor. Fifteen cases were evaluated to be satisfactory while two cases unsatisfactory. The average follow-up period was 4.2 years (range, 1 ~ 11.5 years). Presence of diabetes and history of anterior transposition of ulnar nerve were associated with unfavorable surgical outcome.

In situ decompression of ulnar nerve resulted in favorable outcome in patients with failed cubital tunnel surgery. History of anterior transposition of ulnar nerve and presence of diabetes were associated with unfavorable surgical outcome.
2019 Australian Hand Surgery Society Carpal Tunnel Surgery Audit Report

Dr Roland Hicks¹
²Newcastle Hand Surgery, Newcastle, Australia

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

AHSS 2019 Carpal Tunnel Surgery Audit Report
The Australian Health Professional Regulation Agency (AHPRA) is the statutory body which oversees the registration of medical practitioners and other health care workers in Australia. This is the thirteenth Carpal Tunnel Surgery Audit Report for the Australian Hand Surgery Society. We are indebted to Mark Allison who set up this audit, which satisfies the AHPRA requirement for an audit of all or part of one’s practice each year, for those members of the Society who choose to participate. Some are in private practice only while others, whose public hospital work is regularly audited, take this opportunity to review an aspect of their private practice.
(As the audit period is from 1 January to 31 December 2019 no figures will be able to be provided until at least 31 January 2020)
Ultrasonography guided Percutaneous Release in Patients with Carpal Tunnel Syndrome: Mid-Term Results of a Series 376 Patients (641 operations) and Review of the Literature

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Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

【Objectives】 Development of the mini-invasive procedure such as mini-open (MOCTR), endoscopic carpal tunnel release and more recently ultrasonography guided percutaneous carpal tunnel release (UPCTR) may circumvent adverse outcomes associated with open carpal tunnel release (OCTR) such as prolonged recovery time, scar, and pillar pain. The purpose of this study is to present the mid-term results of UPCTR.

【Methods】641 UPCTR were performed in 376 patients with CTS. We collected age, sex, duration of disease, dominant hand and involved side, thenar atrophy, frequency and provocative factors of symptoms and comorbidity. All patients received the identical operative procedure, under local anesthesia without using tourniquet. Pre and postoperative Visual Analogue Scale (VAS), carpal tunnel syndrome symptom severity scale (CTS-SSS) and carpal tunnel syndrome functional status scale (CTS-FSS) and grip power examinations was recorded and analyzed.

【Results】376 patients were enrolled. The average VAS score was 96.2±20.9 preoperatively and improved to 0 after 6-month follow-up. Average pre-operative CTS-SSS was 1.61±0.98 and CTS-FSS was 3±0.03.14, with improvement to 1.08±0.02 and 1.00±0.00, respectively after 24 months. The grip power strength scores improved from 14.21±9.8kg to 22.86±7.6 kg at the final 2 years follow-up.

【Summary】In this study, 97.3% of the patients had subjectively good result with symptoms improvement. All objective parameters (VAS, CTS-SSS, CTS-FSS, 2-point discrimination tests and grip power) showed progressive and significant improvements during two years of follow-up. UPCTR is an effective and safe procedure in patients with CTS. The mid-term results support this technique can reliably relieve the clinical symptoms, restoration of sensory and grip power.
Revision open carpal tunnel release with hypothenar fat-pad flap

Dr Benjamin Hope1,2, Dr Thomas Maxwell1,2, Ms Wilma Walsh3, Prof Mark Ross1,2,4

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Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

Objectives

Scars in the carpal tunnel (CT) following open carpal tunnel release (OCTR) can result in recurrent CT syndrome with pain, sensory and motor deficits. Revision surgery with pedicled hypothenar fat-pad flap (HFPF) aims to prevent recurrence of scar tissue and improve perineural vascularity. This prospective study reports the outcomes of patients undergoing revision OCTR with HFPF.

Methods

A consecutive sample of 15 patients (16 wrists; 6 female, 11 dominant) underwent the procedure. Mean age was 60 years (range 39 – 78) and follow-up was 14 months (1.5 – 84). Nine wrists had one prior operation, three had 2, and two had 3 or more. CT Questionnaire (LCTQ), QuickDASH, PRWHE, pain, grip and pinch strength, and Global Rating of Change (GRC) were measured and reported as mean (standard deviation).

Results

Comparing pre-operative scores to most-recent follow-up, LCTQ score for symptoms decreased from 3.1 (0.7) to 2.1 (0.9). PRWHE and QuickDASH scores dropped from 52 (30) to 23 (24) and from 51 (27) to 29 (21) respectively. Reported pain decreased from 51 (19) to 22 (24). Grip strength was maintained from 16.1 Kg (7.6) to 19.0 Kg (10.6), and tip-to-tip pinch strength from 3.8 Kg (1.7) to 3.1 Kg (0.9). At most recent follow-up, GRC scores for symptoms and function were 4.2 (3.8) and 2.5 (3.2) respectively.

Summary

These results, combined with those presented in the literature, suggest that OCTR with HFPF shows outcomes better than revision without flap while being much simpler than other pedicled and free flaps.
ECTR vs OCTR. What is the evidence.

Dr Margaret Fok

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

Carpal tunnel syndrome remains to be the most common compressive nerve entrapment disorder in the upper limb. Both open and endoscopic carpal tunnel release are established effective procedures with good functional outcomes. Each has its own advantages and disadvantages. While endoscopic carpal tunnel release has gain popularity in the last few decades, it seems the paradigm of treatment has shifted back to open carpal tunnel release in recent years. We will present to you the current evidence of both procedures, in terms of surgical techniques, complications, and outcomes.
Epicondylectomy in the Management of Cubital Tunnel Syndrome

Mr Phil Griffin

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

Cubital tunnel surgery has a confusing literature with advocates for different procedures. I shall seek to justify my indications for simple decompression or for medial epicondylectomy and transposition. Key points in the surgical technique shall be discussed.
Uncommon Nerve Compressions

Dr Andrew Yam

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

Nerve compression syndromes are common causes of pain, numbness and weakness in the upper limb. Carpal tunnel and cubital tunnel syndrome have been extensively studied, are almost instantly recognisable and treatable with predictable outcomes in most cases. Less common nerve compression syndromes are easily overlooked or misdiagnosed, resulting in significant prolonged morbidity from wrong or no treatment.

This lecture explores some uncommon nerve compressions affecting the hand, including pronator syndrome, AIN syndrome, radial tunnel syndrome, PIN compression palsy, Wartenberg syndrome, Guyon tunnel compression, and hereditary nerve pressure palsy (HNPP).

Most are diagnosed based on awareness of their existence and their clinical presentation only. Useful clinical indicators suggesting nerve compression syndromes include signs and symptoms confined to the dermatological or muscular territory of the nerve involved, nerve tenderness together with paraesthesia in its territory on applying digital pressure, scratch-collapse test, and exacerbation by specific provocative tests. Electrodiagnostic studies are commonly negative, but are useful to exclude other possible diagnoses and to confirm severity of muscle denervation if weakness is present. Radiological investigations such as MRI, MR neuroradiography and ultrasound may demonstrate changes in the nerve around the site of compression such as edema or constriction, masses causing compression, or changes in muscles suggesting denervation.

Conservative management includes activity modification, muscle relaxants, oral corticosteroids or anti-inflammatory medications, and physical therapy. Surgical decompression is indicated for acute profound weakness or paralysis, acute severe neuropathic pain, or failed conservative management.
The aetiology of CTS, occupational or constitutional

Prof Peter Amadio

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

This presentation will review the current evidence regarding the etiology of carpal tunnel syndrome, with an emphasis on the biological and physiological underpinnings of the disorder, and the various physical and physiological factors that might drive the pathophysiology. The role of repetitive activity, cellular senescence, fibrosis and inflammation will all be reviewed.
Endoscopic cubital tunnel release and anterior transposition with Hoffman system

Dr Andrew Yam

Nerve 1 - Nerve Compressions, Courtyard Room 1 and 2, March 13, 2020, 7:00 AM - 10:00 AM

Endoscopic cubital tunnel release has equivalent results and complications to open release, with a much smaller incision. It has also been shown to be as effective as anterior nerve transposition for most cases of cubital tunnel syndrome, with less complications and faster return to work.

The Hoffman technique uses an endoscopic brow-lift tissue dissector mounted on a 4.5mm 30-degree endoscope to create a plane superficial to the ulnar nerve, allowing direct top-down visualisation of the nerve and any overlying fascial bands or anatomical anomalies causing compression. These are divided using a long blunt tipped Metzenbaum scissors.

In certain situations, anterior transposition may be indicated. These include subluxing ulnar nerve preoperatively, ulnar nerve that subluxes following simple release, presence of large osteophytes that may continue to impinge on the nerve, a prominent medial epicondyle causing increased nerve traction on elbow flexion, and previous trauma around the epicondyle with scarring around the nerve.

Conventional open anterior transposition requires a lengthy incision to ensure a long enough segment of the ulnar nerve is free proximally and distally to the epicondyle, while preserving its vascularity. The branches of the medial antebrachial cutaneous nerve are at risk of injury and painful neuroma formation with this incision. Using the Hoffman endoscopic cubital tunnel release to free the ulnar nerve, anterior subfascial or subcutaneous transposition can be done via a limited 3-4cm incision, allowing return to full use of the upper limb in 2 weeks in most cases.
Electronic Medical Records. Is there a problem? Is there a solution?

A/Prof Michael Sandow

Cybersecurity and patient privacy, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

The transition to an electronic medical records (EMR) environment has been generally problematic and frequently regarded at the clinician level as frustrating and productivity compromising. It is seen as an example of a required technology paradigm imposing a shift in well-established and effective clinical care processes.

The design priorities and drivers of EMR are almost always non-clinical and relate to the efficient management of data, the ability to analyses patient care metrics and the perceived IT advantages of efficient information access and storage. While efficiency and quality gains in patient care is claimed, the reality is generally the opposite. Clinicians will adapt as required and frequently develop “work around solutions”, but the purported gains in productivity at the clinical coal-face are rarely realized.

By setting the clinician interaction and data gathering capabilities as an absolute priority, and using standard inter-operable connectivity, a fit for purpose electronic clinical record can interface with existing data management platforms and EMR systems to maximize the success of the digital transition.

Patient care delivery by the clinician must be the key driver, with IT systems adapting and delivering solutions to achieve the desired critical integrative centrality that realizes improved outcomes and addresses the needs of the entire health care axis.

Cybersecurity- how to stay safe(r) in an ever more connected world’

Prof Peter Amadio

Cybersecurity and patient privacy, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

The risks of identity theft, loss of protected data (clinical, financial, business secrets) is steadily rising, as attackers use increasingly sophisticated methods to probe individuals, networks and devices (“the internet of things”) for vulnerabilities. This talk will review the current threat landscape, and a strategic framework that individuals and institutions can use to reduce risk of cyber harm.
New strategy for the treatment of lateral epicondylitis of the elbow

Dr Ryusuke Honma¹, Dr Yasushi Naganuma¹, Dr Toshiya Nito¹, Dr Hiroshi Satake¹, Dr Junichiro Shibuya¹, Prof Michiaki Takagi¹

¹Yamagata University Faculty Of Medicine, Yamagata, Japan

OBJECTIVES: We have developed a new strategy for the treatment of lateral epicondylitis of the elbow.

METHODS: We diagnosed lateral epicondylitis of the elbow in 86 patients. Conservative treatment for 6 months was the first choice, and this resulted in resolution in 60 patients. Surgery was required in the remaining 15 patients. If the posterior branch of the posterior cutaneous nerve of the forearm (PBPCNF) showed a positive response to local anesthesia (block test), we performed PBPCNF denervation surgery. Conventional arthroscopic treatment was performed for patients showing a negative response in the block test. Patients were asked to rate the degree of pain and sensory disturbance using a visual analog scale (VAS), the 11-item version of the Disability of the Arm, Shoulder and Hand (QuickDASH) measure, and the patient-rated elbow evaluation (PREE).

RESULTS: A positive response to the block test was seen in 10 elbows (67%). After denervation surgery, pain relief was seen in 9 elbows (90%). The mean follow-up period was 30.4 months. At the final follow-up, the average VAS for pain, the QuickDASH score, and the PREE score were 4.3 mm, 10.45 points, and 5.9 points, respectively. In the early period after denervation surgery, sensory disturbance was observed in 9 cases (90%).

SUMMARY: Our new strategy of denervation surgery for lateral epicondylitis of the elbow was effective for relief of pain among patients showing a positive response in the block test.
VOLAR SCAPHOID PLATING FOR NON-UNION: A MULTICENTRE CASE-SERIES STUDY

Mr Kevin Eng1,2, Mr Vivek Shridar3, Dr Stephen Gil2, Dr Simon Hoy1, Dr Natasha Van Zyl1, Prof Richard Page1,2

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Free Papers 8 - Elbow, Scaphoid, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

The volar scaphoid plate is a variable angle titanium locking plate. It may act as a buttress plate for correction of humpback deformity. Our objectives were to review our case series, and suggest technical pearls.

METHODS
Patients were retrospectively reviewed. Operations were performed by 3 hand fellowship trained surgeons in 2 centers. Inclusion involved a scaphoid plate procedure for a non-union of the scaphoid with a minimum of 6 months of follow up. Exclusions were those who had less than 6 months of follow up.

Data included demographics, patient rated wrist evaluation (PRWE), a disabilities of the arm, shoulder and hand (DASH), visual analogue score (VAS) and range and grip. Radiology was reviewed.

RESULTS
Thirty two patients were assessed. The mean age was 25 years (range 13-46), fifteen were smokers. Mean follow up was 18 months.

Twenty nine of 32 patients united (90.6%). Clinical assessment was carried out in the 29 patients. The mean dash score was 12.5 (range 0-42), mean PRWE was 11 (range 0-54). The mean arc of motion was 115 degrees. Grip strength was recorded in 13 patients. The mean was 39kg compared to 41kg on the non-operated side.

SUMMARY
The plate acts like an internal bridging device, acting over a small distance, and inherent stability of the construct prior to plating is advantageous. Problems include impingement on the volar lip of the radius, particularly when trying to plate more proximal fractures. Ideally it is utilized for mid to distal waist fractures.
Arthroscopic debridement for osteochondral lesion of the posteromedial trochlea in baseball players

Dr Yasuhiro Mitsui1, Dr Hidehiro Nakamura2, Dr Hisao Shimokobe3, Syuichiro Sakai1, Dr Masafumi Gotoh2, Dr Syoji Nakao1, Dr Kosuke Hyakutake1, Dr Naoto Shiba3
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Objectives
Few reports have described osteochondral lesions (OCL) of the posteromedial area of the humeral trochlea. This study investigated the outcomes of arthroscopic debridement for OCL of the posteromedial aspect of the humeral trochlea in baseball players.

Methods
The study included 5 patients (5 elbows, all men) among 12 patients diagnosed with OCL of the posteromedial aspect of the humeral trochlea between April 2017 and August 2018. The mean age at surgery was 17.2 years (range 16–20 years). The mean duration between the onset of pain and surgery was 6 months. With regard to their positions, 4 were pitchers and 1 was a fielder. The mean postoperative follow-up period was 8.4 months. Concomitant medial collateral ligament injury occurred in 2 patients, and these patients received conservative therapy. The parameters investigated were pre- and postoperative Japanese Orthopaedic Association (JOA) sports score and the return to competition postoperatively by the Conway-Jobe rating score.

Results
The mean time until restarting pitching postoperatively was 71.8 days (range 56–90 days). The mean JOA sports score improved significantly from 44.6 points preoperatively to 91.2 points postoperatively. Using the Conway-Jobe rating scale, 4 patients showed ‘excellent’, and 1 patient showed ‘good’ scores.

Summary
OCL of the posteromedial aspect of the humeral trochlea is commonly undiagnosed over long periods. Ultrasonography or computed tomography is useful in the diagnosis. Arthroscopic debridement was performed for OCL of the posteromedial aspect of the humeral trochlea in baseball players and was associated with favorable postsurgical treatment outcomes.
Three-Dimensional Computerized Tomography Analysis of Acute Scaphoid Fracture Patterns

Prof Gregory Bain\textsuperscript{1,2}, Dr Anne Eva Bulstra\textsuperscript{1,3}, Dr Job Doornberg\textsuperscript{1,2,3}, Mr Batur Hayat\textsuperscript{1}, Ms Miriam Oldhoff\textsuperscript{4}, Dr Arthur Turow\textsuperscript{1,2}, Dr John While\textsuperscript{1,2}

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Free Papers 8 - Elbow, Scaphoid, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

The aim of this study was to characterise acute scaphoid fracture morphology using 3D CT. Fracture patterns can provide insights into fracture morphology and allow correlation to other characteristics such as comminution and displacement.

Adults with an acute scaphoid fracture (<6 weeks) were retrospectively studied. Patients with pre-existing scaphoid pathology and scans of insufficient quality were excluded. CT-scans were manually segmented to create 3D surface-rendered models. Displaced fractures were virtually reduced. Fracture lines were mapped onto a 3D template of an intact scaphoid.

75 fracture were examined, revealing four distinct fracture patterns: 1) Proximal pole (9%): Fractures proximal to the dorsal ridge of the scaphoid. These fractures were typically more distal than previously described; 2) Transverse waist: 37% of the fractures, fractured transversely through the waist; 3) Oblique waist (31%) fractures ran obliquely along the dorsal ridge of the scaphoid; 4) Tubercle fractures (11%) involved the scaphoid tubercle. Three fractures (4%) were incomplete, both involving the waist. Three fractures (2 proximal and 1 oblique waist) were part of a perilunate dislocation. Most fractures were comminuted (52%) or displaced (64%). 73% of displaced fractures had concomitant comminution. Waist fractures had higher rates of comminution and displacement when compared to all other fractures. Communion was located along the dorsal ridge and the volar scaphoid waist.

Our 3D CT analysis confirms four distinct fracture patterns when using the dorsal scaphoid ridge as reference. A better insight into fracture morphology and associated characteristics can aid surgeons in the understating of fracture aetiology and prognosis.
INCIDENCE OF ASSOCIATED WRIST INJURIES IN DISPLACED SCAPHOID FRACTURES

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Objectives:
Displaced scaphoid fracture AO type B/C is usually treated surgically. This moderate to high energy trauma could disrupt the integrity and biomechanics of the wrist. The purpose of this study was to describe the associated wrist injuries in this type of fracture.

Methods:
Retrospective study on 30 cases with displaced scaphoid fractures AO type B and C, which were treated surgically via Kirschner (K) wire or headless screw fixation. Incidence of associated carpal bones, radio-ulna fractures or intrinsic ligament injuries were investigated with X-rays, CT scan ± MRI and intra-operative assessment.

Results:
There were 30 cases, 28 male and 2 female with mean age of 26 years old. 58% of the cases required headless screw fixation of the scaphoid, while 22% had K-wire fixation only, 20% required both K-wire and screw fixation. The most common injury to occur alongside were perilunate dislocation (38%), radial styloid fractures (10%), while lunate fractures, ulna styloid fractures, distal end radius fractures and scapholunate ligament tear each constitutes 6%. Some of the rare injuries, each occurring at 3% were triquetrum, hamate, capitate, trapezoid fractures and lunotriquetral ligament tear. Average time for union for isolated scaphoid fractures was 3.1 months, while scaphoid fractures with associated injuries united at 3.6 months.

Summary:
Displaced scaphoid fractures implicate substantial trauma to the wrist biomechanics. Thus, incidence of associated injuries is high and might be missed in routine X-rays. Pre-operative CT scan or MRI can help in proper diagnosis and pre-operative planning for the benefit of patients.
Salvage of the proximal scaphoid: A retrospective comparison of Medial Femoral Trochlear Osteocartilaginous graft and Costo-osteochondral graft with a minimum 2 year follow-up

Mr John Galbraith1, Mr Cameron Keating2, Mr Chris Powell2, Mr Charles Bain, Mr Peter Maloney2, Mr Anthony Berger2,3, A/Prof David McCombe2,3, A/Prof Eugene Ek1, Mr Stephen Tham1,2,3
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Objectives
The aim of this study was to compare outcomes of free vascularized medial femoral trochlear (MFT) osteochondral graft and the costo-osteochondral graft (COG) at a minimum of 2 years postoperatively.

Methods
All patients who had undergone either a MFT or COG for fractures of the proximal third of the scaphoid over the last 20 years. Baseline demographic information was collected. Patients returned for clinical review and outcome measures were recorded (DASH, PRWE and VAS). Range of motion (ROM) of the wrist and grip strength were measured. Follow-up radiographs were reviewed to identify degenerative changes and carpal alignment.

Results
There were 12 MFT and 21 COG procedures performed, of which 9 MFT and 12 COG patients presented for review. The MFT group were younger (average 30.6 Vs 38.3 years, p=0.01) and had significantly shorter follow-up (average 35 Vs 124 months, p<0.001). The MFT group had significantly better postoperative VAS (1.4 Vs 3.3, p=0.05), but there was no significant difference in postoperative DASH (15.3 Vs 12.7), PRWE (23.3 Vs 16.5) or Grip strength (41 Vs 35.6 kg) (p>0.05). There was no significant difference in postoperative wrist Flexion/Extension arc (65°Vs 77.7°), Ulnar/radial arc (36.1° Vs 34.2°) and Pronation/Supination arc (159.4° Vs 158.9°) (p>0.05). The two groups had a markedly different complication profile.

Discussion
The survivability of the COG group is notable at 10 years with good outcomes despite the radiological changes. The intermediate results of the MFT group are promising and potentially will have better long-term outcome.
Volar percutaneous screw fixation of horizontal oblique scaphoid fractures: Does different screw placement affect the fixation strength

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Objectives
Recently, some surgeons reported that most waist fractures were horizontal oblique rather than transverse. This cadaveric study aimed to biomechanically compare the fixation strength between central and eccentric screw placements for volar percutaneous fixation of horizontal oblique scaphoid fractures.

Methods
Eight matched pairs of fresh-frozen forearm cadaver specimens were prepared for testing and randomly assigned to two groups. Group I specimens were fixed by screws in central placement. Group II specimens were fixed by screws in eccentric placement. A horizontal oblique osteotomy was made along the scaphoid waist. We potted scapho-lunate specimens in a holder with polymethylmethacrylate. Then each specimen was placed under the increasing load of a pneumatically driven plunger. We recorded stiffness, load to failure, and failure mechanisms between the central and eccentric screw placement groups.

Results
Stiffness was higher in central screw placement (74.1N) than in eccentric screw placement (29.38 N). The median load to failure in group I and II was 65.30 (76.04~43.84) N, and 29.69 (36.93~20.33) N, respectively. The specimens in group I demonstrated a significant increase in the fixation strength of the construct (p < 0.001). The failure mechanism for all specimens was fracture at the screw-bone interface.

Summary
In this biomechanical model of a horizontal oblique scaphoid waist fracture, we demonstrated that central placement is superior to eccentric screw placement in terms of fixation strength. However, further clinical investigation is warranted to evaluate whether the different screw placements for volar percutaneous approach of horizontal oblique scaphoid fractures affect the clinical outcomes.
Supracondylar Fracture of the Humerus and Late Displacement – for Avoiding Cubitus Varus Deformity

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Objectives
Posttraumatic cubitus varus deformity is the most common late complication of a supracondylar fracture of the humerus. However, avoiding such a deformity is most ideal. Remaining internal rotation, such as anterior spike on the radiographs, at the initial treatment for supracondylar fracture of the humerus causes cubitus varus deformity.

Methods
We followed up 160 elbows with supracondylar fracture of the humerus for more than a year. The average age of the patients at the time of the injury was 5.8 years. The humerus-elbow-wrist angle (HEWA) and Baumann’s angle (BA), tilting angle (TA), medial shift (MS) and anterior spike length (AS) on the radiographs at the time of the injury (conservative cases) or immediately after surgery (operative cases) were assessed. The carrying angle (CA) was clinically assessed at the final follow-up.

Results
No significant correlations were detected between HEWA/BA/TA and CA at the final follow-up. However, MS/AS showed more significant correlations (p < 0.01). All cases with anterior spikes > 3 mm on the lateral view of radiographs at the time of the injury or immediately after surgery had CA >10 degrees at the final follow-up.

Summary
Neither medial shift nor anterior spike should not be left at the initial treatment. We should not consider closed reduction but open reduction if there remain such deformities. Gartland type II should be divided into 2 subtypes, with (IIb) or without (IIa) anterior spike. Gartland type IIb should be indicated for the operation for reducing anterior spike to avoid the cubitus varus deformity.
The sliding osteotomy technique for treatment of the radial head fracture; four case series

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Objective
We present four cases who underwent open reduction and internal fixation (ORIF) using a sliding osteotomy technique (modified Blair fusion) for dislocated radial head fracture.

Methods
Three fresh radial head fracture cases and one nonunion case with follow up period of more than 6 months underwent ORIF. Three cases were classified to the Mason type 2 while one case was to the Mason type 3. We initially exposed radial head and neck using a lateral approach, then the osteotomy (width was one quarter circumference of the proximal radius consistent with the fracture line and length was from the base of radial head to proximal edge of the supinator, approximately 2 cm) was performed, consecutively the fragment was slid proximally to stabilize the fracture. The fragment was fixed to the residual radius with screws followed by cancellous auto bone grafting as needed.

Results
All cases achieved bone union. There were no postoperative complications except for small correction loss in one case. The Mayo Elbow Performance Score were 100 in two cases, 95, and 90, respectively.

Discussion
The technique has two advantages including wide bony contact that can promote bone union, and rigidity of slid fragment that stabilizes fracture site like plate. The disadvantage is extensive exposure of the fracture site. Meticulous screw insertion may be required to achieve good supination-pronation.

Summary
The sliding osteotomy technique for displaced radial head fracture results good bone union and satisfied functional outcomes.
Arthroscopic osteosynthesis with bone substitutes in carpal nonunion and arthritis

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Free Papers 8 - Elbow, Scaphoid, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

Objectives: Autogenous bone grafts always is best choice for orthopaedic surgeon. Although autograft is still the gold standard, limited supply and donor morbidity must be considered. The advantages and disadvantages of all of these bone graft materials will be emphasis on their relevance and applicability for arthroscopic procedures.

METHODS: From 2010 to 2018, 35 patients had received arthroscopic osteosynthesis procedure due to scaphoid nonunion, arthritis of carpal joint. There were 21 male and 14 female in our series, mean aged 40.3 years (range, 23 to 58). There were 18 patients with scaphoid nonunion and 17 patients with advanced arthritis; they all received arthroscopic osteosynthesis with bone substitutes and fixation with headless screws or K wires. Post operation, they all received splinting for 4-6 weeks.

RESULTS: In nonunion of scaphoid bone, 20/23 (86.95%) get union. Two of three still non-union patients had received vascularized bone graft for osteosynthesis. In partial fusion of carpal bones, 10/12 (83%) patients get fusion. Two patients still non-union of carpal fusion (one RCJ, one STT). In our series, most calluses could be found from x ray around 10-12 weeks post operation. No any complication found in our series.

Summary: We report the results and conclude the arthroscopically assisted treatment with the injectable bone graft substitute is a reliable and minimally invasive method to achieve union and healing.
Individualized Prosthetic System for the Treatment of Irreparable Radial Head Fracture: Preliminary Experience in Eleven Cases

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Objectives
The present study aimed to present the surgical technique and evaluate the outcomes of individualized radial head prosthesis (IRHP) generated by the reverse engineering technology in treatment of irreparable radial head fractures associated with elbow instability.

Material and methods
Between January 2016 and December 2018, eleven patients (6 women, 5 men; mean age: 45.6 years, mean follow-up duration: 18.4 months) underwent radial head replacement using the individualized radial head prosthesis equipped with instruments designed to properly restore the patient’s anatomy. Of these patients, 7 sustained an acute fracture and 4 had a chronic injury. There were 3 Mason III and 8 Mason IV fractures. A computed tomographic scan of the patient’s contralateral elbow was done and used as a mirror image to create the individualized prosthesis, patient-specific surgical guides and 3D models for pre-operative planning. In the first two patients, the titanium prostheses were manufactured from precision casting utilizing 3D-printed pattern whereas the others titanium prostheses were 3D-printed, directly from metal powder, using selective laser melting technology.

Results
Intraoperatively, the prosthetic articular surface was well congruent with the native radial notch of the ulna and capitellum in all cases. The artificial radiocapitellar articulating surface was completely even with the native coronoid articular surface. On the basis of Mayo Elbow Performance Scores, 7 patients had excellent results; and 4, good results at the final follow-up.

Summary
IRHP provided the satisfactory results in the preliminary study. Our experience has encouraged us to continue using such prosthesis in irreparable radial head fractures.
Mini-operative treatment of tennis elbow using bipolar radio-frequency

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Free Papers 8 - Elbow, Scaphoid, Eureka Room 1, March 13, 2020, 7:00 AM - 10:00 AM

Tennis elbow is a noninflammatory, degenerative condition of the origin of the ECRB or EDC, associated with overuse and characterized by: absence of inflammatory cells, profusion of disorganized collagen and fibroblastic hypertrophy. A principal aim in treatment of tendinosis is to establish a biologic healing response. The purpose of this study was to evaluate the long-term results, safety and effectiveness of using RF-based microtenotomy to treat tennis elbow. It was prospective, nonrandomized, two-center clinical study. Into the study were involved 49 patients with symptomatic epicondylitis lateralis and failed conservative treatment. The average age of patients was 44.9 years. Dominant limb was involved in 89% of the patients.

We used bipolar microtenotomy of ECRB and EDC using TOPAZ Microdebrider. Before operation was done VAS, DASH and clinical examination. Postoperative clinical assessment: 2 and 14 day. FU: 12 and 24 months after operation: VAS, DASH, USG, clinical examination. There were no complications related to the procedure.

The mean VAS decreased from 8.8 before operation to 2.6 (p=0.001). Postoperative DASH was 21.6. Ultrasound abnormalities 24 months after operation: focal hypoechoic area (74%), focal anechoic area (33%), cortical irregularity 70%), tendon thickening (27%), intratendinous calcifications (22%), increased vascularity (18%).

RF-based microtenotomy appears to be a safe and effective method for treating patients with chronic tendinosis. Microtenotomy is a technically simple procedure to perform and associated with a rapid and uncomplicated recovery.

Ultrasoundography is a widely and inexpensive study for assessing tendons providing useful information on the severity and stage of tendon pathology.
Are our forearms really symmetrical? (Combined - The shape of the radius differs between men and women + Right to Left shape differences in the ulna + Ulnar size, not shape, differential is between men and women)

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Wrist 6 - Advancing technology in wrist surgery, Eureka Room 2, March 13, 2020, 7:00 AM - 10:00 AM

Objectives

Understanding normal radius geometry is important for diagnosing forearm disorders and planning corrective osteotomies. It is known that male radii are larger than females, however it is not clear shape differences exist independent of size. The aim of the study is to evaluate differences in the shape of the radius between males and females.

Methods

The left and right radius bones of 20 males, and 20 females, were segmented from CT data. All data clouds were aligned using super imposition and the left bones were reflected. To account the differences in size data clouds were scaled to a uniform length. Using in-house created software modes of shape variation were created using principal component analysis. Mode weights were then normalised to the standard deviation of each mode.

Results

The first ten principal components showed 81% of the total radius shape variation. There was a significant difference in the first mode which captured 27% of the variation. This mode primarily captured torsion in the shaft of the radius. The apex of the radius bow tended to be more lateral in females rotating to a more postero-lateral position in males. Due to the larger bones angles within the distal radius were significantly smaller in males than females.

Conclusion

Males tended to have a bow in the radius shaft that was rotated posteriorly relative to females. This rotation variation may provide greater mechanical advantage to pronating and supinating muscles. Angular differences need to be taken into account when operating on males versus females.

Objective

Proximal ulnar geometry is complex and inadequate fracture reduction produces instability and arthritis at the elbow. There has been a move towards patient specific computer-assisted approaches using the contralateral bone as a model. The aim of this paper is to compare shape differences between sides in the ulnar.
Methods

CT scans were performed on 40 cadaveric subjects. Segmentation using in-house designed software were made of right and left ulnae. This created a register of bones, the left bone was reflected and all bones were scaled to an average length and fitted to a common mesh. Using the software the program was able to identify modes of shape variation. Each mode was given a specific weight and calculations of absolute differences and mode weights were created and normalised to standard deviation.

Results

Having normalised bone length, the first ten principal components captured 86% of the total shape variation. On average the shape of the right and left bone is different by 0.4-0.6 standard deviations. The only significant differences were in the fifth and eighth modes which represent a very small proportion of the overall shape variation.

Conclusion

In general, the contralateral ulna provides a good approximation of ipsilateral ulnar geometry. However there were asymmetries of up to 2.2 standard deviations for some individuals. Therefore, some patients may experience poor treatment outcomes when side to side symmetry of the ulnar is assumed. Further research is needed to identify these patients to define a more accurate target anatomy.

Objectives

Malunions of the proximal ulna can cause forearm instability and elbow arthritis. It has been reported that there significant sex differences in geometry of the ulna. However, it is not clear whether this observation relates to shape differences or differences in bone size. The aim of this study was to investigate differences in ulnar shape between males and females independent of the differences in size.

Methods

Right and left ulnar bones were segmented from the CT scans of 20 males and 20 females. Bones were aligned using super imposition and the left ulnae reflected. Bones were isometrically scaled to a uniform length. A triangular surface mesh was created providing 20,000 nodes. Ulnar shape variation was then characterised using principal component analysis, and with the use of in-house software weighted modes of variation were created.

Results

After normalising for bone length, the statistical shape model captured 81% of the total ulnar shape variation in the first 7 components. The first component represented 37% of the shape variation and the weight associated with this mode was 0.73 standard deviations larger in males than females this mode was primarily associated with greater ulna volume, a large trochlear notch and a more prominent supinator crest. There were no significant differences observed in the modes capturing variation in the curvature of the ulnar shaft and in the shape of the proximal and distal ulna.

Summary
Male and female bones differed in bone volume. There were no substantial differences in curvature or shape.
3D-Printed Computer Generated Patient-Specific Guides for Corrective Osteotomy

Mr Jeffrey Ecker

Jeff Ecker Hand and Wrist Microsurgeon, Claremont, Australia

Wrist 6 - Advancing technology in wrist surgery, Eureka Room 2, March 13, 2020, 7:00 AM - 10:00 AM

Introduction
This study analyses the results of 3D-printed patient-specific guides used for corrective osteotomy of the distal radius and/or ulna.

Results
Over 6 years (2013-2019) comparative imaging has been performed for 76 patients. Of these, 46 proceeded with surgery (60.5%). 37 were extra-articular, 2 intra-articular, 5 diaphyseal and 2 were classified as ‘other’ (one metacarpal and one lunate model). 2 patients had the osteotomy performed as part of a multi-stage procedure before partial wrist fusion. They were excluded from the study, along with a further 15 with incomplete data, 6 still in process and the 2 classified as ‘other’.

Measurements at an average of 15 months post-surgery demonstrated mean wrist flexion of 55° (81% of the contralateral side), extension of 61° (91% of the contralateral side), radial deviation of 22° (82% of contralateral side), ulnar deviation of 27° (100% of contralateral side), lateral pinch of 6.8 (88% of contralateral side), 2-point of 4.6 (98% of contralateral side), 3-point of 5.7 (87% of contralateral side), Jamar power of 22.6 (85% of contralateral side) and force plate of 85% compared to contralateral side.

There were 4 complications; one plate fracture, one ulnar nerve compression which resolved with transposition and release, one case of ulnar carpal impaction requiring an ulna shortening osteotomy and one anterior superior iliac spine fracture.

Conclusions
The use of 3D-printed patient-specific guides has turned a complex and at times unpredictable procedure into a reliable operation where one can expect a good outcome with a low complication rate.
3D surgical planning

A/Prof Michael Sandow

Wrist 6 - Advancing technology in wrist surgery, Eureka Room 2, March 13, 2020, 7:00 AM - 10:00 AM

The ability to plan an operation and anticipate issues and preempt risks and problems prior to performing the procedure, is the hallmark of a skilled surgeon - and a pathway to an optimum outcome for the patient. Virtual surgical planning enables surgeons to realize a pre-operative planning capability, but is generally predicated on delivery in a commercially viable outcome for the suppliers of the technology. This requires the provision (and funding) of printed 3D models, the provision of expensive interactive software, or the utilizations of implants where the cost of the implant cross subsidizes the provision of the virtual planning capability. Despite the hype, this approach has been generally unable to justify the additional expense by the resultant improved outcomes.

An alternative solution is to deliver the virtual planning capabilities to the clinician as part of the normal provision of diagnostic imaging. Using a system of interactive 3D technology, the anatomical model can be imported, and using a series of simple virtual tools, plan and practice the proposed intervention. Models of implants can be imported within a system to protect the IP and prevent unauthorized copying, but still allow real time templating.

This option allows the surgeon to plan the surgery without the restraints of a vendor controlled interactive interface, the requirement for biomedical engineers, or the additional costs inherent in existing virtual surgery systems which generally require 3D model or cutting guide printing. Improved capabilities can simply be achieved by handing control of the surgical planning to the surgeon.
Arthroscopy has completely revolutionized the field of joint surgery. Superior visualization, coupled with a minimally invasive approach, allows for a less painful surgical intervention leading to faster recovery. While now the standard of care in such joints as knee and shoulder, it is perhaps ironic that the joints perhaps best suited for this technique remain neglected. Small joints, whether in the hand or foot, are inherently difficult to visualize by open means simply due to their miniscule dimensions. While the knee is still amenable to an open approach with minimal disruption, this can be difficult in the small joint where simple arthrotomy can lead to marked scarring and stiffness. In the hand, articular and capsular pathology of the metacarpophalangeal joints in digits and thumb, can lead to marked dysfunction. The thumb basal joint remains the most common symptomatic location for hand osteoarthritis.

Arthroscopic treatment is ideally suited for these small joints and indications/methodologies should be well understood in order to increase utilization and incorporation to the treatment armamentarium.
Minimal Invasive surgery and assessments of upper limb conditions

Dr Ter Chyan Tan

Wrist 6 - Advancing technology in wrist surgery, Eureka Room 2, March 13, 2020, 7:00 AM - 10:00 AM

Upper limb surgery has historically been done with direct vision of the anatomy and handling of the six main tissues in an open manner. There are many named incisions made to access the injury and the repair and fixation. The development of endoscopic, arthroscopic techniques pioneered have been now shrunk in size to fit the small spaces in the upper limb namely the wrist and spaces in the hand and forearm. The use of image intensifiers, some of which are now ultraportable, are common and in mainstream use. The ease of use and adoption ultrasound techniques have enhanced the use of these minimally invasive techniques by providing real time dynamic guidance. This lecture touches on the recent and soon to be available techniques and options we will be dealing with in the 2nd decade of the 21st century.
4D scanning for dynamic wrist disorders

Mr Simon MacLean

Wrist 6 - Advancing technology in wrist surgery, Eureka Room 2, March 13, 2020, 7:00 AM - 10:00 AM

4-Dimensional Computed Tomography (4DCT) is a diagnostic tool used in the assessment of dynamic upper limb disorders. Functional wrist anatomy is incompletely understood, and traditional imaging methods are often insufficient in the diagnosis of dynamic disorders.

We have developed a protocol for 4DCT of the wrist, with the aim of reviewing the clinical utility of this technology in surgical assessment. A Toshiba Aquilion One Vision scanner is used in which 2D and 3D ‘static’ images, as well as 4D ‘dynamic’ images are produced and assessed in the clinical context of each patient. These consist of a series of multiple 7-second movement clips exploring the nature and range of joint motion.

We have demonstrated varied abnormalities of joint movement attributed to a range of wrist pathology including degenerative arthritis, ligamentous injuries, Kienbock’s disease and pain following previous surgical reconstructive procedures. In our provisional study, interpretation of the 4DCT scan changed the clinical diagnosis in 13 cases (68.4%), including the primary (15.8%) or secondary diagnosis (52.6%). In all cases the assessment of the dynamic wrist motion assisted in understanding the clinical problem, and lead to a change in management in 11 case (57.9%).

We have found that the clinical utility of 4DCT lies in its ability to provide detailed information about dynamic joint pathology not seen in traditional imaging, targeting surgical treatment.
Comparison of outcome of ADP free flap and thin groin flap for coverage of dorsum of hand wound.

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Reconstruction 3 - Perforator and Local Flaps in the Hand, Eureka Room 3, March 13, 2020, 7:00 AM - 10:00 AM

Objective: Dorsum of the hand is not only serving as functional unit but also have a greater impact on psychological impact of a person. Thus, always there are several options for the wound coverage. We present our experience for a free flap and a distal flap for to serve the patient’s better interest.

Method: This is a retrospective study which included the operations held on 2017-2019. Twenty patients were included in this study, ten in each option. Patients were selected to each group based on the criteria according to donor site availability, recipient site requirement and patient’s desire.

Results: All patients were followed up at least 6 months. There were no statistically significant difference of clinical outcome of two group, however patient’s satisfaction is higher with ADP free flap option

Summary: Favorable results were obtained from both the options however selection of the should consider careful attention of patients’ expectation
SCIP flaps for hand reconstruction

Dr Sandeep B

Reconstruction 3 - Perforator and Local Flaps in the Hand, Eureka Room 3, March 13, 2020, 7:00 AM - 10:00 AM

Dorsal hand and web space are unique because of the thin pliable skin normally present to aid the functionality of the hand. When patient present with such defects, it’s a technical challenge to replace like with like.

The objectives in such defects are infection control, early cover to prevent tendon desiccation and early return to activity. Criteria’s taken into consideration in the selection of flaps are 1) Reliable and reproducible flap 2) Thin flap to aid in early functional recovery 2) Flap that is easy to raise again for further secondary procedures like tenolysis/ tendon reconstruction.

The options available are 1) Suprafacial ALT 2) SCIP 3) facial flaps with graft 4) PIA perforator flaps 5) Muscle flaps.

We present 16 cases of SCIP flaps used for such defects in last 4 years. 1 flap was done as a part of first stage flap cover before toe to hand transfer. All of the patients could achieve early uncomplicated functional recovery.

Advantage of SCIP over other mentioned flaps are 1) Reliable and reproducible 2) Even in obese individuals the groin crease is thinnest compared to other flap donor regions 3) Can be raised thin with reliable direct cutaneous perforator 4) Secondary procedures are easy since it is easy to re raise the flap 5) Donor site scar is well concealed in the groin crease.

Conclusion:
SCIP is a reliable reproducible thin faciocutaneous flap coverage option for dorsal hand and webspace defects aiding in early functional recovery.
Reconstructive Microsurgery of The Hand

Dr Nyoman Riasa

Reconstruction 3 - Perforator and Local Flaps in the Hand, Eureka Room 3, March 13, 2020, 7:00 AM - 10:00 AM

Introduction. The history of microsurgical reconstruction begins with microsurgical replantation of the hand. Evolution of flap surgery has changed since the application of microsurgical technique on tissue transplantations. Various tissue free flaps are now available for hand reconstructions.

Method. Evaluation of various cases and free flap choices for hand reconstruction were conducted to reveal some principles derived from the experience during practicing microsurgical reconstructions.

Results. Pediatric hand and upper limb replantation had paved the way for the development of reconstructive microsurgery in pediatric patients. Replaced with tissue alike is the guidance in choosing donor tissue. Midsole skin perfectly matches the palm skin. It is the best option for palm reconstruction, but other thin harvested skin flap also can give similar skin quality. The first web space reconstructed with thin harvested skin flap can give good outcome especially if the defect is wide. Additional thinning procedures can give better function and aesthetic appearance. The compound fibular bone flap is the flap choice for distal forearm bone defect reconstruction. End to side anastomosis is the proper anastomosis technique when using radial or ulnar artery as the recipient’s vessels to avoid the complication of late finger ischemia.

Summary. Microsurgical reconstruction on the hand is a reliable technique to achieve good results of hand function and aesthetic hand.
Arterialized venous flaps

Prof Yu-Te Lin

Reconstruction 3 - Perforator and Local Flaps in the Hand, Eureka Room 3, March 13, 2020, 7:00 AM - 10:00 AM

BACKGROUND: Arterialized venous flaps can be useful for hand/digit reconstruction, providing very thin skin coverage. However, their popularity has been limited by concerns over poor peripheral perfusion and severe congestion, which may be due to unrestricted arteriovenous shunting and pressurization of the efferent vein. To mitigate these problems, we design our flaps to restrict shunting. This report describes our clinical experience with these techniques. METHODS: A consecutive series of 21 flaps was reviewed. All flaps were transferred with antegrade flow. Shunt restriction was achieved in one of the following ways, according to the flap's venous pattern: (1) II-pattern: use of separate veins for inflow and outflow; (2) H-pattern: as for II-pattern, with ligation of connecting branch; (3) Y/lambda-pattern: ligation of one branch near bifurcation, with use of that branch for outflow and other segment for inflow (or vice versa); and (4) I-pattern: ligation at midpoint. Laser Doppler flowmetry was used to compare flap perfusion with and without shunt restriction in two patients. RESULTS: All flaps survived entirely. Color, turgor, temperature, and capillary refill mimicked conventional arterial flaps, facilitating postoperative monitoring. Five flaps demonstrated mild venous congestion. Moderate venous congestion at the afferent end, with some developing epidermolysis but no full-thickness loss, were observed in 4 flaps. Intraoperative flowmetry showed enhanced perfusion in the flap's periphery when shunting was restricted. CONCLUSIONS: Restriction of arteriovenous shunting enhances peripheral perfusion and decreases congestion of venous flaps, thereby improving reliability and utility for hand/digit reconstruction.
Toe pulp transfers for finger reconstruction

Dr Jyoshid R Balan

Reconstruction 3 - Perforator and Local Flaps in the Hand, Eureka Room 3, March 13, 2020, 7:00 AM - 10:00 AM

The functional and the aesthetic importance of the hand in day to day life is unquestionable. Fingertip injury requiring flap cover is very common in the modern era. The ideal cover should fulfill both functional and aesthetic improvement. The ideal tissue for the finger reconstruction should have glamorous skin with good sensation. By nature the best substitute for finger pulp is a toe pulp flap. The toe pulp can be harvested along with its digital nerve for coapting with the recipient digital nerve for good sensory recovery. In case of injury of the finger with bone, joint or extensor tendon deficit we can also harvest toe pulp along with bone joint or extensor tendon as a single vascularised unit. The aesthetic superiority of the toe pulp gives extra confidence to the patient. The free toe pulp flap is an efficient choice for fingertip and volar finger defects reconstruction with an excellent tissue match.
Different Approaches for Treating Early vs Late Stiffness

Ms Judy Colditz

Hand Therapy C1 - Finger Stiffness In Depth, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Explore the evidence-based rationale for treating stiffness in the hand. Common myths of treating stiffness will be discussed and evidence for key concepts such as ideal mobilization approaches and duration of treatment will be reviewed.
Role of Interosseous/Lumbrical Muscle Shortening in Finger Stiffness

Ms Judy Colditz

Hand Therapy C1 - Finger Stiffness In Depth, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Increase your understanding of the influence the interosseous and lumbrical muscles have on finger movement and how adaptive shortening of these muscles limits finger motion as well as what you can do to reduce the muscle tightness.
Hand Therapy after Collagenase Injection Treatment in Dupuytren’s Disease

**Mrs Sonja Pelzmann**

*Wilhelminenspital, Vienna, Austria*

Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

OBJECTIVES: Hand therapy is essential after pharmacological treatment of Dupuytren’s disease to achieve adequate function of the affected hand. It would be useful to consider some form of synthesis to evaluate the scope of research describing the use and implementation of hand therapy methods after CCH injection treatment in clinical practice and their outcomes.

METHOD: Multiple electronic databases and journals were searched for available information. The studies were classified using the Oxford Level of Evidence (LoE) and the Structured Effectiveness Quality Evaluation Scale (SEQES).

RESULTS: Orthosis and exercises were the most applied methods in the 13 analyzed studies. The sample size of the studies had a range from 4 to 144 patients. The LoE and the SEQES-Score in the included studies ranged from Ib to V and from 43 to 6, respectively. In general evidence for the effectiveness of hand therapy in range of motion, physical function, and satisfaction was not found.

SUMMARY: The effect of hand therapy after Collagenase injection treatment is rarely investigated or researched together with the pharmacological intervention and so it is difficult to determine the effect of the method of hand therapy. All experts agree, that hand therapy methods always applied on the patient’s condition and his individual needs. In addition, non existent heterogeneity of disease history, small sample size of studies, short follow-ups make it difficult to examining the methods of hand therapy in CCH treatment in term of effectiveness.
Surgical rehabilitation for chronic severe flexion contractures of the proximal interphalangeal joint by the external fixator

Mr Kenji Ohira¹, Mr Yoshitaka Minamikawa¹, Mr Yoshitaka Hamada², Ms Emiko Horii³, Mr Takeyasu Toyama²
¹Namba Hand Center, Osaka, Japan, ²Kansai Medical University Medical Center, Osaka, Japan, ³Kansai Medical University Hospital, Osaka, Japan

Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Objectives: Despite many patients suffering from joint contractures, its clinical treatment persists difficult. Ilizarov Mini Fixator (IMF) is a powerful and gentle tool for distraction of soft tissues used for solving proximal interphalangeal joint (PIPJ) contractures in our clinic. In this series, we analyzed short-term results of IMF for chronic severe flexion PIPJ contractures.

Methods: 10 fingers of chronic severe flexion PIPJ contractures treated with IMF since 2007 were retrospectively studied. In this study, the severe contracture means more than 80° flexion over one year period. The treatment strategy is divided into 3 phases: distraction, correction, and stabilization. In the distraction phase, PIPJ was distracted in its flexion position by elastic bands attached to IMF. In the correction phase, PIPJ was distracted in extended position for more than 4 hours per day including while sleeping. Range of motion (ROM) exercise commenced to spread the joint motion. In the stabilization phase, ROM exercise was continuously performed even after the removal of the fixator to prevent the recurrence. Optionally, the extensor reconstruction could be operated, if the residual extension lag confirmed. Throughout the treatment, once the extension contracture was intentionally arisen, therapists were conscious to induce flexion movement that led to the moderate extension movement can be remained later.

Results: At the final evaluation, the median ROM arc improved from 6° to 47°. In addition, all fingers obtained approximate functional ROMs.

Summary: Even the severe flexion PIPJ contracture lasts for a long term, its ROM could recover losses by the external fixator.
Retrospective analysis of outcomes following hemi-hamate arthroplasty

Ms Amy Sturgeon¹, Dr Sharon Chu¹, Mr Tim Darch¹
²Redimed Total Health Solutions, , Australia

Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Objectives
To evaluate the effectiveness of a standardized post-operative treatment algorithm in patients who have undergone a hemi-hamate arthroplasty.

Methods
A review of the literature was conducted to determine the viability of the hemi-hamate procedure in acute and chronic unstable fracture-dislocations of the PIPJ, not amendable to other procedures. A retrospective review of patients treated post a hemi-hamate procedure was conducted and treatment evaluated. A standardized post-operative treatment algorithm was developed between the Surgeon and Therapist, and implemented with all patients who had received a hemi-hamate arthroplasty. Data was collected retrospectively and the protocol frequently reviewed.

Results
Currently 13 patients have been treated with our protocol. Results are comparable with those documented in the literature following surgical intervention for significant PIPJ injuries, including hemi-hamate arthroplasties. Current results indicate potential for increased total arc of flexion achieved and reduced fixed flexion deformities while protecting the volar stabilising structures.

Summary
Compilation of data from our study and the current literature base indicate hemi-hamate arthroplasty it is a viable surgical intervention for significant PIPJ injuries achieving a good functional outcome. Results indicate therapy needs to focus on achieving early FDP glide and increasing/maintaining extension to reduce fixed flexion deformities. We aim to continue to build a greater sample size to develop a case series with a standardized approach and achieve more long term results. Further analysing the protocol will allow us to assess potential deviations and refine it as appropriate.
Innovative splint design improves functional movement and grasp in a patient with Rheumatoid Arthritis: A case report.

Ms Bec Kevill$^{1,2}$

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Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

OBJECTIVES
To determine if an innovative splinting solution, Dorsal Blocking Ulnar Deviation (D-BUD) Correction Splint, could restore anatomical alignment and functional grasp in a patient with metacarpophalangeal subluxation and ulnar deviation resulting from Rheumatoid Arthritis (RA).

METHODS
A case report methodology was used to illustrate several static and dynamic splinting approaches trialled during treatment of a 72 year old female at a tertiary hospital outpatient clinic. While mild improvements in function were achieved with traditional splints, each splint lacked some element of open grasp, effective flexion or ulnar drift correction. The D-BUD Correction Splint was the only splint successful in achieving the objective.

The newly designed splint utilised a foundation of a hand-based dorsal blocking splint, combined with ulnar drift correction straps. Duration of splint wear was 12-15 hours per day indefinitely. The variables of interest were functional movement and grasp, and quality of life. Outcome measures were the SF-36, goniometry, Quick-DASH, patient self-report and clinician-assessed outcomes. Data will be presented using descriptive statistics.

RESULTS
The study is ongoing and preliminary results are presented. Patient self-report indicated a substantial increase in quality of life, hand function, confidence, and satisfaction with cosmesis following application of the splint. Clinician-assessed outcomes demonstrated a meaningful improvement in functional grasp, movement, and anatomical alignment. No adverse events or issues with compliance were experienced.

SUMMARY
The D-BUD Correction Splint can be made with standard hand therapy materials and provides a safe, low cost splinting solution for patients with metacarpophalangeal subluxation and ulnar deviation resulting from RA.
Outcomes following proximal phalangeal fracture fixation

Dr Lauren Miller

Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Unstable fracture of the proximal phalanx of the finger is a common hand injury, usually requiring surgical fixation. Intervention following surgery is aimed at decreasing pain, oedema, loss of range of motion, weakness, scar formation, and deformity. Despite this, individuals can be left with reduced range of finger motion and other impairments, affecting hand use and work participation. The effect of baseline characteristics, timing of commencement of exercise and alternative interventions on these outcomes was previously unknown. Four published studies from a PhD thesis will be summarised. These studies explore factors that are associated with, and efficacy of intervention for, proximal phalangeal fracture following surgical fixation.
Complex phalangeal fractures - surgical optimisation

Prof Richard Page

Hand Therapy C1 - The Digits, Sovereign Room, March 13, 2020, 7:00 AM - 10:00 AM

Complex phalangeal fractures - surgical optimisation will be discussed in relation to these often difficult to manage fractures. The treatment priorities of stability, swelling and mobility will be explored to understand how the injury pattern can influence our ability to get the best outcomes.
Artificial intelligence in Hand Surgery

Mr Paul Jarrett

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The Future 1 - Virtual Reality. It's Place in Hand Surgery, Education, Therapy and CRPS, Goldfields Theatre/Plenary, March 13, 2020, 10:30 AM - 1:00 PM

Self-governing robots or human built automatons are millennia old ideas but the term Artificial Intelligence (AI) was coined in 1956. AI is intelligence demonstrated by computers and implies a computerised system which is capable of working or reacting like humans and of ideally learning.

There have been slow improvements in AI over the last decades but with the significant improvements in computational power in the last two decades AI’s progress is now accelerating rapidly.

Hand surgery has progressively advanced with improvements in the understanding of pathologies, diagnostics, surgical techniques and implants and instrumentation but there has been limited introduction of AI. This presentation will cover concepts of AI including the areas of machine learning, robotics, augmented reality and discuss what the current uses for these technologies are in hand surgery and what the potential uses might be for the medium-term future.

Currently one might be forgiven for seeing no impact of AI on hand practice. However, weak AI is embedded in our everyday life, it is just relatively unobtrusive. Academic searches make extensive use of AI and research may use big data techniques or machine learning for pattern recognition. Some fields of surgery employ robotics and many fields of medicine use AI to improve diagnosis and planning of treatment, yet AI for these uses have yet to be employed in hand surgery meaningfully.

Areas in which AI will become more common in hand surgery include diagnostic assistance or treatment algorithms, research, image guided or augmented reality surgery, and robotic surgery.
3D Bone Model Reconstruction of Distal Forearm from X-ray image of wrist using Artificial Intelligence; 2D-3D Reconstruction

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[Objects] Three dimensional (3D) bone models generated from computed tomography (CT) are very useful in clinical practice. However, the radiation exposure for the patients and increasing medical cost are the disadvantages. In order to solve these problems, we used Artificial Intelligence (AI) to estimate and generate a highly precise 3D bone model from two dimensional (2D) X-ray images without CT.

[Methods] We used CT and X-ray images of normal distal forearm of 126 patients. In order to gain sufficient number of data for training, the data was expanded 40 times using digital reconstructed radiography (DRR) generated from CT. AI learnt the data set of CT images and DRR images to estimate and generate the highly precise 3D bone model from DRR image. Another AI was used to transform an X-ray image into DRR image. By combining the two processes, it became possible to estimate and generate the highly precise 3D bone model from 2D X-ray image.

[Results] The 3D bone models generated from X-ray images showed an average accuracy of 0.90 ± 0.35 mm for the radius and 1.19 ± 0.33 mm for the ulna in the average symmetric surface distance when compared with the 3D bone model generated from CT. All of them had an error less than 1.25 mm, which is the resolution of the data used.

[Summary] Using AI, we were able to estimate and generate a highly precise 3D bone model from X-ray images.
VR for procedural pain management and its potential application in WALANT surgery

Dr Paul Leong

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Periprocedural pain management is critical to optimal procedures and outcomes. WALANT (wide awake local anaesthesia no tourniquet) has transformed the anaesthetic approach to hand and forearm surgery in many thousands of procedures. How might Virtual Reality (VR) aid WALANT procedures and outcomes?
The hand that shook the world”: 3D printing, VR, AR and modern approaches to medical anatomy education

Prof Paul McMenamin

The Future 1 - Virtual Reality. It's Place in Hand Surgery, Education, Therapy and CRPS, Goldfields Theatre/Plenary, March 13, 2020, 10:30 AM - 1:00 PM

Digital technology has opened a plethora of opportunities for anatomy education and application. With many parts of the world unable to gain, or afford, access to body donor material, providing high-level, accurate anatomical resources to all is challenging. Enter 3D printing and the idea of duplicating and enhancing the real dissections available previously to only this studying in a registered anatomy laboratory with access to cadavers. At Monash University we developed a workflow for scanning (laser and CT, MRI), segmenting, modelling, colouring and 3D printing specimens, from a range of body regions. Further access to the innovative high quality high fidelity source digital data through Sectra visualisation tables has taken anatomy education into areas impossible with only dissection (let along with books and plastic models). Now students can look INSIDE the dissection/print they're holding, interact with complementary metadata and independently assess their knowledge. The latest progressions have VR and AR capability, freeing the learning further from the tethers of a conventional anatomy lab. What was previously specialist equipment with limited accessibility is now becoming mainstream. Anatomy education is only constrained by our imaginations.
Clinical Application of Robotic Interventions in Hand Therapy and Upper Extremity Rehabilitation

**Mr EngWah Tan**

1 **SOCSO Tun Razak Rehabilitation Centre, Malacca, Malaysia**

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Various robotic technologies had been developed and applied in neuromuscular rehabilitation. The capacity to deliver highly intensive, repetitive, specific, adaptive and quantifiable therapy sessions has shown favorable results and potential for its application in hand therapy and upper extremity rehabilitation. Various exoskeleton types robots and different training modalities in robot-mediated therapy would be addressed. As the amount and intensity of exercise and the quality of motor learning are positively correlated with rehabilitation outcome, the feasibility and effectiveness of the robotic interventions in various orthopedics and neurological upper extremity conditions will be discussed. Clinical applications of robotic interventions for hand and upper extremity functional training will be highlighted with associated outcomes.
Adventures in 'Leap Motion'. Current and future applications of virtual hand tracking technology in therapy.

Mr Dan Purtell

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'Leap Motion' also known as 'Ultra Leap' is a readily available USB powered, camera based hand tracking module. It's module captures the movements of your hands and the data can be used for both projection in simulation, virtual reality, or digitally measuring and recording movement (goniometry). Whilst currently limited and in it's infancy, hand tracking has many potential applications in therapy. From graded return to function in chronic regional pain syndrome, or hypersensitive clients. It can be used for Gaming / simulation based non-impact therapy and even an alternative to current day mouse / keyboard use. This presentation offers a brief demonstration of the technology, allowing you to see it's current uses and envisage it's future benefits.
Objective assessment of pain severity in CRPS with AI

Prof Hitoshi Hirata

The Future 1 - Virtual Reality. It's Place in Hand Surgery, Education, Therapy and CRPS, Goldfields Theatre/Plenary, March 13, 2020, 10:30 AM - 1:00 PM

Complex regional syndrome (CRPS) is an uncommon pain syndrome triggered by relatively minor trauma. Since the first detailed description by Michell in mid 19th, CRPS has perplexed physicians by concurrent occurrence of vasomotor and sudomotor dysregulation, abnormal motion, mental instability, dystrophic changes in osseous and soft tissues, etc. Recent studies using brain functional analysis have made it clear that these seemingly inexplicable simultaneous abnormalities in multiple biological systems are the result of abnormal brain activities triggered by persistent nociceptive inputs. With the support of Ministry of Health, Labor, and Welfare, we conducted a multi-center clinical study for the purpose of development of objective severity assessment of CRPS using magnetoencephalography (MEG). In this study, we used the CRPS diagnostic criteria proposed by the Japanese CRPS Research Group which is a validated instrument created using the same methodology for IASP criteria against Japanese patients. Pain severity was assessed with short form McGill Pain Questionnaire and CRPS severity was assessed according to a method proposed by Harden. The MEG signals were recorded with a whole-head MEG system including 160-channel gradiometers. Coherence values between the pairs of cortical areas were calculated. The coherence value of the current waveforms between the two corresponding regions was then calculated. In addition, we applied machine learning method using a tools in JMP. Coherence analysis revealed significantly lower connectivity between left insular sulcus and anterior insular gyrus for pain and CRPS severity, respectively. Machine learning successfully provided a prediction formula to discriminate CRPS patients from healthy control.
Artificial intelligence is beginning to improve medical practice, for example with the ability now to use a 15 second ECG tracing to predict the risk of heart failure, future arrhythmia, and even, with high accuracy, the serum potassium level. Is it possible to use AI techniques, perhaps based on imaging or electrodiagnostic data, to better identify those patients with CTS whose symptoms might respond long term to conservative therapy, or those who might require a more aggressive surgical approach? This presentation will discuss current efforts to pursue this goal, which may have implications for other neuropathies as well.
Australian Rules Football Thumb Metacarpal Fractures: Surgical Results and Return to Play Time Frames.

Mr Greg Hoy¹, Mr Jason Harvey², Mr Hamish Anderson³

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Sporting Injuries - Are Injuries in Sports People Different?, Courtyard Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Objectives:
To examine the outcomes of surgically managed thumb metacarpal fractures in a cohort of elite Australian Rules footballers; and to investigate if these differ from finger metacarpal fractures in a similar population as previously described by this research group (Yalizis, 2017).

Methods:
Retrospective data was collected on twenty elite level Australian Rules footballers treated consecutively by two specialist upper limb surgeons over a twelve year period. The patients were contacted by telephone for an interview and completion of the QuickDASH.

Results:
The median numbers of weeks between surgery and return to play was four, with all patients returning to an elite level of football. The mean QuickDASH score was zero. Two patients reported mild loss of grip strength, and two had had the plate removed. All were satisfied with the result of the surgery.

Summary:
In elite Australian Rules football, 2.02 games per season are lost per club due to hand fractures (AFL Injury Report 2017). We believe that this does not reflect our experience with thumb metacarpal fractures, and so may provide inaccurate expectations with regard to return to play timeframes. Notwithstanding this, our intervention with these athletes is certainly aggressive. This review seeks to investigate the results of our intervention within a cohort of professional footballers and compare these results to finger metacarpal fractures in a similar cohort.

References:
Upper Limb nerve injuries in Sports

Dr Ip Wing Yuk Josephine

Sporting Injuries - Are Injuries in Sports People Different?, Courtyard Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Upper limb nerve injuries in sports is relatively infrequent. It may happen as an acute injury or a chronic injury caused by repetitive stretching or compression or direct compression. It is sports specific. Acute injury of cervical spinal nerve roots or brachial plexus can occur in contact sports like rugby. An acute fracture od dislocation can cause direct nerve compression. For chronic injuries, a nerve can be compressed by hypertrophic muscles, eg biceps compressing on musculo-cutaneous nerve or by a compartment with high pressure after training. Lactic acid generated with anaerobic exercise in muscles can cause transient increase in compartment pressure in forearm and compress on nerve in the compartments. posterior interroseeous nerve compression. External compression by sports equipment at certain vulnerable site e.g. ulnar nerve compression by handle bar of a bike. Traction injury can occur in vulnerable sites, eg axillary nerve with a lot of shoulder abduction or ulnar nerve with a lot of elbow flexion and extension.
A new treatment for tennis elbow

Dr Alejandro Badia

Sporting Injuries - Are Injuries in Sports People Different?, Courtyard Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Lateral epicondylitis, and its medial counterpart, remain one of the most frustrating entities to treat, whether by the hand surgeon, general orthopedist or even primary care physician. Enthesopathies in general are challenging, since hypovascular tissue may ultimately require excision since failed conservative measures may demand additional care. However, traditional open debridement can lead to a prolonged, and occasionally, painful recovery. Inconsistent results, coupled with this slow recovery, often lead the clinician to delay definitive treatment, frustrating to the patient.

Ultrasonic ablation of the tendon origin, akin to phacoemulsion of the eye cataract, allows for a minimally invasive and virtually painless treatment for tennis and golfers elbow.

Clinical results have shown that this simple technique is at least as successful as current open means. This now affords us the confidence to offer a much earlier definitive cure for this very frustrating and challenging malady.
Common wrist injuries in tennis players.

Dr Alejandro Badia

Sporting Injuries - Are Injuries in Sports People Different?, Courtyard Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

The tennis athlete's wrist serves as conduit of force transmission from their entire body via a racquet to the ball. While stability and strength is critical, the complex carpal motion that creates spin can lead to injury. Hand/wrist specialists should interface with the sports medicine doctor, physiotherapist or athletic trainer since they are at the front line, or perhaps baseline, of this challenging sport for the upper limb. Complex carpal mechanics are well beyond the scope of their training, hence early assessment and possibly intervention should be considered in order to avoid prolonged absence from play. Once conservative measures fail, arthroscopy remains the keystone of diagnosis, while also affording definitive treatment at the same sitting. A clear diagnosis may be challenging since dynamic instabilities may be manifested only with midcarpal assessment. A clear understanding of common injuries affecting the tennis player's wrist, and possible early intervention, may allow for faster return to play.
Acute triceps tendon rupture in athletes is relatively rare with an occurrence of approximately 1% of all tendon injuries. The injury most commonly occurs with an eccentric load applied to the flexed elbow, most frequently described in American Football offensive lineman. In the athlete (and non athletic population) there are pressures to return to competition (or work) early and in this regard repair techniques are evolving to repair the tendon in a more robust and anatomic manner. This talk will discuss the anatomy of the triceps insertion and the evolution of triceps repair techniques.
Digital injuries are exceedingly common in any sport where a high speed ball encounters the outstretched finger. This may represent axial impact, torsional injuries, or hyperextension/flexion trauma. Unfortunately, these injuries are often minimalized by the player, coach or even medical professional that first encounters the injured player. The nonspecific and confusing term, "jammed finger" is often used which affords no accurate description of the actual pathology involved, This can be a ligamentous or capsular injury, a tendon avulsion, dislocation or even articular fracture. Timely assessment, and early intervention if needed, should be instituted in the athlete since even a single digit dysfunction can end an athletic career. Conversely, temporary pinning and finger cast application may even allow for early return to play depending upon the sport, digit involved, and the athlete's position. Close interaction with the team doctor, and therapist, is critical since undertreatment may be the norm.
Do post-operative radiographs change the management following internal fixation of distal radius fractures?

Dr Gregory Couzens1,2,3, Dr Bradley Gilpin1, Dr Jamie McKenzie1,2, Dr Paul Hak1,2, Dr Mark P Robinson1,2, Prof Mark Ross1,2,4
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Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Objectives
The utility of obtaining routine post-operative radiographs following the internal fixation of distal radius fractures is poorly defined. The purpose of this study was to determine whether post-operative radiographs influence the current management of fractures of the distal radius following internal fixation.

Methods
We retrospectively reviewed all patients that underwent internal fixation of distal radius fractures over a five year period. We interrogated patient files to determine whether patients were returned to theatre on the basis of routine post-operative radiographs. A total of 543 procedures were performed with 1340 radiographs obtained on these patients over the ensuing six weeks.

Results
Of these patients only seven returned to theatre. All patients that returned to theatre were either symptomatic or had findings prompting revision that were also identifiable on intra-operative radiographs that had not been addressed intra-operatively.

Summary
The evidence did not support routine post-operative imaging following the internal fixation of distal radius fractures.
Arthroscopic repair of the unreconstructable radius

Mr Jeff Ecker¹,²
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Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Objective: To evaluate the outcome of non-union of the proximal pole of the scaphoid treated using arthroscopic bone graft from the iliac crest and internal fixation.

Methods: 29 proximal pole non-unions were treated using arthroscopic bone graft and internal fixation. The mean time elapsed between the injury and surgery was 3.5 months. The proximal pole was intact in all cases with no evidence of disintegration on CT scan. The articular cartilage of the proximal pole was intact.

The surgical technique involves a combination of dry and wet arthroscopy using a 1.9mm arthroscope and a traction tower. The non-union is excised arthroscopically. The DISI deformity is corrected and internally fixed with a radiolunate k-wire. The deformity of the scaphoid is reduced and internally fixed with 3 to 4 x 1.2mm k-wires inserted distal to proximal. The bone defect is arthroscopically packed with cancellous bone harvested from the iliac crest. The Kwires are cut beneath the skin.

Results: There were 2 non-unions. One case was a technical failure with inadequate fixation. Union had not occurred at 3 months. An open dorsal approach was performed with cancellous bone graft and 2 mini compression screws. The scaphoid subsequently united. The second case was geographically isolated and returned for review with bent K-wires. They were treated with a vascularised medial femoral bone graft and is currently in evolution.

Summary: Arthroscopic bone graft and internal fixation to treat non-union of the proximal pole of the scaphoid is is a reliable and useful surgical technique.
Comparison of volar locking plates with external fixation and K-wires in arthroscopically assisted intra-articular distal radial fracture fixation.

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¹Microsurgery Centre Of Latvia, Riga, Latvia

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

There are many articles which claim that superior outcomes are achieved as a result of anterior plating of distal radius fractures and others which claim that external fixation and K-wires are superior. Arthroscopic reduction of intra-articular fragments, as opposed to conventional methods, may improve outcomes regardless of the method of fixation, volar locking plates or external fixator and K-wires.

Methods: This article presents the results of a prospective cohort study which included 63 patients with intra-articular (AO C-Type) distal radial fractures who were treated using an arthroscopically assisted approach with either volar locking plates or external fixator and K-wires. During the 2-year study period, 74 surgeries were performed (38 VLP and 36 EF and K-wires). Consequently, only 34 patients from Group VLP and 29 patients from Group EF were included in the final data assessment. Postoperative analysis was carried out using X-ray assessment, clinical data, PRWE score, Gartland & Werley score, MASS07 score, range of motion, grip, pinch and tripod pinch assessment at 1, 3, 6 and 12 months postoperatively.

Results. Despite the statistically significant differences found in a number of parameters during the period of observation, there were no clinically relevant differences determined between the two methods. There was a greater number of complications in the external fixator/K-wire treated patients.

Summary: Our results using arthroscopy to visualize fragment position following preliminary reduction confirm the worth of this method in the treatment of these fractures.
Minimally Invasive Plate International Fixation of Distal Radial Fractures

Mr Paul Jarrett

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Displaced distal radial fractures are commonly internally fixed with a volar locking plate using a moderate sized incision with pronator quadratus raised at its radial insertion.

Minimally invasive techniques have evolved using a smaller incision and sparing pronator quadratus by sliding the plate under the muscle thus reducing soft tissue damage. The incision is frequently 15 mm in length or smaller and thus placement of the incision requires careful attention to allow ease of fixation.

Following minimally invasive distal radius volar plate fixation, patients are provided with a thermoplastic splint for use as much or a little as they feel required and rehabilitation and functional recovery is permitted as comfort allows.

Initially when commencing this technique, it is advisable for surgeons to undertake a cadaveric workshop or learn from a surgeon experienced in this method and it is recommended to use a larger incision initially and then gradually reduce the length of the incision with experience.
Management of associated ligamentous structures in DRF

Dr Margaret Fok

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Open reduction and internal fixation is one of the standard treatments for the distal radius fractures. While a high incidence of ligamentous injuries, namely TFCC, SL ligament and LT ligament, is known to be associated with distal radius fracture, the management of these injuries is more controversial. Debate has been on whether we need to repair or reconstruct these lesions and when we should do it. We present with you our study showing that we do not need to manage all of these injuries in the acute setting. Outcomes on delayed TFCC repair after distal radius fractures will also be discussed.
Plate presetting arthroscopic reduction technique for distal radius fractures

Dr Yukio Abe

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

Background
We developed a surgical procedure that can facilitate arthroscopic intervention for palmar locking plate fixation for distal radius fracture (DRF) with a less invasive technique. This study is to investigate the effectiveness of our original procedure for the treatment of DRF.

Methods
Five hundred and eighteen wrists of 510 consecutive patients underwent our original procedure: the plate presetting arthroscopic reduction technique (PART) for DRF. The fractures were reduced, anatomical alignment was regained with the aid of a fluoroscopy, and the palmar locking plate was preset. Wrist arthroscopy was then performed and the intra-articular condition assessed. If there were any residual dislocations of the intra-articular fragments, these were reduced arthroscopically, and soft tissue injuries were subsequently treated. The traction was then removed, and the plate was securely fixed.

Results
On arthroscopic inspection, intra-articular dislocations were found to be residual in about 22%, even if reduction seemed to have been achieved when viewed with fluoroscopy. Free fragment in the joint was observed 8% of the intra-articular fracture. Scapholunate interosseous ligament injury was recognized in about 30%, and traumatic triangular fibrocartilage complex injury was observed in about 48%. The outcome according to DASH was 76% of excellent, 22% of good, 1.5% of fair, and 0.5% of poor.

Conclusions
Palmar locking plate fixation recently has become popular, and simultaneous arthroscopic procedures for reduction have become difficult. PART can overcome these difficulties, and can be performed with a small skin incision, and simplifies the combination of plating and arthroscopy, and achieves good results.
Volar marginal rim fractures

Mr Simon MacLean

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

The volar marginal rim of the distal radius owes its importance to both loadbearing function as well as the attachment of the radiolunate ligaments, which prevent volar subluxation and ulnar translocation of the carpus. The centroid of force application is volarly on the lunate facet, and because it is offset in a palmar direction relative to the radial shaft, this area transmits high loads and is difficult to stabilize. The volar marginal rim, or “lunate facet” fracture, therefore is an important subset of fractures, which may not be adequately fixed with traditional volar locking plate technology.

Specific volar rim plates have been designed to sit distal to the watershed line of the radius and contain this critical fragment. Despite fragment-specific technology however, hardware positioning can be challenging, and fixation may be inadequate to stabilize this challenging injury. The volar marginal rim fracture may be only one component of a more extensive distal radius or carpal injury, and poor outcomes may result from treatment of this fracture in isolation.

Management begins with appropriate radiographs and 3-dimensional imaging. Selection of surgical approach and fixation techniques is crucial. The surgeon should take a step-by-step approach – with judicious use of fluoroscopy and arthroscopy to ensure satisfactory fixation. If primary fixation is tenuous or if in any doubt, a bridge plate should be added to neutralize forces and allow fracture healing.
Distal radius fractures remain amongst the most common orthopaedic injuries requiring treatment in the community. Over the last twenty years there has been a rapid evolution in the treatment options, techniques and implants available to manage these fractures. The surgical options have often moved ahead of the evidence with subsequent pressures on costs. When is old new and new out of date? This talk will explore the changing treatment trends, the evidence in support and look at where we are heading with contemporary treatment.
The anatomy of the distal radius fracture

Mr Simon MacLean

Wrist 7 - Distal Radius Fractures, Eureka Room 1 and 2, March 13, 2020, 10:30 AM - 1:00 PM

The radius microstructure has evolved to transfer the physiological compressive loads from the carpus to the forearm. Greater forces will create fractures of the distal radius and disruption of the associated ligaments.

Fracture initiation is determined by the position of the carpus, and the tension on the ligaments. Fractures propagate through the osseous radius, usually between the ligamentous attachments. Therefore, the ligament remains attached to the bone, as an osteoligamentous unit. The osteoligamentous units determine the behaviour and natural history of the wrist, including the settling position, carpal instability and contracture.

Sequential failure occurs of these units depending on the vector of force applied. Ligamentotaxis is when tension is applied to enable the ligaments to assist in reduction of a fracture. Unfortunately, this usually provides incomplete reduction. However, multiplanar ligamentotaxis can place tension on the various osteoligamentous units, to reduce the entire fracture.

Complications and failure of reduction and fixation often occur when the soft tissue component of these injuries is inadequately managed. Optimal treatment of distal radius fractures relies on the osteoligamentous concepts - respecting the osseous and the soft tissue components of the injury.
Treatment of Extensive Friction Burns in Upper Extremity with Microvascular Flaps

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Objectives: extensive friction burns are devastating and disabling injury for upper extremity. Patients often require multiple structure reconstruction and extensive coverage of full thickness defect.

Methods: we present retrospective cohort of twelve extensive upper extremity friction burns reconstructed with microvascular flaps. All patients were debrided in 72 hours post injury and covered with flap. Underlying structure defect was reconstructed at the same time. Flap survival, functional recovery and cosmetic appearance were evaluated immediately, six months and one year after reconstruction.

Results: Study collected data of 11 male and 1 female with average age of 32 years. 9 patients suffered injury from agricultural machines, one from road traffic accident and two hot press injuries. Anterolateral tiep flap was used in 5 cases, one gracilis, one latissimus dorsi, one parascapular, two inguinal and two radial forearm flaps were used. Flap survival rate was 100% despite two patients forcefully escaped ICU 3-4 hours after operation. All patients required at least one scar revision operation due to extensive scars. In one year time 8 of 12 patients returned to previous work, two are doing lighter duties and two can not work.

Summary: Microvascular flaps for early reconstruction of extensive friction burns is the best option allowing to reconstruct underlying structures immediately and simultaneously, allowing faster recovery and return to work.
PERFORATOR FLAP FOR COVERAGE OF POST BURN WOUND OVER THE WRIST JOINT.

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¹Sheikh Hasina National Institute Of Burn And Plastic Surgery, Dhaka, Bangladesh, ²Dhaka Medical College Hospital, Dhaka, Bangladesh

Objective:
Soft tissue defects around the wrist following burn require early coverage to replace missing tissue, to protect exposed structures and finally to mobilize earlier. This study was performed to see the outcome of perforator flap in covering the wound around the wrist joint as it was not commonly done in our country.

Material and Method:
This prospective and observational study was carried out from January 2015 to December of 2016, in Plastic Surgery Department of Dhaka Medical College and Hospital. 18 patients (15 male, 3 female) underwent coverage with distal ulnar artery perforator flap (10 cases) and Radial artery perforator flap (08) cases. The causes of the defects were Electric burn (12), Flame (04), Post burn contracture (02). Donor site was closed primarily in six cases and STSG was done in 12 cases. Follow up period was for 3 months to 1 year.

Results:
13 flaps survived with excellent result. One flap (Ulnar artery perforator flap) had sub total loss, another one flap (radial artery perforator) developed epidermis losses which were managed by STSG. There were two cases of marginal necrosis. Wound infection and dehiscence occurred in one case.

Summary:
Perforator flap is a good coverage option for post burn wound around wrist joint.
Lessons learned from a free reconstructive surgery project for burn victims called “Hope After Fire”

Dr Raja Shanmugakrishnan Raja Sabapathy

Topic: Lessons learned from project ‘Hope after Fire’ - a free reconstructive surgery project for burn deformity correction.

Objectives

Post-Burn deformities (PBD) is a major health problem in the developing world. There is a gap in the provision of accessible and affordable healthcare. PBD correction is skill, labour and resource intensive. Creating sustainable projects providing holistic care is the challenge. Project ‘Hope after Fire’ which provides free reconstructive surgery to burn survivors, is a joint initiative of Ganga Hospital, Coimbatore, India and Rotary Club of Coimbatore Mettopolis.

Methods

PBD patients are treated totally free of charge. Rotary bears the cost of consumables and hospital charges and the surgeons operate free. Started in March 2012, it has sustained and has become one of the largest burn care projects in South Asia.

Results

802 surgeries were performed for 483 burn patients between March 2012 and August 2019. The total project value is US$ 588,963 of which the contribution of Rotary and Ganga Hospital were US$ 376,332 and US$ 212,631 respectively. Admitting the patients at their convenience, providing high quality outcomes with senior input, all care under one roof and undertaking staged procedures at the earliest opportunities were critical for success. We found that with a good purpose, passion and commitment to back it, finance would be the least of the problems. Passionate story telling of successful outcomes is essential.

Summary

We will share the lessons learned to help others to start, sustain and scale a PBD correction project.
Hand burns can be devastating injuries, both in the young and old. The hand is an intricately woven mesh of different tissues compacted into a small area. It performs a myriad of functions requiring both dexterity and strength. It is also unique in that the dorsal skin is thin and pliable, whereas the palmar skin is thick, glabrous and made for holding objects. A full thickness burn destroys this unique property and restoring it is extremely challenging to say the least. There are definite benefits to early treatment and in this lecture, I will answer some of the myths and try to define what should and should not be done as my practice has been. There are numerous studies on various approaches, and it is difficult to acknowledge all, but we will try to address as many major contentious issues as possible. Important factors involved would be depth and area of burn, the predictive factors for outcome and working around the patient’s occupation and needs. Finally, therapy works wonders but there are times when a surgical option is a necessity and cannot be substituted.
Burns Scar Management for the UL

Prof Wai Ping Cecilia Li

Trauma 2 - The Burnt Hand, Eureka Room 3, March 13, 2020, 10:30 AM - 1:00 PM

Burnt injuries on the hand may result in scar contracture, thus leading to deformities and functional impairment. Different location of scars will create different clinical problems. Common types of deformities are flexion or extension deformities of the wrist, Hyperextension of MCP joints, flexion deformities of PIP and DIP joints, web space contracture. This presentation will illustrate how conservative rehabilitation protocol could minimise the risk of hand deformities of the burnt hands. Through careful analysis of the anatomical and biomechanical properties of the hand, different pressure therapy techniques using pressure garment, inserts, conformers and splints will be illustrated using clinical case studies.
Introduction. Hand burn involving wrist and forearm will result in severe scar tissue and contractures if the initial acute burn was not treated adequately. The massive scar on the hand dorsum, wrist joint and forearm will multiply contraction forces and produce deformity, which makes challenging reconstructive efforts.

Method. Review of 3 cases involving 4 hands, wrists and forearms were done. An evaluation was performed on initial patient assessment, the stage reconstructive option, operative procedures, flap selections, complications and the outcome.

Results. Initial assessment includes the severity of the deformity, the risk while releasing the contracture, possible defect area and the available donor sites. The risk includes the need for tendon lengthening and maximum correction of the hand position. Stage reconstructions consist of determining the priority area for contracture release on hand, wrist and forearm. The flap of choice is ALT flap. An additional skin graft is performed when the flap insetting unmatched the defect area. Early outcomes showing improvement on hand function.

Summary. Contracture forces acting on hand-wrist-forearm should be treated first or simultaneously if possible to enable further reconstruction of the hand.
Neuromuscular rehabilitation improves strength and reduces functional impairment following moderate-severe wrist injury.

Miss Zoe Milner\textsuperscript{1}, Miss Hayley O'Sullivan\textsuperscript{1}
\textsuperscript{1}Royal Melbourne Hospital, Parkville, Australia

Hand Therapy C2 - Wrists, Sovereign Room, March 13, 2020, 10:30 AM - 1:00 PM

Background:
Studies on wrist rehabilitation indicate the importance of incorporating proprioception, strength and endurance. Failure to address these aspects can reduce the effectiveness of rehabilitation and impact on patient outcomes. Whilst clinical research indicates the benefits of neuromuscular rehabilitation programs, there is little evidence of how to design and implement these programs.

This study outlines an 8-week neuromuscular program to enhance functional outcomes for patients following a moderate-severe wrist injury.

Objectives:
To evaluate the effectiveness of a group based neuromuscular rehabilitation program for patients following moderate-severe wrist injuries.

Methods
A group based neuromuscular rehabilitation program was developed and implemented at Royal Melbourne Hospital. This 45 minute group was modelled off Hagert’s staged protocol with a particular focus on stages 5-6 and aimed to improve wrist control and function.

A battery of outcome measures were completed pre and post group completion and included:
• Active range of motion
• Strength (grip and pinch)
• Pain
• Weight bearing capacity
• Joint position sense (active)
• Patient rated wrist evaluation
• Upper extremity functional index

Data analyses was undertaken by a research statistician

Results
71 patient data sets have been analysed with the following results. Statistically significant improvements have been identified in active range of motion ($p=0.018$), grip ($p=0.000$) and pinch ($p=0.000$) strength, weight bearing capacity ($p=0.000$) and both patient rated outcome measures ($p=0.000$).

Summary
This large study indicates that group based neuromuscular rehabilitation is effective for improving objective measures and more importantly patient function following wrist injury.
The effects of alcohol consumption on distal radius fracture outcomes

**Miss Yuen Mei Cheng**, Professor Susan Brandis², Prof Randip Bindra³
²Bond University Occupational Therapy, Gold Coast, Australia, ²Bond University Faculty of Health Science and Medicine, Gold Coast, Australia, ³Griffith University School of Medicine, Gold Coast, Australia

Hand Therapy C2 - Wrists, Sovereign Room, March 13, 2020, 10:30 AM - 1:00 PM

Objectives:
The negative effect of alcohol on fracture healing has been established, but there are no studies reporting on the outcome of fractures in heavy drinkers. This study explores the relationship between alcohol drinking habits and the outcome following distal radius fracture (DRF).

Methods:
This was a prospective study of patients with DRF presenting to our hospital over 1 year. We recorded drinking habits questionnaire and used DASH score as outcome measure.

Results:
Compared with people who had consumed alcohol less than two times per month, the change in DASH score was statistically and clinically significant 14.4 points lower in people who had consumed alcohol two times or more per month after adjusting for 6-weeks DASH score and non-injurious fall in prior 12 months. From 6 weeks outpatient visit to 3 months outpatient visit, people who had six alcohol drinks or more on one occasion had a clinically significant 10.96 lower change in mean DASH score when compared to people who did not consume more than six alcohol drinks on one occasion.

Summary:
Our study suggests that heavy alcohol consumption may negatively impact improvement in arm function of people with distal radius fracture. This is likely related to slower fracture healing, other lifestyle factors and possibly lesser compliance with therapy in this group of patients.

This study brings attention to raising alcohol consumption awareness among patients with DRF.
Early outcomes of a post-operative protocol allowing immediate forearm rotation

Ms Kristine Beacham, Mrs Anita Bourton
1Hand And Upper Limb Centre, Claremont, Australia

Objective measures include the visual analogue pain (VAS) scale, range of motion (ROM), Disabilities of the Arm, Shoulder and Hand (DASH), Patient-Rated Wrist Evaluation (PRWE), grip and supination/pronation strength.

Results
Preliminary results from 10 of the 14 patients at 12 weeks post surgery have been analysed. Results show all patients achieved a minimum forearm ROM of 73% of the contralateral side, with 6 achieving 100% or better. 9 patients reported a resting VAS score of 0. Improvements in DASH and PRWE scores were documented for 8 of the 10 patients.

Summary
Preliminary results show peripheral TFCC repairs can be safely treated in a wrist immobilising orthosis, allowing forearm rotation. Functional ROM is achieved with minimal pain by 12 weeks, and as early as 4, allowing patients to return to functional use soon after orthosis discharge.
This lecture will review basic carpal anatomy, biomechanics and pathomechanics contributing to common wrist instability patterns. Anatomical and biomechanical contributions to joint stability and instability, and the basic neurophysiology of the wrist sensorimotor control system will be reviewed as a foundation to understand the development of rehabilitation treatment approaches. Considerations and therapy for wrist instability reconstructive including splinting techniques, proprioception, wrist stabilization exercises, and the role of muscles in carpal stability will be reviewed.
Rehabilitation of Scapholunate Instability

Mr Adrian Leung

Hand Therapy C2 - Wrists, Sovereign Room, March 13, 2020, 10:30 AM - 1:00 PM

Scapholunate dissociation is the most common ligamentous injury to the wrist, and scapholunate instability is the most common pattern of carpal instability. Scapholunate instability can result in chronic wrist pain, limitation in wrist range of motion, weakened power grip and affecting function of daily living.

Understanding the muscle actions and the tendon loading on the carpal bones is the key of the rehabilitation of SL instability. A comprehensive program such as splinting, kinesthesia and proprioception training, conscious neuromuscular training, muscles reconditioning and work rehabilitation can promote the healing and regain the function of the injured wrist.
Effects of a non-surgical rehabilitation program on pain and function for adults with acute triangular fibrocartilage complex injury

Ms Liying Pang

Hand Therapy C2 - Wrists, Sovereign Room, March 13, 2020, 10:30 AM - 1:00 PM

Objective
Non-surgical management of triangular fibrocartilage complex injury is not widely researched. This prospective cohort study aims to examine the effects of a 6-visit 20 weeks rehabilitation program, on pain and function in adults with acute TFCC injury.

Methods
Twelve participants completed the entire rehabilitation program, consisting of 6 visits. The first 3 visits were focused on the management of symptoms via a muenster orthosis, activity modification and joint protection advice, proprioceptive retraining and dynamic stabilizers strengthening. The last 3 visits were focused on conscious and unconscious neuromuscular rehabilitation. Outcome measures were the Visual Analog Scale (VAS) for pain during activity, the Jamar dynamometer for grip strength, an analog weighing scale for weight-bearing capacity, the Disability of the Arm, Shoulder and Hand (DASH) for self-rated disability and symptoms, and the Patient-Specific Functional Scale (PSFS) for the ability to perform valued activities. All outcome measures were recorded at the start of the first, fourth and sixth visit.

Results
Statistically significant improvements were demonstrated in all outcome measures across the 3-time points. Post hoc analyses revealed further statistically significant improvements from the fourth to the sixth visit for grip strength, weight-bearing capacity, DASH, and PSFS.

Conclusion
The results suggested that a 6-visit 20 weeks rehabilitation program was able to bring about statistically significant improvements in pain and function. This program has the potential to eliminate the need for surgical interventions, which translates into reduced associated costs resulting from hospitalizations, medical leaves, and absence from work.
The aim of this presentation is to introduce the effect of forearm position, and forearm muscle function upon overuse syndromes. The presentation will focus on research into the particular function and role of brachioradialis and abductor pollicis longus. The functional anatomical position of the forearm is in mid-pronation and extremes of motion from this position lead to overuse syndromes. The presentation will present the role of brachioradialis on forearm function, and the effects of over-pronation or supination leading to muscle overuse and in particular fibrosis affecting the radial nerve. The presentation will also focus on the function of abductor pollicis longus, and its mechanical moments about the distal radius resulting in friction leading to tenosynovitis. Repeated movement of the thumb in extreme pronation and ulnar deviation creates extreme stress by mechanically on the APL. The audience should to gain an appreciation of muscle function and forearm position as a precursor to overuse syndromes.
A model of management for women with upper limb RSI

Dr Therma Cheung

Combined Hand Therapy 3 - Occupational Disorders of the Hand and Wrist, Goldfields Theatre/Plenary, March 13, 2020, 2:00 PM - 3:30 PM

Upper Limb RSI refers to a disorder caused by muscle overload from either repetitive use or constrained posture. In a hand clinic in an acute hospital in Singapore, it was found that patients with upper limb RSI makes up 16.5% of the total referrals per year, most of them are females (74.6%) with tendon related conditions who need to do housework and aged between 51-60 years old (38.4%). For this group of women, conventional strengthening and exercise program very often aggravate their symptoms. The model of pathology proposed by Cook and Purdam in 2009 describes a pathology continuum of transition from normal tendon to late degenerative tendinopathy. They distinguished degenerative tendinopathy from reactive tendinopathy and suggested the reversibility of tendon at reactive stage but not at the late degenerative stage. Based on this model of pathology, a model of management was developed for this group of women seen in our clinic. The aim of the model is to help these women to restore a balance between their daily biomechanical load and musculoskeletal capability, while taking into consideration the pathology of their degenerative tendinopathy.
Work related wrist pain: a review of chronic 'sensorimotor wrist dysfunction'.

Dr Tanya Burgess

Work related wrist injury can present either as an acute or chronic injury. This presentation will focus on the chronic non traumatic wrist condition known as ‘sensorimotor wrist dysfunction’ that can often present as a slow burning deterioration in function associated with dorsal wrist pain and loss of strength.

The aim is to understand and recognise the variable presentation of work induced wrist pain and how it relates to loss of stability and proprioception of the wrist. Acknowledgment of the role wrist stability plays in wrist function and its complex relationship to wrist strength can lead to early management of the condition.

The keystone of management is Hand therapy with three main goals achieved in overlapping stages: Pain relief, stability and strength. Educating the patient and the employer can lead to a more rapid recovery. Early involvement of an exercise physiologist and rehabilitation provider helps to reduce relapse.
Factitious disorders of the hand

Prof Randy Bindra

Combined Hand Therapy 3 - Occupational Disorders of the Hand and Wrist, Goldfields Theatre/Plenary,
March 13, 2020, 2:00 PM - 3:30 PM

Everything is not what meets the eye. Occasionally health practitioners will face a patient intentionally playing the sick role for a material gain (malingering) or for gaining empathy in playing the sick role. The latter group of patients fall under the umbrella of "factitious disorders" when no clearly identifiable gain is identified.

Patients with factitious disorders can present in various ways, the non-healing ulcer, clenched fist syndrome, Munchausen syndrome and SHAFT syndrome.

A factitious disorder should be suspected in the following situations:
- A surgical wound fails to heal in the absence of obvious causes
- Patient is adamant for surgery to treat a relatively minor problem and get hostile if surgery is refused
- Patient is unable to extend the ulnar 2-3 digits after a trivial injury and do not respond to splinting
- Patient blames previous surgeon for problems and will not allow access to previous medical records

The management of this condition is tricky and the key is to avoid surgery. The option of seeing a psychologist should be carefully broached. Patients may improve with behavior therapy but recurrence rate is high.
Relative motion splinting to solve hand pain problems

Dr Donald Lalonde

Combined Hand Therapy 3 - Occupational Disorders of the Hand and Wrist, Goldfields Theatre/Plenary, March 13, 2020, 2:00 PM - 3:30 PM

Relative motion splinting to solve hand pain problems
Many patients show up to hand surgeons and hand therapists complaining of pain in their fingers or hand. The Xrays are normal. Usually there is a history of trauma a few months ago, and “It has been hurting ever since”.
Many of these patients can be helped with the pencil test and relative motion splinting. Just Google Lalonde pencil test hand pain or follow this link https://journals.lww.com/prsgo/pages/articleviewer.aspx?year=2017&issue=10000&article=00026&type=Fulltext
If the pain is relieved by placing the finger either in relative flexion or extension of the MP joint by separating the sore finger from the others with a pencil holding the finger either more flexed or extended, you can help the patient with relative motion splinting.
With the pencil holding the finger in the pain free position, you have rebalanced the forces so the body can heal. If the post traumatic hand or finger hurts in movement, the body is talking to the patient and saying: “Hey, would you quit that? I’m trying to heal in here and you are screwing it up! Stop that!” The relative motion splint allows the patient to use the hand, but takes the pain away so the body can heal.
What is an occupational injury

Dr Kevin C Chung

Combined Hand Therapy 3 - Occupational Disorders of the Hand and Wrist, Goldfields Theatre/Plenary, March 13, 2020, 2:00 PM - 3:30 PM

Association between occupation and hand problems continues to be debated. This presentation injects scientific viewpoints in guiding management of people with hand discomfort in the work place.
Undiagnosed Pathology - the role of the hand therapist

Mrs Nicola Goldsmith

Work Related Upper Limb Disorders are complex. Many patients have trawled the medical and therapy world for a diagnosis. Hand therapists are ideally placed to thoroughly assess to ensure no specific musculo-skeletal disorders have been missed. When all disorders have been excluded, the therapist can treat the symptoms.

Understanding the impact of these symptoms for the patient is vital. A hand therapist must use their physical and mental health backgrounds to apply strategies for recovery. Symptoms, for those with on-going longer-term presentations will include physical, psychological and social challenges.

Treatment starts with belief – the belief of the patient to get better. The therapist’s ability to explain complex concepts such as distal symptoms from proximal sources and the nature of chronic pain are vital. Hands-on techniques can be used where specific over-use or other MSK symptoms are uncovered but the mainstay of treatment will be a home programme of specifically prescribed exercises, education in desk (or other work) health and ergonomics alongside empowerment of the patient to get better.
Free medial femoral condyle flap for phalangeal and metacarpal bone reconstruction

Mr Chung-Chen Hsu

Reconstruction 4 - Reconstruction of Traumatic Bone Loss in the Hand and Wrist, Courtyard Room 1 and 2, March 13, 2020, 2:00 PM - 3:30 PM

Background. The Medial Femoral Condyle (MFC) Flap is a versatile option for the reconstruction of small osseous defects, however its use in reconstructing phalanges and metacarpal bones in the hand has not been widely reported.

Material and Methods. Between 2013 and 2018, 13 consecutive patients with osseous defects of the phalanges or metacarpals reconstructed with free MFC flaps were included. Demographics, defects characteristics, flap design and clinical course were recorded. Outcomes measured included time to bone union, total active motion (TAM) and patient reported outcome measures using the Michigan Hand Questionnaire (MHQ) and NHS friend and family test.

Results. A total of 14 MFC flaps were used to reconstruct 17 bone defects. Median age was 25 (21-36) years and M:F ratio was 7:6. Nine phalanges and 8 metacarpals were reconstructed. Median bone gap size was 1.5 (1.3-2.1) and most were segmental bone defects (15/17). Bone union was achieved in all the cases within a median of 7 (5-8) weeks. Median TAM was 200 (135-205) degrees. The affected hands scored lower than the unaffected hands in MHQ total scores (p=0.014), function (p=0.013) and satisfaction (p=0.029) domains. However, all patients or patients caregivers were likely to recommend the procedure someone would need similar care or treatment.

Conclusions. In this series the free MFC proved to be a reliable and predictable method for bone reconstruction of the hand, providing also a one stage solution for multiple bone defects in conjunction with soft tissue loss.
Microsurgical reconstruction of bone and cartilage loss in hand and wrist

Dr Yung-Cheng Chiu

Bone and cartilage loss in hand and wrist is a difficult problem to be dealt with by hand surgeon. Traditionally, we handle these injuries with arthrodesis, resection arthroplasty or artificial joint arthroplasty. However, each method has its own inadequacy. Here, we humbly present our early surgical result in cartilage and bone loss reconstruction with microsurgery.
Triple Chimeric flap - SCIP with vascularised iliac crest bone graft

Dr Sandeep B

Vascularised bone flaps have become a standard reconstructive method for limb reconstruction because of better wound healing, prompt bone union and less infection due to robust vascularity. These flaps are particularly beneficial in adverse conditions such as scarring and contaminated wounds. Several types of vascularised bone flaps, including the fibula, scapula and iliac bone, have been reported; however, they have several drawbacks, including donor-site morbidity. A superficial circumflex iliac perforator (SCIP) flap was first reported by Koshima et al., in 2004 with minimal donor-site morbidity and increased versatility. SCIPs have several branches to the iliac bones used previously to harvest for complex defects in few cases.

We were presented with 18 year old with complex hand defect after crush injury on ship. He had delayed presentation with skin loss on dorsum of hand and 2nd metacarpal midshaft bone defect after debridement.

Coverage was accomplished with a triple component Chimeric SCIP flap. The iliac crest bone graft was used for metacarpal defect, external oblique fascia to prevent adhesion of tendons and fasciocutaneous part for skin defect. Patient had uneventful recovery post op with graduated physiotherapy protocol to regain function of hand. Viability of the bone was confirmed with bone scan.

Conclusion:
This is a first case with iliac crest bone graft and external iliac fascia harvested in a chimeric SCIP. It is a viable option for complex reconstruction requiring bone graft.
Distal nerve transfer for upper limb reconstruction

**Prof Kanit Sananpanich**

1Department Of Orthopedics, Faculty Of Medicine, Chiang Mai University, Chiang Mai, Thailand

Reconstruction 5 - Nerve vs Tendon Transfers for Peripheral Nerve Injuries, Eureka Room 1 and 2, March 13, 2020, 2:00 PM - 3:30 PM

Distal nerve transfer has gained popularity recently by its rapid recovery and unnoticeable deficit. The main factor is anatomical knowledge of transferring the donor nerve very close to target muscle, which reduces regenerate time for axonal growth to the end organ. The donor nerve should be one of several nerves in similar role leads to usage with functional replacement by other nerve. The role of recipient nerve should be very important enough to sacrifice the donor. There are several interesting nerve transfers such as: pronator quadratus branch of median transfer to ECRB, ECRB to anterior interosseous nerve, ECRB to ulnar FDP motor branch, supinator branch of radial transfer to digital extensor of posterior interosseous, triceps branch of radial nerve transfer to axillary deltid branch, or even deltid branch transfer to triceps in opposite manner. The other benefit of distal nerve transfer comparing to tendon transfer is breakthrough limitation of donor muscle. For example, pronator quadratus or supinator has never been used in tendon transfer because of their anatomical limitation. But in distal nerve transfer, the nerve of those two muscles can be used. One most important limitation of distal nerve transfer is timing, which require early period of reconstruction before the end organ degeneration occur which sensory is more last long than the muscle. The concept of distal nerve transfer can be applied in brachial plexus injury, peripheral nerve injury, and central nervous deficit such as spinal cord injury.
Tendon transfers for Paralytic Conditions

Prof Santosh Rath

Reconstruction 5 - Nerve vs Tendon Transfers for Peripheral Nerve Injuries, Eureka Room 1 and 2, March 13, 2020, 2:00 PM - 3:30 PM

Tendon Transfers for Paralytic Conditions

Tendon transfer (TT) procedures are common, and have over 80% success rates. The fundamental principles for selection of donor tendon, route of transfer, site for transfer and tension for insertion are fairly standard practice. Our experience with over 3000 paralytic limb presented many operational challenges from a large pool of longstanding neglected deformities, barriers to timely access to surgery and provision of post-operative follow-up. Our journey to reduce treatment time and methods to identify failing TT are two innovations that improved outcomes.

The 12-16 weeks loss of work is a major barrier to undergo TT in countries lacking social security payment. Disruptive innovation in the form of “Early post-operative active mobilization of TT” demonstrated 40% reduction in treatment time without compromising surgical outcome. The safety of the concept was first tested on opposition transfer in isolated median nerve paralysis. Further RCT on TT for hand claw deformity and foot drop established the efficacy and safety of early mobilisation of TT.

A method to identify failing TT was an important learning. Therapy assistants were trained to document joint position, range of motion and interpret changes to resting and active positions from TT. An algorithm was developed based on the relationship of resting and active position to identify failing TT. The process identified risk factors for unsatisfactory results of TT for paralytic limb. Predictors for poor outcomes were long standing deformities, secondary contractures, extensor apparatus damage, complicated claw, flexor contractures, 1st web contractures and CMC joint subluxations.
Therapy principles following nerve transfers

*Mrs Jaslyn Cullen*

Reconstruction 5 - Nerve vs Tendon Transfers for Peripheral Nerve Injuries, Eureka Room 1 and 2, March 13, 2020, 2:00 PM - 3:30 PM

It is important for surgeon and therapist to adopt a team approach to optimise clinical outcomes after nerve transfer surgery. This begins during the surgical planning phase. Therapists provide baseline functional assessments, which assists with donor selection. Patient education prior to surgery provides a consistent and clear pathway for managing patient expectations of treatment. After a short (2-3 weeks) period of post-operative immobilisation, facilitation of cortical remapping is commenced using a donor-activated rehabilitation approach. Biofeedback using a mirror box is useful in the early phase of treatment. Graded exercise programs prevent development of compensatory movements and assist with relearning normal movement patterns. Rehabilitation after sensory nerve transfer should be commenced in the early stages of recovery. Sensory re-education techniques involve flooding of cortical pathways by methods such as visual feedback and integration of all senses. Re-education improves cortical re-mapping, particularly when used prior to sensory reinnervation. Once stimulus perception has begun to recover, therapy to improve tactile gnosis and localisation can commence.

Early and continuing collaboration between surgeon and therapist is essential to maximise outcomes after nerve transfer surgery. Rehabilitation strategies focussed on re-education and cortical remapping improve functional outcomes in both motor and sensory nerve transfers.
Nerve transfers or tendon transfers for median nerve injury

**Dr Ip Wing Yuk Josephine**

Reconstruction 5 - Nerve vs Tendon Transfers for Peripheral Nerve Injuries, Eureka Room 1 and 2, March 13, 2020, 2:00 PM - 3:30 PM

Solitary median nerve injury is of frequent occurrence due to its superficial anatomical position. It is also involved in repetitive injuries in distal median nerve. If the other peripheral nerves, ulnar nerve and radial nerve are intact, median nerve injury is amenable to reconstruction by nerve transfer or tendon transfer. The usual pattern of median nerve injury is upper median nerve palsy and low median nerve palsy. High median nerve palsy involves long flexors to thumb and fingers except FDP to ring & little fingers, radial wrist flexor and radial intrinsics. For sensory deficit, the radial 3 and a half digits, radial aspect of palm will be involved. Low median nerve palsy involves the thenar eminence and radial 2 lumbricals and sensory supply to radial 3 and a half digits.

Tendon transfer can be done to restore lost motor function by a dispensable motor supplied by radial nerve or ulnar nerve. Planning of tendon transfer needs to be individualized according to functional demand of individual. In case of multiple nerve injuries, throughout physical examination to identify potential donors and recipients need to be done for proper operation plan. Staged procedures may be required to maximize reconstructive options. Nerve transfer from nerve supply to a dispensable motor is an option before degeneration of denervated muscle occurs. For sensory restoration, nerve transfer of sensory fibers from dispensable region is possible as the cell bodies of sensory neurons are in dorsal root ganglion and restoration of sensory function in important area is possible.
5 year results for the Motec total wrist arthroplasty in Australia

Dr Shivani Verma

Introduction:
Total Wrist replacement (TWR) Implants have advanced over the past 30 years aiming to treat disabling joint pain while preserving motion. Recent prosthesis have improved outcomes, offering enhanced stability by preserving bone stock. The Motec Wrist is a modular, cement-less, ball-and-socket wrist implant which has shown great design benefits and can be potentially used to treat a more high demand clientele.

Method:
Between 2014 and 2019, a Hunter region based surgeon conducted total wrist arthroplasties (TWA) for 30 patients with pan-carpal arthritis. Primary outcome measures included range of motion and DASH (Disability of the Arm Shoulder and Hand) scores and comparisons were made pre and post-operative over spaced intervals. Appropriate ethics approvals were obtained.

Results:
The range of motion improved on average by 16 degrees of extension and almost 20 degrees of flexion at 6 months. This gradually increased for the following 5 years. The average pre-operative DASH score was 53, which decreased significantly post-operatively with a 4 year post-operative average DASH score of 20. Complications included a case of revision to arthrodesis due to persistent pain and a case of infection requiring removal of hardware.

Discussion:
This study demonstrates that a cement-less, modular TWA improves pain and function while also increasing range of motion from the pre-operative morbidity stage. This compliments results published from similar studies in Europe and the United Kingdom. Particularly in younger and higher demand patients, this prosthesis appears to result in reliable outcomes for patients with debilitating wrist pain secondary to arthritis.
Surgical Technique for the Motec Total Wrist Arthroplasty

Dr Kristoffer Thorvaldson

Wrist 8 - Wrist Replacements, Now and the Future, Eureka Room 3, March 13, 2020, 2:00 PM - 3:30 PM

The Motec Total Wrist Arthroplasty (by Swemac, Linkoping, Sweden) provides an option for maintaining range of motion and providing pain relief for arthritis of the radio-carpal joint. It has been available in Australia for over 6 years, and in Scandinavia for more than 15 year, showing promising long-term results. This presentation will explain the procedure, as well as some tips and pit-falls for accurate placement of the prosthesis components.
Fascia Lata interposition, a biologic option.

Mr Siddharth Karanth

Wrist 8 - Wrist Replacements, Now and the Future, Eureka Room 3, March 13, 2020, 2:00 PM - 3:30 PM

In non-salvageable, symptomatic wrist pathology total wrist fusion (TWF) or Total wrist arthroplasty (TWA) are usually preferred. I propose a wrist salvage procedure as an alternative to TWA and TWF. It involves use of fascia lata autograft and no implants. It is a single operator series of 10 cases over 5 year period for a broad range of indications. The outcomes have been satisfactory in terms of pain with preservation of useful wrist movements. There was no complications or morbidities related to fascia lata donor site. TWA and TWF can still be performed if the proposed procedure fails. Two cases (out of the 10) have progressed to TWF.
Total wrist arthroplasty - evolution in design

Prof Randy Bindra

Total wrist arthroplasty is clinically indicated when preservation of motion is desirable or critical to function when partial fusion is not an option.

Current total wrist arthroplasty design is the result of half a century of evolution. Swanson silicone arthroplasty was the first generation of implants and provided valuable pain relief while preserving motion. The inability of silicone to bear stress became clear pretty soon with fragmentation and bone resorption from the foreign body reaction.

Subsequent ball and socket designs such as the Volz and Mueli implants focused on achieving large ranges of motion but failed due to lack of stability. Later elliptical designs such as the biaxial arthroplasty brought better stability at the expense of reduced mobility of the wrist. These implants were plagued with distal loosening and cut out of the middle metacarpal. The introduction of the universal total wrist arthroplasty showed that distal fixation of the carpal component could be achieved without metacarpal fixation using screw fixation in the scaphoid and hamate with a capitate stem. Subsequent use of CAD modelling and locking screw technology has seen improvement in stability and motion while lowering implant profile in the "Freedom wrist".

The "Motec wrist" has seen a return to ball and socket design but with smaller implants and metal on metal or PEEK articulation. The implant has challenged the traditional notion of restricting patient activity and successful results have been reported in younger, active patients with osteoarthritis.

The role of hemiarthroplasty is still being explored.
What are outcome Measures vs PRO

Dr Kevin C Chung

Combined Hand Therapy 4 - Outcome Measures, What, When, Why. Evidence of Experience Based Medicine., Goldfields Theatre/Plenary, March 13, 2020, 4:00 PM - 6:00 PM

Outcomes research has been a critical pillar in hand surgery for a generation. This presentation shares the past, current and future direction of outcomes research in illuminating this critical movement in Medicine.
In the era of value added care it is important to be able to compare treatments and outcomes across a range of disease profiles. EQ5D is a patient reported outcome measure (PROM) that has basic elements common in most health states relating to disease and treatment that enables comparisons to be made. This talk will explore the and provide examples of how this tool may be used.
Measurement of outcome that is reliable, valid and responsive to change is central to research and clinical practice. Measurement must also be goal directed, with tools chosen that reflect the outcome for the person with a tetraplegia based on the surgical or therapeutic input. This presentation will discuss the international classification of functioning disability and health (ICF) as a framework to choose outcome measures from a cross section of domains including impairment, activity/participation and environment. The pros and cons of existing outcome measures used in the tetraplegia literature will be briefly discussed.
Clinician Reported (ClinRO), Observer Reported (ObsRO) and Patient Reported (PRO) outcomes: What, when, why and respective strengths

Dr Emily Ho

Combined Hand Therapy 4 - Outcome Measures, What, When, Why. Evidence of Experience Based Medicine., Goldfields Theatre/Plenary, March 13, 2020, 4:00 PM - 6:00 PM

Despite surgical and rehabilitative advances, children with congenital limb differences or brachial plexus birth injury have permanent limitations in their upper extremity function. Clinician reported (ClinRO) outcomes are critical to determine candidacy for interventions, while Observer Reported and Patient Reported outcomes (ObsRO and PRO) are critical for measuring the child’s functioning and HRQoL within their unique life situation. Coming together, ClinRO, ObsRO and PRO outcomes provide a comprehensive evaluation to determine what interventions or supports may help the child to participate in activities that are required and meaningful to their life situation. This presentation will describe what, when, why and respective strengths of ClinRO, ObsRO and PRO measures in paediatric upper extremity surgical and rehabilitative practice.
Quantitative Techniques for Assessment of Upper Extremity Movement and Function: Possibilities, Challenges, Opportunities

**Dr Aviva Wolff**

Combined Hand Therapy 4 - Outcome Measures, What, When, Why. Evidence of Experience Based Medicine., Goldfields Theatre/Plenary, March 13, 2020, 4:00 PM - 6:00 PM

Clinical and biomechanical movement analysis of the upper extremity is complex due to the multiple degrees of freedom and wide range of tasks afforded to the upper limb. Standardized protocols are not as well developed and described as in the lower limb. Emerging technologies present new opportunities for clinicians to accurately and efficiently assess movement. The aim of this brief presentation is to present a framework for assessment and measurement for quantitative dynamic motion of the upper extremity with a focus on the challenges, possibilities, and opportunities. The clinical and research applications of available tools will be discussed briefly.
Evidence vs experience based medicine

Prof Santosh Rath

Combined Hand Therapy 4 - Outcome Measures, What, When, Why. Evidence of Experience Based Medicine., Goldfields Theatre/Plenary, March 13, 2020, 4:00 PM - 6:00 PM

Evidence vs. Experience Based Medicine

The debate continues. Does ‘experience’ trump over ‘evidence’ at the point of delivery of care to a patient? The definition and objective criteria for evidence based medicine or practice is constantly shifting. Over the past 3-4 decades the gold standard for evidence has moved from RCT to meta-analysis, and currently to GRADE criteria for evidence hierarchy from very low to high. Experience based medicine on the other hand lacks definition and includes substantial bias in decision-making. The knowledge content for ‘evidence based medicine’ and ‘experience based medicine’ are not similar, but there is significant overlap of scientific rationale. ‘Experience based medicine’ includes fair amount of ‘evidence’ knowledge, and the practices outside this overlap contributes to variation in care. Experience based medicine relies on what works in the local population thus influencing decisions for individual patient. Information from clinical trials or evidence as commonly known is rarely adopted into practice adoption requires experience and understanding pathophysiological rationale; awareness of contextual relevance, social, personal preferences and finally value. The key difference is the application of knowledge at the bedside or for policy decisions. When the knowledge from clinical trials, pathophysiological rationale and personal experience line up nicely, then decision-making for both policy makers and for the physician becomes easy. The debate should now focus to identify the basis of the differences in knowledge of experience and evidence for a given condition and undertake research to increase overlap of these concepts for value based care.
Medial Sural artery perforator flap a thin alternative for resurfacing of distal forearm and dorsum of hand

Dr Anil Mathew

1Christian Medical College Vellore, Vellore, India

Objectives: Soft tissue resurfacing of the dorsum of the hand and distal forearm requires durable, thin skin to allow gliding of tendons. We describe the use of the free medial sural artery perforator flap (MSAP) in the resurfacing of the dorsum of hand and distal forearm.

Methods: A cohort of patients who underwent free MSAP flap reconstruction of the hand dorsum and distal forearm were included in the study after informed consent. The data was extracted from the patient records, operative records, operative and post operative photographs.

Results: This descriptive series included six patients. All flaps survived completely in this series with one requiring re-exploration. All flaps were thin (5 to 8 mm). The pedicle length was 6.7 cm (5.3 to 8 cm). The diameter of the artery at anastomosis was 0.7 to 2.0 mm. The average flap harvest time was 1 hr 20 min. All flaps were anastomosed to radial or ulnar arteries. The basilic or cephalic vein and the venae comitantes accompanying the radial and ulnar artery were used for venous outflow. The primary pathology for the resurfacing included, 2 tumors, three scar revisions and one primary soft tissue loss after trauma.

Summary: The MSAP flap a thin flap even in obese individuals can be rapidly harvested under a tourniquet with a two team approach. It’s dimensions and relative hairless surface is ideal for distal forearm and dorsal hand resurfacing. However donor site closure is difficult for flaps that are greater than 6 cm in width.
Use of perforator flaps in reconstruction of different soft tissue defects in hand

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Free Papers 9 - Trauma, Courtyard Room 1 and 2, March 13, 2020, 4:00 PM - 6:00 PM

Objectives: There are many options for coverage of soft tissue defects in hand ranging from local and loco-regional flaps to distant flaps. Use of perforator flaps for this purpose has made it more simplified in many aspects though technically demands expertise. This study was conducted to see the outcome of different types of perforator flaps applied to reconstruct the soft tissue defects involving different areas of hand due to different causes.

Methods: Perforator flaps were performed in 15 cases in 12 patients, composed of 10 males and 2 females, from 2016 to 2019. Causes of the defects were trauma and machinery injury (6 cases), electric burns (4 cases), release of Syndactylies (4 cases) and release of post burn scar contracture (1 case). Flaps applied were Dorsal Metacarpal artery perforator flaps (7 cases), Dorsal metacarpal artery perforator based Island flap (3 cases), Innervated digital artery perforator flaps (3 cases), Thenar perforator flap (1 case), and Ulnar artery perforator flap (1 case).

Results: 6 cases developed post operative venous congestions but only 2 of them had partial necrosis in the distal part of the flaps which healed conservatively. All other flaps survived completely. Flexion deformity and web creep developed in one case of syndactyly and Tourniquet palsy involving radial nerve was observed in one case which resolved spontaneously in 6 weeks.

Summary: Perforator flaps are single stage procedures, they do not sacrifice major vessels like radial or ulnar arteries, the donor sites can be closed directly in most of the cases.
Hyperbaric oxygen therapy as a synergistic tool in hand injuries

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Objectives - Hyperbaric oxygen therapy is a useful tool helpful in improving the results of hand injuries when there is a reduction of blood supply. The main objective of this paper is to study the role of hyperbaric oxygen therapy in management of hand injuries.

Methods: Hyperbaric oxygen therapy is used as an adjutant therapeutic module in patients presenting with major crush injuries of hand. The improvement of outcome was assessed and documented.

Results and Conclusion: I would like to present my experience of hyperbaric oxygen therapy in hand injuries and draw the conclusions regarding indications and techniques also publish my results.
Vascularized bone graft for Reconstruction of upper extremities

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Free Papers 9 - Trauma, Courtyard Room 1 and 2, March 13, 2020, 4:00 PM - 6:00 PM

(Introduction)
Severe injuries including open fractures or amputated fingers can be the cause of non-union or large bone defect. For the treatment of that cases in upper extremities lesions, techniques of vascularized bone grafts are indispensable.

(Materials and methods)
The patients ranged in age from 23 to 73 y.o. (mean : 47 years). Cases:
1. Clavicle non-union : treated with Fibula 1, Medial epicondyle from femur (MEF) 2 cases.
2. Humerus : Fibula2, MEF 3
3. Radius and ulna : Fibula 7 (Double folded 2), MEF 3, rib with serratus anterior 1
4. Thumb : Fibula 1(Metacarpal), MEF2, Radius with forarm flap 3 (Pedicled).
5. Fingers : MEF 3, metacarpal bone 6 (1 pedicled, 5 free), Vascularized joint transfer 5 from toe.

(Sometimes 3D plastic models were used during operation to decide size of the graft.

(Results)
Bone union observed in all cases, but in some cases additional operation was necessary. Additional operation : Secondary Iliac bone graft for 2 cases from 9 Fibula grafts. 2 additional plating for Fibula grafts. 3 additional wire fixation and 2 free skin graft after 11 MEF.

(Discussion)
In cases of humerus, radius and ulna non-union, or large size bone defects, vascularized fibular graft or MEF recommended according to the size of graft needed. In cases of thumb metacarpal bone non-union or defect, short fibula graft possibly match the size of defect. In finger cases, small free vascularized bone graft from hand and foot lesion is useful using short pedicle.
A NOVEL DYNAMIC CADAVERIC WRIST SIMULATOR
FOR 3-DIMENSIONAL CARPAL BONE MOTION
MEASUREMENT USING BIPLANE X-RAY
FLUOROSCOPY

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Free Papers 10 - Wrist, Eureka Room 1, March 13, 2020, 4:00 PM - 6:00 PM

INTRODUCTION
The aim of this study was to develop and validate a physiologically meaningful dynamic cadaveric wrist simulator.

METHODS
A custom-designed computer-controlled dynamic wrist simulator was developed by applying physiological loading to six prime wrist tendons using six stepper-motor-driven actuators with the radius and ulnar vertically mounted.

Motion simulations following sinusoidal profiles of dynamic wrist flexion-extension (± 30°), radial-ulnar deviation (± 20°) and dart thrower’s motion were performed by applying muscle forces that minimised the sum of squares of muscle activations. The real-time global wrist motion was measured using four high-speed video motion analysis system cameras with tracking triads of retroreflective markers rigidly attached to the radius and third metacarpal and used as position feedback to update the muscle forces. The control system was implemented in LabVIEW and employed a decentralized adaptive controller and a quadratic programming optimizer for muscle force estimation, with additional feedforward of the tendon velocities estimated based on a simplified kinematic model of the wrist. Carpal bone motions were measured using biplane fluoroscopy system that had a dynamic root mean square (RMS) accuracy of 0.168° in rotation and 0.039 mm in translation. Repeatability of simulated motions was measured using RMS errors in angles and positions.

RESULTS AND DISCUSSION
Simulated flexion-extension, radial-ulnar deviation and dart thrower’s motion resulted in sub-degree RMS errors in global wrist motion, sub-millimetre and sub-degree repeatability in carpal bone motion, and sub-Newton tendon force repeatability.

CONCLUSION
A novel dynamic wrist simulator to study carpal kinematics using dynamic x-ray fluoroscopy has been developed.
Carpal Chondromalacia and Dynamic Scaphoid Instability, A Treatment Dilemma

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Free Papers 10 - Wrist, Eureka Room 1, March 13, 2020, 4:00 PM - 6:00 PM

OBJECTIVE
We report on the prevalence of associated chondromalacia and other pathologies in patients with dynamic scaphoid instability (DSI) Garcia Elias (GE) stage III, and report on the efficacy of arthroscopic treatment for stage III with chondromalacia.

METHODS
From 191 consecutive wrist arthroscopies, 71 (37%) were diagnosed with DSI and classified as GE stage III with additional chondromalacia and other associated intercarpal pathologies. These included 52% radial styloid impingement, 23% hamate chondromalacia, 16% triquetrum chondromalacia, 50% TFCC tear, and 11% ulna head chondromalacia. Of the 71 wrists, the average age at time of arthroscopy was 45 years and the average follow-up was 5.5 years (range 1-10 years).

RESULTS
44 (62%) were treated by arthroscopic debridement with concomitant abrasion arthroplasty, partial carpectomy, TFCC excision, and/or radial styloidectomy. During the 5-year average follow-up, additional open surgeries were required in 27 (38%) wrists (18 (67%) Dynadesis and/or 9 (33%) partial or total wrist fusion).

SUMMARY
Dynamic scaphoid instability of GE stage III can be associated with chondromalacia and other associated wrist pathology. We suggest this group be called stage GE3+. Arthroscopic treatment alone was successful in more than 60% of the patients with an average of 5.5 years follow-up. Acknowledging the natural history of uncorrected scaphoid instability and the fact that it happens in a younger, active age group, we conclude that medium-term relief can be accomplished by arthroscopic surgery alone. However, we recommend a longer follow-up for determination of long-term results.
Arthroscopic Debridement of Scapholunate Interosseous Ligament tears: A 5-year follow-up

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Free Papers 10 - Wrist, Eureka Room 1, March 13, 2020, 4:00 PM - 6:00 PM

OBJECTIVE
We report on the efficacy of arthroscopic treatment for dynamic scaphoid instability (DSI) Garcia Elias (GE) stage III.

METHODS
From 191 consecutive wrist arthroscopies, 79 (41%) were diagnosed with DSI and classified as GE stage III. Of the 79 wrists, the average age at time of arthroscopy was 38 years old and the average follow-up was 4.5 years (range 1-10 years). All were treated with arthroscopic debridement and synovectomy.

RESULTS
46 (58%) of wrists in this group were treated by arthroscopic debridement alone and did not require further treatment. 33 (42%) required dynamic stabilization of the scaphoid (Dynadesis).

SUMMARY
We conclude that medium-term relief can be accomplished by arthroscopic treatment alone in more than 50% of patients diagnosed with dynamic scaphoid instability with an average of 5-years follow-up. However, acknowledging the natural history of uncorrected scaphoid instability and the fact that it happens in a younger, active age group, we recommend a longer follow-up for determination of long-term results.
EFFECTS OF LIGAMENT SECTIONING AND RECONSTRUCTION ON SCAPHOLUNATE MOTION DURING ACTIVE WRIST FLEXION AND EXTENSION: A BI-PLANE X-RAY FLUOROSCOPY STUDY

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Free Papers 10 - Wrist, Eureka Room 1, March 13, 2020, 4:00 PM - 6:00 PM

INTRODUCTION
This study aimed to quantify changes in scapholunate (SL) angles after sequential disruption of the SL stabilising ligaments and after two surgical reconstruction techniques.

METHODS
Seven fresh-frozen human cadaveric wrists were mounted to a wrist simulator that replicated dynamic cycles of active global wrist flexion and extension by means of simulated muscle force application.

Normal SL kinematics were evaluated, and testing repeated following sectioning the volar and proximal SLIL; dorsal SLIL; radioscaphocapitate, long and short radiolunate; and scaphotrapeziotrapezoid ligament, dorsal intercarpal and radiocarpal ligaments based on previous research associating pathoanatomy to the Geissler grading system (Geissler II - IV). The wrists were then reconstructed with the three-ligament tenodesis, and an anatomical based technique (THM). During testing, carpal bone motion was measured using a validated biplane x-ray fluoroscopy system that had a dynamic RMS accuracy of 0.168° in rotation and 0.039 mm in translation.

RESULTS AND DISCUSSION
The greatest scaphoid motion change occurred after sectioning the dorsal SLIL (Geissler III) (mean flexion increase relative to normal: 19.70°, p<0.001). A further 28% increase in SL flexion occurred after sectioning the dorsal SL supporting ligament (mean difference: 8.55°, p=0.020). The 3LT was unable to restore anatomical SL motion (mean difference: 12.87°, p<0.001). The THM technique demonstrated an effective reduction in SL instability.

CONCLUSIONS
Injury to the dorsal SLIL and the dorsal SL stabilisers results in significant alteration of normal SL motion. An anatomical based SLIL reconstruction technique restores carpal bone motion more effectively than the 3LT technique.
Results of Proximal Row Carpectomy.

Prof Krishna Priya Das

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Abstract

OBJECTIVES: To evaluate long-term clinical outcome of proximal carpectomy. Our assumption was that this intervention should result in long-term benefit, making a wrist painless, mobile, and functional, compatible with social and professional life, whatever the initial etiology of the degenerative wrist.

METHODS: We report the last 30 months (8 patients) result of Proximal Row Carpectomy (PRC) in hand unit of orthopaedic department, BSMMU. Objective (mobility, strength, radiographic evaluation) and subjective (pain, subjective wrist value, functional scores) functions were assessed by Mayo wrist score. Surgery was performed mainly for Kienbock's disease, scapholunate advanced collapse (SLAC) and scaphoid nonunion advanced collapse (SNAC) wrists.

RESULTS: The follow-up lasted 14 months in average, during which pain was improved in all cases; 83% of the patients were satisfied with a mean score of 1.2 on a visual analogue scale (VAS) and 76% subjective wrist value (SWV) (disabilities of the arm, shoulder and hand [DASH]: 31). Wrist flexion-extension arc averaged 76 degrees, and the grip strength equivalent to 78% of the contralateral limb. Radiographic modification developed in 52% without any clinical impact. One patients required arthrodesis and never felt comfortable with their carpectomy.

CONCLUSIONS: Our study shows a short-term efficacy of proximal row carpectomy. This treatment must be considered in the therapeutic arsenal for a degenerative and painful wrist, and it should no longer be regarded as a salvage procedure. Advantages of this intervention are obvious: technical simplicity, short rehabilitation, immediate functionality of the wrist and few complications.
Chronic volar instability of the DRUJ corrected by 3D planned rotational osteotomies of both radius and ulna: a single case study

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The objective is to highlight the potential importance of the rotational profiles of both radius and ulna in DRUJ instability.

The method used to treat a rare case of chronic volar DRUJ instability was first to exclude any possible soft tissue component to the problem. Thereafter a 3D program was used to change the rotational profile of both bones by referencing the other forearm. Corrective rotational osteotomies were then performed.

Surgical results were assessed clinically, and with video, and via comparison of 4D CT before and after surgery. These showed a complete resolution of DRUJ instability.

In summary this case demonstrates that it is possible for gross DRUJ instability to be present, without a soft tissue abnormality, due to the combined rotational malalignment of both bones. Correcting the inertial axis of both forearm bones may correct this DRUJ instability.
Regenerative Peripheral Nerve Interface Implantation - A Novel Technique to Treat Symptomatic Digital Neuroma

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¹Monash Health, Dandenong, Australia

Nerve 2 - Nerve Injury and Reconstruction, Eureka Room 2, March 13, 2020, 4:00 PM - 6:00 PM

Objectives: Regenerative peripheral nerve interfaces (RPNIs) have been studied for use in prosthetic control.(1) It has been demonstrated to be effective in treatment of non-digital neuroma.(2) We have extended the use of this novel technique to patients with symptomatic digital neuroma which is often difficult to treat.

Methods: In patients with symptomatic digital neuroma, we excised the neuroma, followed by harvesting a small cuff of denervated muscle from volar forearm to suture and wrap around the proximal nerve end from which neuroma was excised. This was implanted within the interossei. We measured pain using numerical rating scale, pain intensity and pain interferences using Patient Reported Outcome Measurement Information System. Outcome measures were carried out pre-operatively and post-operatively at 6 weeks, 3 months and 6 months.

Results: Pain level improved in all patients at 1 week post-operatively. All patients reported significant improvement in pain scale, pain intensity and pain interference at 6 weeks after surgery.

Summary: This is the first series of 4 patients who had undergone RPNI implantation with positive result in surgical literature. We believe RPNI implantation is a simple and effective method to treat symptomatic digital neuroma.

References:
Vein wrapping for radial nerve hyperesthesia

Dr Shalimar Abdullah

Nerve 2 - Nerve Injury and Reconstruction, Eureka Room 2, March 13, 2020, 4:00 PM - 6:00 PM

Following De Quervain’s release, it is not uncommon for patients to develop debilitating pain and hyperaesthesia of the superficial sensory branch of the radial nerve (SSRN).

Wrapping of the hyperaesthetic median nerve with a vein graft is a known procedure with good outcomes. However, there are no reported cases of vein wrapping of the superficial sensory branch of the radial nerve. Using the same principles, we logically assume that wrapping of the SSRN will not be any different.

We present two cases with severe wrist pain after De Quervain’s release. Both described their pain as “sharp” even on light touch and unresolved with medications and physiotherapy. The first case was an 80-year-old man with a one year history of pain post-surgery and a VAS of 8. The second case was 46-year-old man with a 3 year history of pain post-surgery and VAS score of 7.

Both patients underwent surgical procedures of adhesiolysis, neurolysis and vein grafting. We harvested the dorsal vein of the wrist in the first case and saphenous vein in the second case and wrapped it cylindrically around the affected nerve.

At one-year follow-up, both had a reduced VAS score, the first from 8 down to 5 and the second case was 7 down to 3. There was still pain but the area was not hypersensitive as before. We conclude that vein wrapping of the superficial sensory branch of the radial nerve is similar to vein wrapping for the median and ulnar nerve.
Conduits for nerve repair, when and how

Dr Ip Wing Yuk Josephine

Nerve 2 - Nerve Injury and Reconstruction, Eureka Room 2, March 13, 2020, 4:00 PM - 6:00 PM

Peripheral nerve injury is of common occurrence and frequently there is nerve loss. The gold standard of management is early nerve repair and auto nerve grafting for a nerve defect. Nerve grafting requires a donor nerve with some degree of donor site morbidity. It is natural for surgeon and scientist to find replacement to minimize donor site morbidity. Currently, nerve conduit that can guide nerve regeneration include auto tissues like muscle or veins, allografts from decellularized nerves and artificial conduits made up of various biomaterials. Many artificial conduits are being researched and the author will present her study of her design of nerve conduit. Currently, no nerve conduit can perform equally good as autograft. The clinical results in the literature of using various nerve conduits for replacing nerve defects are reviewed. For short segment defects, the clinical results are acceptable.
Neuromas that occur after nerve injuries may result in severe and debilitating pain that causes greater disability and morbidity than loss of nerve function. These can be either end-neuroma forming in the proximal stump of a severed nerve, or neuroma-in-continuity forming in a partially cut, crushed or stretched nerve.

Early recognition and surgery is essential to minimise progression to CRPS. Surgical methods for end-neuromas include excision of the neuroma followed by nerve repair and grafting, translocation of the neuroma or stump, electrocautery of the stump, and various methods of capping the stump to prevent recurrence. For neuroma-in-continuity, neurolysis preserving residual nerve function is performed for mixed nerves with good residual motor function. Damaged fascicles are repaired with grafts.

In addition to surgery, a multi-disciplinary approach is needed in most patients, especially those with chronic regional pain syndrome. This involves pharmacological pain management, physical therapeutic modalities, and cognitive behavioural therapy. In some cases, more esoteric methods such as hypnosis and mindfulness based cognitive therapy may also prove useful.

Good results are seen most commonly in patients with end-neuroma with pain localised to the nerve territory who undergo early surgery followed by aggressive pharmacological and physical pain management, are motivated, and who remain active and socially engaged despite their pain. Poor results are common in those presenting more than 6 weeks after developing pain, those with neuroma-in-continuity, sympathetic dystrophy, hypersensitisation beyond the territory of the injured nerve, and those claiming Workmen’s Compensation.
Nerve repair in 2020

Dr Alexander Shin

Nerve 2 - Nerve Injury and Reconstruction, Eureka Room 2, March 13, 2020, 4:00 PM - 6:00 PM

Reconstruction of peripheral nerve injuries continues to challenge surgeons. While advances in our understanding of nerve regeneration and improvements in surgical techniques have improved outcomes, the results of treatment are not consistent and often fall short of patient and surgeon expectations. The current role of bioabsorbable synthetic nerve conduits, processed nerve allograft, stem cell enhanced allografts and autograft nerves will be reviewed in this talk which will focus on advances in peripheral nerve reconstruction.
How Much Does the Distal Interosseous Membrane of the Forearm Contribute to the Stability of the Distal Radioulnar Joint?

**Mr Kyung-wook Kim**, Professor Hyun-Sik Gong, Professor Yo-han Lee, Mr Hyun-seok Jeong, Mr Hyun-Sik Seok, Professor Ji-hyeung Kim, Professor Goo-Hyun Baek

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Wrist 9 - DRUJ Instability and Salvage Procedures, Eureka Room 3, March 13, 2020, 4:00 PM - 6:00 PM

**Purposes**

Anatomic and biomechanical studies suggest that a thick part of the distal interosseous membrane (DIOM), known as the distal oblique bundle (DOB), may also contribute to the stability of this joint. The purpose of this study was to evaluate the role of the DOB as a secondary stabilizer of the DRUJ.

**Methods**

We reviewed 352 patients who presented with ulnar wrist pain and had a physical examination for DRUJ stability and MRI examinations between February 2018 and April 2019. After applying the exclusion criteria, we analyzed 85 patients with a mean age of 42 years. We evaluated MRIs for TFCC foveal tears and presence of the DOB. And we correlated the MRI findings with a clinical diagnosis of DRUJ instability.

**Results**

Out of the 85 patients, 45 (53 %) had foveal TFCC tears and 29 (34 %) had the DOB in the MRI, and 38 patients (44.7 %) had clinical DRUJ instability. Patients with DRUJ instability had significantly higher incidences of foveal TFCC tears (30/88, vs 15/47) and absence of the DOB (36/38 vs. 20/47) than those without DRUJ instability. In the 45 patients with foveal TFCC tears, only 1 out of 13 DOB-present patients showed DRUJ instability, while 29 out of 32 DOB-absent patients showed DRUJ instability.

**Summary**

This study demonstrates that clinical DRUJ instability is less common when the DOB is present in patients with foveal TFCC tears, supporting the role of DOB as a secondary stabilizer of the DRUJ.
Arthroscopic assessment of distal radioulnar joint laxity, the push and probe manoeuvre

Mr Michael Boland¹²
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Wrist 9 - DRUJ Instability and Salvage Procedures, Eureka Room 3, March 13, 2020, 4:00 PM - 6:00 PM

Objectives

Instability of the distal radioulnar joint is difficult to diagnose and there is no standardised classification to define severity. The aim of the study was to utilise distal radioulnar joint arthroscopy to assess and classify degree of laxity in cases with a clinical presentation of distal radioulnar joint instability.

Methods

This is a retrospective observational study of all operative cases with DRUJ instability presenting between January 2014 and December 2017. There was a total of 273 distal radioulnar joint arthroscopies. In all cases laxity and diastases between the sigmoid notch and ulna head was assist by pushing the scope between the joint surfaces and probing the interval while positioning the forearm in mid supination full supination in mid pronation.

Results

Attempting a push manoeuvre with probing the joint diastases revealed consistently 5 grades of laxity which was easiest to demonstrate in mid supination. Grade 1 was tight contact between joint surfaces. Grade 2 layer of the probe to pass. Grade 3 allowed the probe to pass in the probe to be rotated. Grade 4 allowed the 2.7 arthroscope to pass between the 2 joint surfaces. Grade 5 was a frankly dislocatable joint.

Summary

The push and probe manoeuvre revealed laxity between the articular surfaces of the sigmoid notch and ulnar can be consistently assessed using DRUJ arthroscopy utilising a dorsal 2 portal approach and the test is most reliable in mid supination.
Total Distal Radioulnar Joint Arthroplasty

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Wrist 9 - DRUJ Instability and Salvage Procedures, Eureka Room 3, March 13, 2020, 4:00 PM - 6:00 PM

Aim: Total Distal Radioulnar Joint (DRUJ) Arthroplasty is defined as replacement of both the sigmoid notch and ulna head. The aim of this paper is to present a single surgeons perspective on Total DRUJ Arthroplasty.

Methods: A retrospective chart review of 32 patients, operated on by a single surgeon between 2010 and 2015, was performed.

Results: In sixteen, a constrained was used (Scheker Aptis) and there were 16 unconstrained (Stability Sigmoid Notch/U head Stryker/Small Bone Innovation). Age: Constrained, 39-79 years; Unconstrained- primarily in their fourth and fifth decades. Intraoperative complications: Constrained- two broken screws capture plate screws in one case; Unconstrained- there were the following technical difficulties, two ulna fractures needing cerclage wire, one distal mismatch due to overtightening the proximal sigmoid screw and one “revision” to a smaller ulna head due to stiffness in supination. Post-operative rehabilitation: Constrained- below elbow cast for two weeks and then mobilisation; There were no infections, and no revisions in either group for aseptic loosening. Post-operative complications constrained : ECU tendonitis in six, Dorsal Cutaneous ulna nerve palsy in two; and skin atrophy leading to radial forearm flap in one. Complications unconstrained : Revision in three, capsular release in two.

Summary- Neither implant needed revision for aseptic loosening. The unconstrained implant was used in younger patients with Post traumatic OA. The constrained implant used in older patients or those with prior bone resection. The technical learning curve is greater in the unconstrained implant. Soft tissue issues were greater following the constrained implant.
DRUJ instability, the DReaded and Underated Jeopardy

A/Prof Andrew Chin

Wrist 9 - DRUJ Instability and Salvage Procedures, Eureka Room 3, March 13, 2020, 4:00 PM - 6:00 PM

The distal radioulnar joint (DRUJ) is perhaps the most important joint in the wrist-forearm complex. Together with the proximal radioulnar joint and the interosseous membrane, it is responsible for the critical pronosupination motion which is so important in executing activities of daily living. The other important function which is more static than its dynamic pronosupination function is that of weight bearing joint of the forearm. More often than not, the DRUJ is the area where the majority of the weight from the load at the hand is transmitted proximally to the trunk through the DRUJ. Without an intact and stable DRUJ, this function is severely compromised. Patients with DRUJ instability will experience pain, discomfort, reduced range of motion, in particular pronosupination and limitation of grip strength and power.

While direct and indirect significant trauma as well as inflammatory arthrosis of the DRUJ can result in DRUJ injury/incompetence and its subsequent instability, subtle repetitive stress and persistent mild cumulative insults can also cause the DRUJ to become unstable insidiously such as in competitive sportsmen like gymnasts where such repeated stress may actually affect the Triangular Fibrocartilage Complex (TFCC) which in turn leads to chronic DRUJ instability. This sometimes can be difficult to detect early and is often missed and usually when the patient has been chronically incapacitated that the signs will become more apparent and by then the patient would have suffered for quite some time before presenting to the relevant surgeon for treatment. To have a high index of suspicion remains the most effective way to deal with this significant group of patients who may present early with paucity of signs and vague symptoms.

A/Prof Andrew YH Chin
Symptomatic radio-ulnar convergence continues to be the most disturbing complication following Sauvé-Kapandji (SK) procedures. Ulnar head prosthesis (UHP) has been described for the treatment for failed SK procedures. We present with you our median to long-term outcome for using UHP.

17 patients with confirmation of unstable ulnar stumps both clinically and radiographically were studied. The etiology for the initial SK procedure included post-traumatic distal radioulnar joint incongruity, primary DRUJ arthrosis and dysplastic DRUJ. All but 3 patients had a minimum of 2 and a maximum of 6 operations prior to having UHP. All patients suffered from severe pain with difficulty in performing work and daily activities.

The average follow-up was 6 years. The reduction of pain was statistically significant with 11 patients remained pain free. The range of motion of the wrist and power grip maintained to have statistically significant improvement at the late follow-up. The DASH score also significantly improved from 77 to 41.

No signs of loosening of the prosthesis was noted at the late follow-up. The only 2 patients who had received cobalt chrome instead of ceramic head prosthesis developed significant osteolysis as well as pain and had to revised to the Scheker total DRUJ prosthesis. Two patients who suffered from traumatic dorsal subluxation of the prosthesis were treated with radial osteotomy. Satisfactory outcome was noted.

This study illustrates that the late results of ceramic spherical ulnar head prosthesis for failed SK procedures in this small but representative patient series are encouraging.
Modified Sauve-Kapandji procedure with stabilization of the proximal ulna stump

Prof Fuminori Kanaya

Wrist 9 - DRUJ Instability and Salvage Procedures, Eureka Room 3, March 13, 2020, 4:00 PM - 6:00 PM

Sauve-Kapandji procedure consists of a radio-ulnar fusion and creation of a pseudo-arthrosis proximal to the fusion. This procedure is mainly indicated to the distal radio-ulnar problem. Typical rheumatoid arthritis (RA) wrist deformity is characterized by volar subluxation of the extensor carpi radialis (ECU) tendon and volar subluxation and supination of the carpal bones that causes dorsal subluxation of the ulna known as caput ulna syndrome. I will present our procedure with a little modification of Sauve-Kapandji procedure. Skin incision is placed dorsal aspect of the ulna. Dorsal straight incision is used when extensor tendon reconstruction is required. The distal radio-ulnar joint (DRUj) is exposed and synovectomy is performed when necessary. The ulna was cut at 15mm proximal to the joint line and 10 to 15mm ulna is resected from the proximal ulna. Then cartilage of DRUj is resected and subchondral bone is exposed. Resected ulna is used to fill the space between the distal radius and ulna. A small cancellous screw is used to fix the DRUj. The distal pronator quadratus is detached from the distal ulna and sutured to the proximal ulna stump through bone. This procedure is enough to stabilized proximal ulna stump especially in RA patients. Reposition of the volarly subluxated ECU is added in the case with volar subluxation of carpal bones. The forearm splint is applied after surgery and active motion exercise starts after 2 weeks.
Most symptomatic distal radioulnar joint (DRUJ) conditions result from derangements to several structures that may include the length, shape, and/or orientation of the articulating surfaces; the cartilage of the DRUJ and/or ulnocarpal joint; the DRUJ and/or ulnocarpal joint ligaments; and the extensor carpi ulnaris and/or pronator quadratus muscle. Once a complete diagnosis is made, often only one of these components is addressed, which results in suboptimal clinical outcomes. In this talk we present the pathomechanics of this complex condition and a treatment algorithm (the Four-Leaf Clover algorithm) to guide treatment of DRUJ instability. The Four-Leaf Clover principle is a guiding algorithm, not a document forcing the surgeon to adopt one particular treatment. Its purpose is to provide treating physicians with a checklist that helps ensure that they do not miss any of the different components that need to be addressed for a complete treatment. Using the treatment algorithm, we should achieve satisfactory resolution of patients’ symptoms after addressing the particular components in a stepwise approach.
A comparison of dorsal versus lateral plating in open reduction and internal fixation of proximal phalangeal fractures

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¹National University Hospital Singapore Hand And Reconstructive Microsurgery, Singapore, Singapore

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

Objective
Open reduction and internal fixation (ORIF) with plates and screws is an established method of treatment for proximal phalangeal fractures and dorsal plating is the most common technique. It is unclear if lateral plating results in decreased adhesions and stiffness. The purpose of this study was to compare the outcomes between dorsal and lateral plating.

Methods
A retrospective review of proximal phalangeal fractures treated with dorsal and lateral plate fixation over a 6-year period was performed. Data on patient demographics, mechanism of injury, fracture patterns, type of implants, post-operative outcomes and complications were reviewed. The primary outcome of interest was range of motion (ROM) at the proximal interphalangeal joint (PIPJ). Secondary outcomes were total active motion, time to union, grip strength and complications.

Results
There were 29 dorsal plates and 11 lateral plates in this series, median age of patients was 27 (range 18-62). There was no significant difference in PIPJ ROM between the 2 groups – 68 (SD, 27) degrees in the “dorsal” group compared to 51 (SD, 31) degrees in the “lateral” group (p = 0.10). Grip strength, complications, and removal of implant rates were also comparable between the groups.

Summary
Both dorsal and lateral plate fixation are acceptable methods of treating finger phalangeal fractures. We recommend lateral plating in situations where there are multiple sagittal fractures lines and extensive comminution that makes dorsal plate placement difficult. The lateral plate in this context behaves as a bridge plate and can be inserted with minimal periosteal disruption.
Comparison of Intramedullary Headless Screw Fixation, Dorsal Plate Fixation and Intramedullary K-wire fixation of Stable Metacarpal Shaft Fractures: A Biomechanical Study

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Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

Objectives
Intramedullary headless screw (IMHS) has become increasingly popular for fixation of metacarpal fractures. The purpose of this study was to assess their biomechanical performance compared with dorsal plating and intramedullary k-wires.

Methods
Sixty-four 4th generation sawbones were tested using a transverse mid-shaft fracture model. The sawbones were fixed in the following configurations -
1. 3mm IMHS
2. 2.2mm IMHS
3. 1.6mm IM k-wire
4. 2mm 6 hole non-locking dorsal plate

Fluroscopy was used to confirm correct position of the implants. There were 8 sawbones tested for cantilever bending and 8 tested for torsion for each configuration. Each sawbones was tested in a materials testing machine and measurements of stiffness and load to failure were made.

Results
For both cantilever bending and torsion testing dorsal plating was the strongest construct followed by 3mm IMHS, 2.2mm IMHS and finally 1.6mm IM k-wires.

Summary
IMHS fixation of stable metacarpal shaft fractures offers less stability compared to plating when loaded in especially in torsion. The diameter of the IMHS has an effect on construct stiffness. IMHS fixation is much more stable than IM k-wire fixation.
Maximizing motion after finger fracture surgery

Dr Rebecca Lim

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

In order to achieve optimal results from finger fracture surgery, surgeons balance the need to protect fracture stability for bone healing against the need for movement required for soft tissue reconstitution. A thorough understanding of the fracture healing processes and its relationship with the various techniques of fracture fixation with respect for gliding soft tissue structures and early controlled mobilization empowers surgeons in their clinical decisions. While fractures that have been fixed with absolute stability can be commenced on early motion protocols; fractures fixed with relative stability must be restricted to supervised short-arc motions to prevent loss of reduction yet maintain the requisite movement to minimize tendon adhesions.

Initial fracture severity is highly correlated with treatment outcome and complications. Stiffness remains the most frequent and serious complications of finger fractures, especially the proximal phalanx. The clinician, therapist and patient must work as a team to achieve the best possible functional outcome. This is the art as well as science of finger fracture management.
What to do when the base of your Thumb is "All Black". Management of Basal Thumb Fracture

Mr Wolfgang Heiss-Dunlop

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

A review of base of thumb fracture management options will be presented along with the preliminary results of an ongoing comparative study of K-wire fixation versus open reduction and internal fixation.
Primary open fixation for PIP joint Fractures (How to make a silk purse from a sow's ear)

Dr Karen Smith

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

Fractures and Fracture/subluxations of the proximal interphalangeal joint (PIPJ) are often complex to manage; a wide range of operative and non-operative treatments have been described.

At the Middlemore Hand Unit, our mantra for these injuries, is that a return of good joint function for the immediate and distant future, requires anatomical restoration of articular congruity, stable fixation and early motion.

The means of achieving this will be discussed, an audit of such procedures from our unit will be presented and the literature will be reviewed.
Non-surgical management of digital extra-articular proximal phalangeal fractures and non surgical management of digital metacarpal shaft fractures.

*Mr Brent Byrne*

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

Commencing in 2013, two prospective observational studies have been completed for digital proximal phalanx and digital metacarpal shaft fractures utilising the theory of fracture stability as published by Burkhalter and Reyes, 1984. A total of 101 proximal phalanx fractures established over a 44 month period, and a total of 179 metacarpal shaft fractures established over a 58 month period were accepted for inclusion. In our setting, both studies have redefined what types of fractures can be considered safe for continued conservative management, decreasing the need for acute surgical fixation while allowing immediate mobilisation. This presentation will detail short term observations at discharge following therapy treatment, the long term patient reported outcome as defined by the quickDASH and a case series demonstrating the outcomes of both patient cohorts.

A retrospective analysis comparing closed reduction and percutaneous cannulated screw for fixing phalangeal fractures with other fixation techniques

Dr Sam Hamilton

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

Phalangeal fractures are common and their management has significant impact for patients’ functional outcomes. Surgical fixation of those fractures requiring stabilisation has traditionally involved K wires or plates/screws. In recent times, there had been growing interest in closed reduction and percutaneous fixation using cannulated screws. These techniques are attractive as they align with the AO principles of fracture management by providing stable anatomical fixation, preservation of circulation and allowing early mobilisation. We present a five year retrospective study of our series phalangeal fractures fixed using closed reduction and percutaneous cannulated screw using intramedullary or transcortical techniques. Their outcomes are compared with other fixation techniques during the same period.
The "Boxers" fracture should we ever operate and how?

Mr James Thomas

Fractures are of the fifth metacarpal neck are a common injury. Non operative management is common and often produces satisfactory outcomes. Surgical intervention for displaced fractures can be associated with extensor tendon adhesions and consequent restricted range of motion. Antegrade intramedullary ("Bouquet") pinning of these fractures is a useful technique that avoids disturbance of the extensor mechanism around the metacarpophalangeal joint. The technique and indications for fixation of fifth metacarpal neck fractures will be discussed.
When not to operate. Ten year results using a dynamic treatment for proximal phalangeal fractures of the hands

Dr Margaret Fok

Fractures 1 - Management of Finger Fractures, Form vs Functions, Goldfields Theatre/Plenary, March 14, 2020, 8:00 AM - 10:00 AM

The fractures of the proximal phalanges of the hands can be treated by many methods. Yet, with surgical interventions, a loss in proximal inter-phalangeal joint movement is not uncommon.

By making use of the stabilizing effect of Zancolli Complex Metacarpo-phalangeal Retention Apparatus and external devices (thermoplastic MCP block splint), proximal phalangeal fractures can be stabilized in terms of axis, length and rotation. We report our 10 year-experience in managing these fractures by undergoing a dynamic treatment.

We analysed a consecutive 97 patients with 103 closed fracture of proximal phalanges. Fractures with rotational deformities or displaced intra-articular configurations were excluded. A dynamic splint that keep the meta-carpal phalangeal joint maximally flexed while allowing free movements of the proximal and distal inter-phalangeal joints of the injured finger was applied for at least 4 weeks.

A minimum of 1 year follow-up was noted. 75% of the patients attained excellent/good results. Neither non-union nor delayed union of fracture was noted.

The 25% of the patients who attained poor results were observed to be in the older age group (53.1 years old vs. 35.1 years old). They tended to have poor compliance to the rehabilitation programme.

By using the stabilizing effect of Zancolli complex Metacarpo-phalangeal Retention Apparatus and metacarpo-phalangeal block splint, bone healing and movement recovery can be achieved at the same time.
OBJECTIVES:
The objectives of this study were to report the overall complication rate, and to compare the complication rates between the approaches and fixation techniques of distal biceps tendon repair.

METHODS:
Studies on primary repair of the distal biceps between January 1998 and January 2019 were identified. A quantitative synthesis of data was done comparing the complication rates between limited anterior incision, extensile anterior incision and double incision and four fixation methods.

RESULTS:
72 articles including 3091 primary distal biceps repairs were identified. The overall complication rate was 24.4% (n=755).
The major complication rate was 4.6% (n=144) and included a 1.6% (n=51) rate of posterior interosseous nerve injury; 0.3% (n=10) of median nerve injury; 1.4% rate (n=43) of re-rupture and a 0.1% (n=4) rate of synostosis. Brachial artery injury, ulnar nerve injury, compartment syndrome, proximal radius fracture and CRPS occurred at a rate of < 0.1% each. The vast majority of nerve injuries resolved with an expectant approach.
The minor complication rate was 19.8% (n=611) with the most common being lateral cutaneous nerve (LCN) injury (rate 9.2% n=283).
An extensile single incision was associated with a higher rate of superficial radial nerve injury (6% vs 2.1%, p=0.002) and a limited anterior single incision technique had a higher rate of LCN injury (9.7% vs 5.2%, p=0.03).
Fixation technique had no significant effect on the rate of each complication.

SUMMARY
This is the largest analysis of complications following distal biceps repair providing valuable data with regard to the choice of technique, surgical approach and rate of complications.
Radial head fractures and replacement

Dr Donald Lee

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The purpose of this presentation is to review:

1) history of radial head implants
2) indications for radial head implants
3) design considerations for radial head implants
   - modularity
   - stem fixation
   - articulation
   - design
      - stem geometry
      - loading design
      - collared vs. collarless
      - expandable
4) fixation of radial head fractures vs. radial head replacement
5) operative procedure
   - surgical approach (Kaplan vs. Kocher)
   - neck resection and broaching
   - head sizing / head height
   - avoiding instability
   - post-operative management
6) results
7) complications
Assessment Imaging and Arthroscopic Management of elbow contracture

Dr Clara Wing Yee Wong

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

Elbow stiffness is a common condition. It is resulted from post-traumatic, degenerative or inflammatory causes. Distortion of joint congruence and articular congruity, capsular contracture, arthrofibrosis and heterotopic ossification are the usual causes of post-traumatic elbow contracture. Impinging osteophytes, secondary capsular and collateral ligament contracture, and sometimes loose bodies impingement result in progressive limitation in elbow range in osteoarthrosis. Painful synovitis in ulnohumeral joint and proximal radioulnar joint limits elbow’s motion, and the eroded bony articulation also produces mechanical obstruction to smooth elbow movement in inflammatory arthritis. 30-130 degrees were known to be the elbow function range. 50% reduction of the elbow motion will resulted in 80% reduction in upper extremity function. Higher demand patients e.g. athletes, would already have functional limitation even when there is mild stiffness. Surgical release helps to restore the elbow function. Arthroscopic release achieves the purpose in a minimal invasive way, which not only give smaller incisions, less infection, and quicker recovery, it also preserves the delicate important structures around the elbow, preserve existing function, meet the high demand patients when open surgery cannot be used for the same purpose. When to intervene surgically, whom can be operated arthroscopically, arthroscopic surgical techniques, post-operative rehabilitation regime, and factors influencing the surgical outcomes are discussed. Realistic goal should be made to the patients before surgical intervention. Pre-operative imaginings, including XR, motion XR, CT scan, MRI, contrast arthrogram, and computer simulation and animation should be useful in specific conditions for better pre-operative planning prognosis estimation.
Introduction to elbow and forearm stability and mechanics

Mr Michael Boland

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The aim of this presentation is to familiarise the audience with an understanding of elbow and forearm bony configuration plus an understanding of static and dynamic stabilisation. The elbow has stable bone anatomy particularly anteriorly. The key static stabilisers medially is the anterior aspect of the medial collateral ligament, and laterally the lateral ulnar collateral ligament. The role of the radial collateral ligament will be discussed. Brachialis and triceps work in tandem there is dynamic elbow stabilisers. Anterior capsular and proximal ulna periosteal stripping destabilises the anterior elbow. The forearm is uniquely designed so that the large bone of the elbow differs from the large bone of the wrist. This allows elbow and wrist mobilisation to work independently. The radius and ulna both have large and small curves allowing interdigitation of the bones with pronation. Multiple transverse muscles along with the interosseous membrane help stabilise the forearm.
Semi-constrained Hinge Total Elbow Arthroplasty

Dr Donald Lee

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The purpose of this presentation is to review the

1) types of total elbow arthroplasty
   - unconstrained vs. semiconstrained implants
2) indications for an unconstrained vs. semi-constrained implant
   - joint stability
   - bone stock
3) choice of elbow implant
   - adequate vs. inadequate bone stock
4) elbow implants used for elbows with inadequate bone stock
   - custom implant, alloprosthesis, impaction grafting
5) results of total elbow implants: linked vs. unlinked
6) results of total elbow arthroplasty for distal humerus fractures
Objective: Primary Elbow osteoarthritis (OA) is an uncommon condition. Arthritis leads to dynamic changes in this trochleo-ginglymoid joint which are not yet fully understood. Four-dimensional Computed Tomography (4D CT) is a novel diagnostic tool allowing real time assessment of dynamic upper limb disorders. This study is a retrospective analysis of our use of 4D CT to guide our management decision in patients with primary elbow OA.

Methods: We reviewed 9 elbows in 8 patients with symptoms of primary osteoarthritis. Symptoms included pain, stiffness, clicking and/or locking. Exclusion criteria included previous trauma, instability, inflammatory or crystal arthropathy and infection.

Results: In all 9 cases, osteophytes were noted in both the medial and lateral aspects of the olecranon and coracoid processes. Osteophytes were also identified in the capitellum (44.4%), olecranon fossa (66.7%) and radial head (66.7%). 3 cases had radiocapitellar osteophytes with loss of radiocapitellar joint space and all showed dynamic changes with subluxation of the radial head on movement. Radial head subluxation was antero-lateral and accentuated with pronation of the forearm. Isolated ulno-humeral involvement was not associated with visible instability.

Summary: 4D CT is useful in the detection of subtle instability changes in primary elbow OA. This helps guide management as simple debridement procedures, arthroscopic or open, may not result in a satisfactory outcome in patients with instability changes.
Elbow instability reconstruction for chronic and subacute elbow trauma

Mr Wolfgang Heiss-Dunlop

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

Our approach to the diagnosis and management of the chronic and subacute elbow instability will be presented along with the results of a comparative study of patients after subacute instability reconstruction versus patients that underwent acute ligamentous repair.
Fractures and Dislocations, including Monteggia and terrible triad injury - acute management

Dr Amir Adham

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The “terrible triad injury” of the elbow, as named by Hotchkiss, is the combination of an elbow dislocation, a radial head fracture and a coronoid process fracture. Posterolateral dislocation of the elbow joint is the most common acute traumatic elbow instability and occurs secondary to a traumatic valgus elbow instability, forearm supination and axial compression. This will induce damages to the radial collateral ligamentous complex extending to the capsule and up to the ulnar collateral ligament compartment. Early treatment will positively affect the outcome. The main objective in the management of such injuries is to restore the stabilizing bony structures of the elbow to convert a complex dislocation of the elbow joint into a simple one. However, proper identification of these lesions is quite demanding and their early management is a favourable prognostic factor for final outcome.
Lateral Collateral insufficiency- Tendinopathy vs ligament injury. When to repair? And how and when to reconstruct.

Dr Donald Lee

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The purpose of this presentation is to review:

1) epidemiology, pathology, and treatment of lateral epicondylitis
   - angiofibroblastic tendinosis
   - non-operative options
   - surgical options
2) lateral collateral ligament complex anatomy
   - radial collateral ligament
   - lateral ulnar collateral ligament
3) types of elbow instability
4) posterolateral rotatory instability (PLRI)
   - causes of PLRI
     - failed surgical treatment of lateral epicondylitis
     - steroid injections
   - history and examination
   - non-operative and
   - surgical management of PLRI
     - capsular ligament imbrication / plication
     - ligament reconstruction
     - postoperative care
     - results
Management of Post-Traumatic Stiff Elbow

Dr Yung-Cheng Chiu

Elbow and Forearm 1- Elbow Instability and Arthritis, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

Elbow is a highly constrained hinge joint that frequently becomes stiff after injury. It is challenging to treat stiff elbow, and therefore prevention is of paramount importance. A stiff elbow has been defined as one with flexion of less than 120° and a loss of extension of greater than 30° (flex-extension arc of motion <100°) or supination-pronation arc of ROM<100°. The etiology includes abnormalities of bone, soft tissue, or a combination of both.

There are some techniques for treatment of stiff elbow including medial/ lateral approach, arthroscopic technique. We reviewed the result of our cases with stiff elbow open release and trying to conclude some treatment strategies.
Distribution of sensory nerve endings in the interosseous membrane of the forearm

Dr Susanne Rein1, Dr Mireia Esplugas2, Dr Marc Garcia-Elias2, Hubertus Philipps1

1Hospital Sankt Georg Leipzig, Leipzig, Germany, 2Kaplan Hand Institute,, Barcelona, Spain

Elbow and Forearm 2- Forearm Disorders, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

Objective
The role of proprioception in understanding the dynamic stability and neuromuscular control of the forearm is important for the treatment of forearm injuries involving bone, ligaments and joint capsules. Therefore the aim of the study was to investigate types and distribution of sensory nerve endings in the different parts of the human interosseous membrane of the forearm.

Methods
The distal oblique bundle (DOB), the distal accessory bundle (DAB), the central band (CB), the proximal accessory bundle (PAB), the dorsal oblique accessory cord (DOAC), and the proximal oblique cord (POC) were dissected from twelve human fresh frozen cadaver forearms. Sensory nerve endings were analysed in two levels per specimen as total cell amount/mm² after immunofluorescence staining with low-affinity neurotrophin receptor p75, protein gene product 9.5, S-100 protein and 4′,6-Diamidino-2-phenylindol (DAPI) on an Apotome microscope (Carl Zeiss Microscopy, Jena, Germany) according to Freeman and Wyke’s classification.

Results
Free nerve endings were the predominant receptor in all six ligaments with greatest density in the DOB followed by POC. The second most sensory nerve endings were unclassifiable corpuscles, followed by Pacini corpuscles. The DOB had the highest amount of Pacini corpuscles followed by the PAB and POC. The DOAC only contained free nerve endings and unclassifiable corpuscles.

Summary
The DOB, PAB and POC had the highest density of sensory nerve endings, which indicates, that control of the dynamic stability of the forearm is pronounced at the distal and proximal radioulnar joint due to the closed proximity of the DOB and POC, respectively.
Essex Lopresti Injury and reconstruction

Prof Toshiyasu Nakamura

Elbow and Forearm 2- Forearm Disorders, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

Essex-Lopresti (EL) fracture is a combination injury of radial head fracture and dislocation of the DRUJ, which indicates progressive proximal migration of the radius (longitudinal radioulnar dissociation; LRUD) mainly due to rupture of the tendinous part of the interosseous membrane (IOM). The indication of this reconstruction was progressive LRUD either in acute or chronic EL fracture. Before reconstruction of the IOM, radial head was firmly fixed with plate or replaced by the artificial radial head. The avulsed TFCC from the ulna was directly repaired in fresh case and reconstructed using ECU half-slip tendon in chronic case. One side of the patellar BTB was inlayed in the same size pit, which was made on the distal one fourth of the ulnar shaft, using two AO 2.7 cortical screws. The patellar BTB was set on the dorsal side of the IOM obliquely. Then radius was distally pulled manually to reduce LRUD and the pit, which was the same size of the BTB, was made. The patellar BTB was inlay fixed on middle part of the radius with two AO screws with the maximum tension.

We reconstructed IOM in acute and chronic case each. At final follow-up, both indicated no pain, and no instability of the DRUJ. There was one excellent and one good clinical result. Patellar BTB was successfully united 6 months after the surgery. There was no deformity on the fixed radial head, failure of the artificial radial head, rupture of reconstructed BTB or recurrence of LRUD.
The interosseous membrane and DRUJ stability

Mr Michael Boland

Elbow and Forearm 2- Forearm Disorders, Courtyard Room 1 and 2, March 14, 2020, 8:00 AM - 10:00 AM

The forearm is uniquely designed with the large bone at the elbow differing from the large bone at the wrist. This allows independent elbow motion from wrist motion. During forearm rotation the ulnar moves in an arc of motion including flexion/extension plus varus/valgus motion at the elbow. The radius can only move about in anatomical axis centred on the proximal radioulnar joint, and the centre of the ulnar head distally. The bone shape of the radius and ulna include long and short curvatures which interdigitate during pronation and are in parallel in supination. Forces through the forearm exist in longitudinal, transverse, and shear. Essentially these are the X,Y and Z planes. The forearm is stabilised by a combination of dynamic and static forces. The role of the interosseous membrane is to share the load through the forearm. The ulnar bone in particular distally is somewhat bamboo like in the interosseous membrane ties the forces from the ulna to the radius and vice versa to prevent concertina bowing of the bones. Multiple muscles across the forearm in a transverse and longitudinal fashion. This provides dynamic forearm stabilisation. The role of the ligaments of the TFCC, and in particular dynamic Distal radioulnar joint stabilisation provided by the pronator quadratus, flexor carpi ulnaris and extensor carpi ulnaris will be presented.
A review of national hand surgery registries

Dr Konstantinos Vakalopoulos¹, Dr Marianne Arner², Dr Geke Denissen³, Dr Jeremy Rodrigues⁴, Dr Yngvar Krukhaug⁶, Prof Michael Schädel-Höpfner⁵, Prof Jean-Yves Beaulieu¹, Prof Ove Furnes⁶, Prof Richard Page², Prof Anne Lübbeke⁸

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Surgery 3 - The Delivery of Hand Care: Challenges and Opportunities, Eureka Room 1, March 14, 2020, 8:00 AM - 10:00 AM

Objectives:
Registries in the field of hand surgery are relatively new and have evolved following national existing hip and knee registries. Despite the existence of these registries data remain scarce and endpoints heterogeneous, making comparison between registries difficult. The aim of this review is to map existing registries in hand and wrist surgery and to provide a basis for future registries.

Methods:
We systematically searched the internet and Pubmed for existing hand surgery registries. Annual reports were consulted and questionnaires were sent to representatives from participating registries assessing registry characteristics, general information, baseline characteristics of the patients and outcomes collected.

Results:
We included a total of six national registries from the following countries: Australia, Germany, Netherlands, Norway, Sweden and United Kingdom. The Australian registry only includes wrist and carpal arthroplasty. Sweden records all performed hand surgery interventions whereas the German registry includes trauma patients only. All registries collect information on patients treated at university, community and private hospitals. The oldest registry is from Norway, with data being collected since 1994. Only Sweden currently reports patient reported outcomes (PROs).

Summary:
Existing registries include all surgical interventions or only focus on a category of patients, i.e. trauma surgery or prosthetic arthroplasty. Non-operative treatment is generally not included. There is a large heterogeneity between included outcomes and registry objectives. Funding is mostly provided on a government level. Most registries focus on arthroplasty, mainly on the wrist with recent efforts attempting to include metacarpophalangeal and interphalangeal arthroplasty. PRO collection is so far infrequent.
Innovations in access to orthopedic healthcare (or hand care)

Dr Alejandro Badia

Surgery 3 - The Delivery of Hand Care: Challenges and Opportunities, Eureka Room 1, March 14, 2020, 8:00 AM - 10:00 AM

The vast majority of orthopedic conditions, particularly of the hand, will have seen several clinicians before actually being assessed and treated by the appropriate professional. For lesser issues, this may suffice but studies have shown that many orthopedic conditions are incorrectly diagnosed, and certainly treated, in typical emergency rooms or the emerging "urgent care" centers. While this will increase the cost of care, the major concern lies within the missed diagnosis. This frequently occurs with occult carpal injuries and even clearer pathology, such as the perilunate dislocations which is one of the most common reasons for an emergency room lawsuit.

The concept of "orthopedic urgent care" emerged in the past decade in the US, allowing patients direct access to an orthopedic clinician. Since most orthopedic issues are not limb or life-threatening, a hospital environment is not necessary, therefore reducing cost while increasing access and convenience. Since musculoskeletal issues represent a relatively high percentage of urgent complaints, it makes fiscal and medical sense to facilitate direct initial assessment by the orthopedic clinician.
The USA Hand Trauma Center Program

Dr Lawrence Scott Levin

Surgery 3 - The Delivery of Hand Care: Challenges and Opportunities, Eureka Room 1, March 14, 2020, 8:00 AM - 10:00 AM

Reliable, high quality hand and microvascular trauma care in the United States has been historically fragmented and difficult to access. To meet this public need, multiple national surgery societies working in coordination initiated a pilot program where a network of National Hand Trauma and Replantation Centers (NHTRC) was established.
Challenges of hand surgery in Cox’s Bazar refugee camp

Dr Shalimar Abdullah

Surgery 3 - The Delivery of Hand Care: Challenges and Opportunities, Eureka Room 1, March 14, 2020, 8:00 AM - 10:00 AM

Cox’s Bazar is currently the world’s largest refugee camp with over than one million Rohingyas. The Malaysian army has set up the Malaysian Field Hospital which is in operation for 2.5 years now. The orthopaedic surgeon requested specialist hand surgery support.

We report on four hand surgery cases performed in May 2018. The children involved were between one to six years old. All cases involved fire or electrical burns (holding a burning charcoal, caught in a burning house, an electrical burn and being thrown into a fire). Two cases were categorized as severe; a severe right wrist contracture with right 2nd–4th MCPJ hyperextension and severe dorsal contracture and ulnar deviation of the right ring and little fingers.

The average time for operation was 2 hours. All surgeries require full thickness skin grafts from the groin or antecubital fossa. Instruments needed include a sharp Steven’s tenotomy scissors, Adson’s toothed forceps, K-wires of various sizes from 1.0–1.4 cm and a good K-wire driver. These items were brought from Malaysia with the hand surgeon as these were not standard items in the field hospital. The K-wires were left for two weeks to allow skin grafts to adhere. The patients were warded for one week to allow for a clean environment for dressings as their homes were tarpaulin sheets with earthen floors.

Wrist and finger contracture release can be comfortably done in a limited orthopaedic setting with minimal levels of sterility.
Quantifying carpal bone motion using 4-Dimensional CT – A comparative study of normal wrist and wrist with scapholunate instability

Dr Melanie Amarasooriya¹, Dr Kimberley Ruxton², Prof Gregory Bain²

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Wrist 10 - Current Concepts in Carpal Mechanics, Eureka Room 2, March 14, 2020, 8:00 AM - 10:00 AM

Objectives. Dynamic CT (4D CT) has evolved into a standard of care to manage joint instabilities. Quantification of joint motion using 4D CT however, remains elusive. The primary aim of this study is to quantify motion of the scaphoid and lunate during radioulnar deviation using 4D CT of the wrist. Comparing the normal wrist with wrists having scapholunate instability is the secondary objective.

Methods. Archived DICOM (Digital Imaging and Communications in Medicine) data from 4D CT scans of 4 patients have been used to track motion of scaphoid, lunate and 3rd Metacarpal bone during radioulnar deviation of the wrist. Images were analyzed with a volume registration technique and transformation sequence to calculate displacement of tracking points marked on bone, in relation to the reference volume - the neutral wrist position frame.

Spatial arrangement of scaphoid and lunate were then calculated using x, y and z coordinates, according to Euler angle principles and graphed against time points and compared.

Results. With this method it is possible to identify in plane and out of plane carpal bone motion during wrist radioulnar deviation. In normal wrist the radioulnar deviation involves significant out of plane motion of scaphoid and lunate. In scapholunate instability out of plane motion of the scaphoid reduced increasing more radial deviation.

Discussion. This is a clinically applicable method to track carpal bone motion to understand and quantify carpal kinematics and diagnose instability patterns. This is a preliminary study in the process of developing the technique to quantify carpal motion.
The impact of Viegas lunate types on wrist biomechanics, pathology and surgery- Review of literature

Mr Siddharth Karanth

Wrist 10 - Current Concepts in Carpal Mechanics, Eureka Room 2, March 14, 2020, 8:00 AM - 10:00 AM

Wrist disorders can be complex to analyse and the treatment outcome can be unpredictable. There are many variables to it. The Lunate types as described by Viegas is one of them. They are known to have impact of the wrist biomechanics and pathology. There is limited literature available collating all the information on Lunate types. This is a literature review looking at the Lunate types and its impact on biomechanics, wrist pathology and surgical outcomes. This will enable surgeons and therapists treating wrist pathology, to be more aware of its influence on the clinical outcomes.
Carpal ligaments are not static cable-like collections of fibres holding bones together, but complex bone binding structures containing sensorial elements (mechanoreceptors) aiming at detecting changes in carpal bone position and transmit that information to the sensorimotor system for a centralized control of wrist stability.

Some carpal ligaments are particularly set to detect intra-carpal pronation torques. They have been classified as the so-called “Helicoidal Anti-Pronation Association of Ligaments” (HAPL’S) and would be predominately active when the carpus is axially loaded, from distal to proximal, along the longitudinal axis of the hand, or when the distal row is torqued into pronation. HAPL’S play an important role in preventing carpal collapse in patients with chronic scapholunate instability.

The so-called “Helicoidal Anti-Supination Association of Ligaments (HASL’s) is formed by ligaments that are only active when the wrist is pulled distally or when the distal row is subjected to a supination torque. They may be subclassified in medial HASL’s and lateral HASL’s. The first would prevent ulnar midcarpal instabilities, while the second would be active in preventing ulnocarpal and lateral midcarpal instability.
Does the Stable Central Column Theory of Carpal Mechanics offer anything useful.

**A/Prof Michael Sandow**

Wrist 10 - Current Concepts in Carpal Mechanics, Eureka Room 2, March 14, 2020, 8:00 AM - 10:00 AM

Carpal mechanics have been investigated by using a process of reverse analysis of the specific biomechanical controls or rules of a specific patient’s carpus, and then use those to create a forward mathematical model to reproduce the unique individual's anatomical motion based on the extracted rules.

The carpus would appear to have only two degrees of freedom, and yet is stable in those arcs, with the controlling motion loads applied proximally in the forearm. The proximal row moved in a singular arc, but with a varying extent of the unitary arc during sagittal and coronal motion. The isometric constraints were consistent in both directions. The distal row moved on an axis formed by a pivot joint laterally (between the trapezium and scaphoid), and a saddle joint medially (between hamate and triquetrum). This axis changed as the proximal row moved. This created a distinct pattern of row motion to achieve the various required positions of wrist motion. On wrist radial deviation, the scaphoid (with the proximal row) flexed, and the distal row extended, whereas in wrist flexion, the scaphoid flexed (with the proximal row) and so did the distal row. The pattern was reversed in the opposite wrist movements. While the general direction of motion of each row was consistent, the extent was quite variable.

The Stable Central Column Theory of carpal mechanics, as well as the concept of RBM provides a basis for the theory driven quantitative analysis and understanding of the normal and injured wrist.

Ligament anatomy of the wrist, evolution and anatomy / function mismatches

Dr Makoto Tamai

Wrist 10 - Current Concepts in Carpal Mechanics, Eureka Room 2, March 14, 2020, 8:00 AM - 10:00 AM

An understanding of the evolution of the wrist aids in treatment of disorders in the upper-extremities. Upper-extremities or forelimbs of all four-limb animals (= tetrapods), including humans, possess common fundamental anatomy that was established over 300 million years ago. The human hand was freed from locomotion by bipedalism and was used as a useful tool for holding and moving things. The hand can perform both powerful and fine manipulation of objects helped by the flexibility and stability of the wrist joint. The wider mobility of the wrist joint compared with other animals was obtained by the withdrawal of the ulnocarpal articulation, which enabled full rotation of the forearm and wider radiocarpal mobility. Although these traits are counted as characteristics of late evolving hominoids, the structures of human hands and wrists are small and delicate relative to those of apes, as a result of human evolution that chose delicacy rather than power or durability for the hand. The continuous and careless use of anatomy taxing its ability and limits and the mismatch of anatomy and newly developed function may be the major causes of disorders of the wrist joint, simply because the human anatomy was not especially created to fit the usages of the modern human beings. Enlightenment about the proper use of the anatomy is essential not only to prevent or minimize the disorders and maintain the performance of the upper-extremity as long as possible but also to obtain better results after treatments.
The Ulnar Column, a dilemma

Dr Ter Chyan Tan

Wrist 10 - Current Concepts in Carpal Mechanics, Eureka Room 2, March 14, 2020, 8:00 AM - 10:00 AM

The ulnar column is often overshadowed by the radial column. Much is known about the radial column. Though very much similar to the lower limb in form, the ulnar column forms a much more integral functional aspect of the upper limb. The bone, ligaments and soft tissue around the ulnar column forms the basis on which the rest of the structure of the forearm pivots. We discuss the anatomy and injuries that occur around the ulnar column and the oft-forgotten aspect of the forearm.
Tips and tricks for managing upper limb hypertonicity for children with CP.

Melinda Lewis & Megan Thorley

Hand Therapy D1 - In Depth Practice Topics Option 2 (a), Eureka Room 3, March 14, 2020, 8:00 AM - 10:00 AM

Cerebral palsy (CP) is the most common physical disability in childhood and almost two thirds of children with CP will have movement difficulties that affect their upper limbs. These upper limb movement difficulties will impact on the child’s ability to perform in their daily occupational roles.

The Manual Ability Classification System (MACS) describes how children with cerebral palsy use their hands to handle objects in daily activities. It is available as a free download in 27 different languages and allows clinicians working with children with CP to communicate easily with families and each other regarding a child’s function. This workshop will describe the MACS and use photos and videos to help participants learn to use this classification confidently.

Paediatric rehabilitation services will utilise many evidence based medical and therapy approaches to improve the daily function of these children. The authors will also present typical goals for children with different abilities according to the MACS and discuss how intervention planning may vary. An outline of the evidence related to the therapy and orthotic options typically used for children with cerebral palsy will also be presented.

Treating without Pain (Taping for the UL)

Ms Alison Taylor

Hand Therapy D1 - In Depth Practice Topics Option 2 (b), Sovereign Room, March 14, 2020, 8:00 AM - 10:00 AM

Treating hand pain can be challenging, but approaching it from a slightly different perspective can change our outcomes and time frames. By looking closer at joint alignment, and the cutaneous nerves, we can start to address pain in a different way. This workshop will present some Kinesiotaping concepts for treating the fingers, and reducing pain in the hand.
This practical workshop aims to discuss on some practical tips in management of complications resulting from burnt injuries on the hand.

The workshop will start with a short introduction on conservative scar management based on the recommendation of International Society for Burn injuries (ISBI, 2018). Background theory on pressure therapy and silicone gel intervention will also be described. A new type of pressure gel pad, the smart scar care pad (SSCP) would be introduced to manage scar problems based on the pressure therapy theory. By combining the silicone gel effect with pressure intervention, it helps to pace up the process of scar maturation.

Practical demonstration on the application of SSCP on webspace, dorsum of hand, wrist and fingers will be conducted during the one hour practicum.

Participants will have the opportunities to try out the different types of SSCP on different application.
Management of stiff PIP joint with insufficient soft tissue

MD Che-Hsiung Lee¹, PT MSc Yueh-Hsia Chen², MD FACS Cheng-Hung Lin¹, MD Chung-Chen Hsu¹, MD Chih-Hung Lin³, MD MSc FACS Yu-Te Lin¹

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Combined Therapy 5 - Management of the Stiff Finger, Goldfields Theatre/Plenary, March 14, 2020, 10:30 AM - 1:00 PM

Objectives
For some flexion contracture of the proximal interphalangeal (PIP) joint, concurrent volar soft tissue shortage and volar plate stiffness can be released simultaneously. We report a useful technique combining the PIP joint adipofascial (PIPJAF) flap to repair the joint capsule defect after stepwise release and the volar neurovascular advancement (modified Souquet) flap for skin advancement.

Methods
Six digits with flexion contracture of the volar plate concurrent with volar skin shortage received the treatment. A V-shape extension incision on volar surface of the metacarpophalangeal joint provided exposure of the flexor tendons for tenolysis. Stepwise release of the volar plate and accessory collateral ligaments left a capsule defect on the PIP joint. A distally-based adipofascial (PIPJAF) flap raised from the dorsolateral surface of the proximal phalanx was transposed to cover the defect. The other mid-axial incision from the palmodigital crease to the PIP joint was performed on the contralateral side of the digit. The volar skin flap (modified Souquet flap) was advanced distally and the proximal skin was closed with a Y-fashion.

Results
The patients were followed for 9.9 months. The volar skin flap was advanced for 9.8mm. The arc of motion of the involved PIP joint was improved from 35° preoperatively to 73.2° postoperatively. The extension lag was improved from 51.7° to 20°. The gain in arc of motion was 38.3°.

Summary
For the PIP joint with concurrent volar plate fibrosis and volar skin shortage, the flexion contracture can be treated by combining the PIPJAF flap and modified Souquet flap.
Adhesion around tendons of the fingers and subsequent limitation of motion, is one of the major complications after tendon surgery. In addition to this, infection, open reduction of fracture, and burn scar contracture could be the causes of tendon adhesion. When these adhesion cannot be mobilised by an adequate course of hand therapy, tenolysis should be considered. However, this procedure is as difficult or more so than tendon repair itself and should not be undertaken lightly. It represents another surgical incursion into an area of previous trauma and surgery. If the procedure is not successful, the patient's hand may show no improvement or even be worse. The risk of further decreasing the circulatory supply and innervation to an already deprived finger is a real one. Rupture of the lysed tendon, a disastrous complication, is the major hazard of tenolysis.
Avoiding and solving stiff PIP problems after surgery and trauma

Dr Donald Lalonde

Avoiding and solving stiff PIP problems after surgery and trauma
1) Try not to open fractures of the PIP joint if possible. Every time you open a fracture, the space you create fills with blood after the surgery. That blood turns to callus and scar. It takes several more months for the wound to settle down if you open it. Get good at closed K wire reduction to avoid this problem.
2) Treat to get good movement, not a good Xray. If the reduction is close to perfect and the range of motion on the table after K wire insertion shows great movement, don’t open the fracture just to get a prettier Xray. You already have great movement on the operating table in the awake patient. The enemy of good can be perfect!
3) Always do your surgery awake so you can educate patients about post operative care during the surgery, as well as see that your surgery has the desired effect.
4) Start early protected movement at 3-5 days with K wired finger fractures, just as you do with flexor tendon repair. Get your patient off of ALL pain killers before you do this. If they don’t do what hurts with therapy, they won’t get K wire infections, and they will not take their fracture apart.
5) Treat PIP extensor lag with relative motion flexion splinting after surgery. Treat PIP flexor lag with relative motion extension splinting after surgery. People exercise while they are living with these splints.
Surgical tips & techniques to reduce the risk of adhesion formation in the PIPJ -

Prof Roohi Syed Waseem Ahmad

Combined Therapy 5 - Management of the Stiff Finger, Goldfields Theatre/Plenary, March 14, 2020, 10:30 AM - 1:00 PM

The Proximal Interphalangeal Joint (PIPJ) is a hinged ginglymus joint which moves basically in a flexion-extension plane with little lateral movement. This stability is provided by a bony tongue in groove articular contour and collateral ligaments providing lateral stability. The volar plate has a thick cartilaginous component and the dorsal capsule is also thickened over the joint. Similar to the elbow joint in function and movement, it does not deal well with trauma and tends to form adhesions with restrictions in range of motion (ROM). Part of this maybe due to the trauma itself, but mainly it arises due to traumatic handling of the supporting tissues.

A detailed knowledge of the anatomy (especially in 3-D), minimal handling of the tissues, meticulous technique with little or no errors are the key to achieving a good functional outcome. In addition, near perfect reduction of the fracture components with minimal disturbance of the articular surface and surrounding structures will definitely help. Low profile titanium plates, judicious use of Kirschner wires (in the joint) and strong stable fixation to allow early motion and therapy are the best ways to achieve good ROM.
How to mobilise the stiff PIP

Ms Judy Colditz

Mobilizing a stiff PIP joint is most effectively done with redirection of active motion while blocking more mobile proximal joint/s. Dynamic and static progressive orthotics impose immobilization, preventing the motor cortex from experiencing PIP joint motion as part of finger motion. Specific techniques for increasing glide of the dorsal apparatus proximal to and at the PIP joint will be discussed.
The Stiff Straight Finger post Trauma/Surgery

Dr Karen Smith

Combined Therapy 5 - Management of the Stiff Finger, Goldfields Theatre/Plenary, March 14, 2020, 10:30 AM - 1:00 PM

The stiff straight finger, resulting from trauma or surgery, is troublesome, compromising grip, pinch and general function of the hand.

Excluding joint destruction, the finger may be stiff in extension following trauma or surgery, because of joint contracture with scarring of the extensor mechanism, the joint capsule and the collateral ligaments and secondarily, the flexor tendons may also become adherent.

Where a stiff straight finger is resistant to hand therapy, surgery to release tendon adhesion and mobilise the Proximal Interphalangeal Joint (PIPJ) can be beneficial in restoring motion.

The surgical technique involves as much of the following as necessary; tenolysis of the extrinsic (and intrinsics) extensor mechanism, removal of metalware, a joint release (by release of the dorsal capsule and origins of the collateral ligaments) and a flexor tenolysis, with aggressive hand therapy thereafter

By this method, in 23 fingers, with initial proximal phalangeal trauma (of which two thirds had been severe), the mean increase in flexion at the PIPJ was 32 degrees and at the DIPJ, 14 degrees with the finger tip to distal palmer crease distance improving from 4 to 1.8 cms

A review of the literature will be presented
Mobilising splinting the stiff hand: what do we know and where do we go from here?

Dr Celeste Glasgow

This presentation will focus specifically on the contribution of mobilising splinting as a therapeutic modality for improving motion in the stiff hand. The importance of addressing both the viscous and elastic components of joint contracture with splinting will be explained in relation to the theory of how soft tissues respond to stress. The need for an evidenced based approach to managing joint contracture with splinting will be highlighted. The evidence to support the use of splinting will be presented focusing on the parameters and factors that influence effectiveness. The differences between splinting to improve flexion versus extension will be highlighted in terms of response to treatment and clinical prescription of the duration of splint wear time. The relationship between the modified weeks test as a measure of pre-treatment joint stiffness and response to splinting will be demonstrated. Areas for further research into the use of mobilising splinting to manage joint contracture will be highlighted.
Release PIP joint with a PIPJAF flap.

Prof Yu-Te Lin

Combined Therapy 5 - Management of the Stiff Finger, Goldfields Theatre/Plenary, March 14, 2020, 10:30 AM - 1:00 PM

Background
Post-traumatic proximal interphalangeal joint (PIPJ) contractures of the digits are common and are associated with impaired function of the hand. However, relapse is common after surgical release of PIPJ contractures. In this study, we present a novel treatment strategy with a PIPJ adipofascial flap (PIPJAF) to resurface the PIPJ after release, and compare patients with similar joint contracture release who did and did not receive resurfacing with a PIPJAF.

Methods
From January 2010 to January 2018, 10 patients received single-digit PIPJ flexion contracture release and PIPJAF resurfacing, and 20 patients received a stepwise release as a control group. A total of 30 joints were compared, and the degree of extension lag improvement over time was measured during an average follow-up period of 292.4 days.

Results
Greater extension lag improvement was observed in the PIPJAF group compared to the control group (37°, median 35° vs. 21°, median 20°, p=0.055). The ratio of improvement was also significantly higher in the PIPJAF group (0.79, median 0.91 vs. 0.49, median 0.63, p=0.049). PIPJAF resurfacing appeared to have a beneficial effect on improvements in extension lag (p=0.042).

Conclusions
PIPJAF resurfacing following PIPJ contracture release may improve and maintain extensor lag. Recovery of PIPJ motion may also be quicker compared to conventional release alone.
Driving diversity - what can established institutions do? The AOA perspective (Combine - Improving Diversity in Orthopaedic Surgery: The Australian Orthopaedic Association Diversity Strategy + The Australian Ethical Health Alliance: 71 Health Organisations supported by Government to drive ethical behaviours in health care)

Dr Jennifer Green1,2
1Canberra Hand Centre, Deakin, Australia, 2Australian Orthopaedic Association, ,

Surgery 4 - Leadership in Hand Surgery, Courtyard Room 1 and 2, March 14, 2020, 10:30 AM - 1:00 PM

In 2018, the Australian Orthopaedic Association (AOA) recognised the importance of improving the female membership in Orthopaedic Surgery (approximately 5%) and involved the female membership in planning the AOA Diversity Strategy.

The structure of the AOA Diversity Strategy and its achievements to date shall be presented, in addition to future initiatives.

At the 2018 APEC Small & Medium Enterprise (SME) "Ethics in Business" Forum in Tokyo, Australia, lead by the Australian Orthopaedic Association (AOA) CEO, Adrian Cosenza, received the Lighthouse Award for developing an Ethical Framework for the Healthcare Industry encompassing 60 signatory organisations.

This framework has now been formalised to become the "Australian Ethical Healthcare Alliance"(AEHA) with more than 70 signatory organisations working together to drive an agenda regarding ethical behaviour in healthcare.

The concept, structure and purpose of the AEHA shall be presented.
The Australian Hand Therapy Association was founded in 1982. Its mission is to advance the hand therapy profession. One of the seven pillars to achieve this mission is to establish standards and encourage best practice in hand therapy. To this end the AHTA introduced the Accredited Hand Therapist (AHT) credential in 2018. An AHT is an Australian physiotherapist or occupational therapist with national registration, who has been working for at least three years and has accrued more than 3600 hours of clinical practice in hand therapy within the past five years. The AHT has completed six 50 hour courses with competency-based assessment, and has undertaken a 12-month mentorship with an approved hand therapy mentor. The AHT credential benefits the clinician, patient and the profession. It affords clinicians an opportunity to differentiate themselves from non-accredited practitioners in the market. It is a guarantee for the community that their hand therapist professional is qualified to provide safe, evidence-based diagnosis, advice and treatment. It also provides a platform for the AHTA, from which to lobby key stakeholders for recognition of hand therapy as a specialty. This presentation will outline the development and implementation of hand therapy accreditation in Australia, describe the formation and function of the AHTA Credentialing Council, and deliver the results of a survey of the first graduates of the accreditation programme.
The general progression course of pathological conditions in osteochondritis dissecans of the elbow

Dr Masatoshi Takahara¹, Dr Mikio Harada², Dr Mikiro Kondo¹, Dr Masahiro Maruyama², Dr Tomohiro Uno², Dr Hiroshi Satake², Dr Michiaki Takagi²

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Elbow 3 - The Paediatric Elbow, Eureka Room 1, March 14, 2020, 10:30 AM - 1:00 PM

Objectives: The aim was to investigate the pathological conditions in the capitellar OCD, and to demonstrate the general progression course.

Methods: The subjects were 18 boys (mean age, 13.9 years; mean skeletal age score, 24.9 points) who had osteochondritis dissecans of the humeral capitellum, and who underwent open autologous transplantation of osteochondral plug grafts. 19 cylindrical osteochondral plugs of 5-7 mm in diameter from the center of the capitellum were examined histologically.

Results: All osteochondral plugs consisted of the articular lesion, proximal epiphyseal bone, and the separation between them. There were no findings of osteonecrosis in the proximal epiphyseal bone. The 19 articular lesions were divided into four: 1) chondro-calcified in six, 2) chondro-calcified-deteriorated in four, 3) chondro-ossified in five, and 4) chondro-osteonecrotic in four. The age at the surgery was significantly lower of the chondro-calcified lesion and significantly higher of the chondro-osteonecrotic lesion. The period from the symptom onset to surgery was significantly shorter of the chondro-calcified lesion.

Discussion: These results indicated that the condro-calcified lesion demonstrated an earliest lesion from the onset, and suggested that the chondro-calcified lesion was caused by a separation at the cartilage-bone interface of the immature epiphysis. We think that both of the chondro-calcified-deteriorated lesion and chondro-ossified lesion can be secondary to the chondro-calcified lesion. The statistical results suggested that osteonecrosis was not an early but late event secondary to re-separation of the newly ossified fragment.
In-house 3D printing - a "how-to" for paediatric elbow/forearm applications

Dr Ezekiel Tan

Elbow 3 - The Paediatric Elbow, Eureka Room 1, March 14, 2020, 10:30 AM - 1:00 PM

3D printing is useful for understanding orthopaedic deformity and has major potential to assist patient counseling and surgical planning. Outsourcing this work can be expensive with significant turnaround times. On the Gold Coast, we have been using in-house 3D printing for around 4 years with full control of our workflow, rapid turnaround times (often <24 hours) and low marginal costs (<$10 per print). We describe our workflow using freeware from the CT to the print in hand.
‘TRASH’ lesions (The Radiographic Appearance Seems Harmless) is a term coined by Peter Waters and James Kasser from Boston Children’s Hospital, almost exactly 10 years ago. TRASH is used to describe pediatric elbow plain x-ray findings that are only very subtly abnormal. However, because of the large proportion of cartilaginous, radiolucent, yet important structures in the pediatric elbow, as well as the relative unforgiving nature of pediatric elbow injuries, these subtle x-ray findings can underlie important problems.

The word TRASH is very fitting in many ways. They are often missed or considered unimportant “trash”. The lesions can represent significant injuries that may “trash” the elbow in later life. Additionally, it is a great acronym!

Classically, TRASH elbow lesions can consist of unossified medial condylar humerus fractures, unossified transphyseal distal humerus fractures, lateral condylar shear/avulsion fractures, radial head fractures with radiocapitellar subluxation, radial head transphyseal separation, and other osteochondral fractures with joint incongruity. Today, TRASH now encompasses several more entities. Examples of TRASH lesions will be given. If missed, many of these injuries can lead to long term joint incongruity, loss of motion, and degenerative changes. Additional radiological investigations are often required, including ultrasound, MRI, or arthrogram, to further characterize cartilaginous and soft tissue injury extent.
Median nerve entrapment within the elbow after fracture dislocations

Dr Jason Harvey

Paediatric elbow dislocations account for approximately 3% of all elbow injuries. It is not uncommonly associated with a medial epicondyle fracture (33%). Neurologic injury after dislocation most commonly involves the ulna nerve but median nerve injuries have been described, although rarely. Entrapment of the nerve within the joint is rarer still. This paper reviews median nerve entrapment in elbow dislocations, including a review of 2 cases. An algorithm is proposed for the recognition and management of these uncommon injuries.
Arthroscopy-assisted repair/reconstruction of the osteochondral injuries of the pediatric elbow.

Dr Kozo Shimada

Elbow 3 - The Paediatric Elbow, Eureka Room 1, March 14, 2020, 10:30 AM - 1:00 PM

Objectives
Pediatric elbow injuries including intraarticular fracture, osteochondritis dissecans (OCD) and rotatory instability are troublesome because preoperative precise evaluation is difficult in X-rays. Postoperative contracture is also big problem because of poor endurance for rehabilitation. Arthroscopy is useful for both for precise evaluation of the intraarticular pathology and for minimum invasive surgery good for postoperative rehabilitation. We talk about our clinical experiences of this approach.

Methods
Our institute is secondary consultation basis and main candidates are chronic cases, however sometimes acute pediatric injuries are consulted. We treated 47 teenage elbow injuries including 26 OCDs, 3 OAs, 3 ligament injuries and 15 fractures with use of arthroscopy in 2019. A small osteochondral lesion such as OCD, posttraumatic OA or intraarticular fracture was treated by arthroscopic debridement. Fresh articular injury or stable OCD lesion was fixed arthroscopically or arthroscopy-assisted mini-open method. An old large osteochondral lesion such as advanced OCD was treated by open reconstruction (e.g. costal osteochondral autograft).

Results
Postoperative rehabilitation was easy and only two cases of severe large lesion showed elbow contracture after surgery. Lesions have been well remodeled in six to 12 months both in debrided small lesions and reconstructed large lesions.

Discussion
Pediatric elbow injury is difficult to evaluate and fragile after improper postoperative treatment/follow-up. Arthroscopy is very useful for both in diagnosis and surgery, however some of the patients still need aggressive treatment such as reconstruction. We have to consider advantages and disadvantages of both arthroscopic and open surgery techniques.
The Clinical result of Arterialized Venous Free Flaps for the Treatment of Soft tissue Defect of the Fingers

Dr Kyung-Tae Kim¹, Prof Young Keun Lee¹, Dr Mooheon Jeon¹
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Trauma 3 - Finger Tip Injuries and Reconstruction, Eureka Room 2, March 14, 2020, 10:30 AM - 1:00 PM

Abstract
The purpose of this study is to report the clinical results of the arterialized venous free flaps in reconstructing soft tissue defects of the finger and to extend the indications for the use of the flaps based on clinical experiences of the authors.

We retrospectively reviewed the records of thirty five patients who underwent an arterialized venous free flaps for a finger reconstruction, between May 2007 and August 2015. The mean size of flap was 4.8±1.23x3.1±0.84 cm. The donor site was the ipsilateral volar aspect of the distal forearm in all cases. There were 17 (48.6%) cases of venous skin flaps, 9 (25.7%) cases of innervated venous flaps, 7 (20%) cases of tendocutaneous flaps, and 2 (5.7%) case of innervated tendocutaneous flap. The vascularity of recipient beds was good except 8 (22.9%) cases (partial devascularity in 3, more than 50% avascularity (bone cement) in 3, and chronic infected bed in 2).

Of the 35 cases, 29 (82.9%) cases (including 3 cases who had more than 50% avascularity recipient bed) showed complete survival. 3 (8.6%) cases, which had partially devascularity of distal phalanx in recipient bed, showed partial necrosis (P=.015). The mean number of included veins was 2.4±0.5 for a flap.

A forearm arterialized venous free flap is a useful procedure for single-stage reconstructing of a soft tissue or combined defect of a finger, we consider that this technique could be applied to fingers despite an avascular or insufficient vascular recipient bed if the periphery of recipient bed vascularity was good and if the recipient beds were free from infection.
Outcomes of V-Y plasty, acellular dermal matrix and semi-occlusive dressing for fingertip amputation injuries

Dr Cheng Sean Gong¹, Dr Jia hui Hannah Ng¹, Dr Eu Wen Aaron Koh¹, Ms Rebosura Cheyenne Kate Pueblos¹, Ms Jane Sim¹, Dr Vaikunthan Rajaratnam¹

¹Khoo Teck Puat General Hospital, Singapore, Singapore

Trauma 3 - Finger Tip Injuries and Reconstruction, Eureka Room 2, March 14, 2020, 10:30 AM - 1:00 PM

Objectives:
Demonstrate the outcomes of three different treatment options for fingertip amputation injuries and quantify the economic burden of such injuries in relation to different treatment modalities.

Methods:
This retrospective study was conducted from 1 January 2016 to 30 April 2019 on patients who received treatment for fingertip amputation injuries at a single tertiary hospital in Singapore. Analysis was according to the following treatment modalities - healing by secondary intention, acellular dermal matrix and V-Y plasty.

The clinical and functional outcomes were examined and compared. Demographic data and costs of treatment were also collected and an estimation of economic costs were performed.

Results:
106 patients met our inclusion criteria. There were 37 patients treated by semi-occlusive dressing, 37 treated with acellular dermal matrix and 32 treated with V-Y plasty.

There were 96 males and 10 females, of which 75 (71%) were foreign residents.

Of the 106 patients, 82 (77%) were involved in industrial accidents.

127 fingertip injuries were documented, with an equal distribution of injury severity: 43 Allen 1 injuries, 43 Allen 2 injuries, 40 Allen 3 injuries and 1 Allen 4 injury.

The mean return to work time was 5.13 weeks (range 0-19 weeks). There was no significant difference in mean time off work between the 3 treatment modalities (5.3 weeks for healing with secondary intention, 5.5 weeks for VY-plasty and 4.6 weeks for acellular dermal matrix).

The economic costs will be presented.

Conclusion:
The clinical and functional outcomes of fingertip injuries was similar across all treatment modalities.
How do we prevent painful finger tips and neuroma formation?

Dr Andrew Yam

Trauma 3 - Finger Tip Injuries and Reconstruction, Eureka Room 2, March 14, 2020, 10:30 AM - 1:00 PM

A pain-free fingertip is of utmost importance in fingertip reconstruction as a painful fingertip results inevitably in avoiding the use of that finger.

Causes of painful fingertips are hypersensitive hard scar tissues forming from inadequate debridement, inadequate soft tissue cover of the bone, complications of nail growth, and neuroma formation.

Fingertip reconstruction should start with a thorough debridement. The bone should be adequately covered, if necessary with a robust flap. Moist dressing methods alone should be used selectively. Neurovascular island flaps have a higher risk of painful fingertips and stiffness, compared to cross finger or thenar flaps, especially in large defects that push the limits of flap advancement. A good nailbed repair and support prevents painful nail complications.

Trauma to the digital nerve and its terminal branches may give rise to painful neuromas. Those forming in the terminal branches generally respond well to physical desensitisation regimens. Those that occur in the main nerve can result in severe pain affecting the function of the entire digit or hand. Any nerve injury including partial lacerations proximal to the terminal branches should be repaired microsurgically. Missed injuries often result in painful neuromas entrapped in scar tissue that require neurolysis, excision and grafting, with mixed results. During revision amputation or terminalisation of fingertips, the digital nerves should be freed as far proximally as possible, electrocauterised under tension, cut and allowed to retract proximally. Painful digital end-neuromas can be treated in the same way or translocated more proximally.
Axial injuries of the wrist

Dr Marc Garcia-Elias

Axial carpal dislocations and fracture dislocations have received mention in the hand and wrist surgery literature. Reference to these injuries in the radiology literature is scarce and anecdotal, resulting in somewhat limited awareness of these lesions among radiologists. These are rare injuries that result from severe, broad crushing or blast forces involving dorsopalmar compression of the wrist. This results in carpal splits, with either the ulnar or radial column stable with respect to the radius and with dislocation of the unstable column. Because of the intrinsic weaknesses in the carpal architecture, similar predictable injury patterns are observed. The most common of these include axial ulnar injuries (transhamate peripisiform axial ulnar fracture dislocation, perihamate peripisiform axial ulnar dislocation, and perihamate transtriquetrum axial ulnar fracture dislocation) and axial radial injuries (peritrapezoid peritrapezium axial radial dislocation, peritrapezium axial radial dislocation, and transtrapezium axial radial fracture dislocation). Our role in evaluating these injuries involves determining the injury path as it propagates through the carpus because surgical repair should address each component of this injury pathway. This review is presented to describe the radiographic findings of axial carpal disruptions in hopes of improving the recognition and successful therapy of these uncommon but often devastating
Isolated injury of the lunotriquetral (LT) interosseous membrane and associated structures is uncommon and less well understood than the other proximal row ligament injury, scapholunate (SL) dissociation. A spectrum of injury may be seen from isolated membrane tears to frank dislocation, and from dynamic to static carpal instability findings. The diagnosis is usually confounded by the many possible causes of ulnar sided wrist pain and the frequently normal x-rays. Even the mechanism of injury is variable, including attrition by age or ulnar positive variance, perilunate or reverse perilunate injury, or dorsally applied forces. Appropriate treatment requires assessment of the degree of instability and chronicity of the injury. Options include steroid injection, immobilization, arthroscopic debridement or pinning, ligament repair, ligament reconstruction with tendon grafts, limited intercarpal arthrodesis, and ulnar shortening. The purpose of this talk will be to highlight the diagnosis, treatment and outcomes of treatment for this unusual injury.
Ulnar Shortening Osteotomy, does the technique matter?

Dr Ian Hargreaves
St Luke’s Hospital Hand Unit, Sydney, Australia

Ulnar osteotomy is useful for treatment of ulnar carpal impaction and instability. Many papers report technical difficulties and complications with correction and union.

Use of a sliding step cut gives a mechanically simple yet stable technique, which requires no special equipment, and allows variable amounts of shortening.

The technique is versatile enough for complex and extensive corrections, but also simple enough for the regional or country hospital, using its fracture fixation set.
Arthroscopic management of Ulnocarpal Abutment
When to Wafer? And when to shorten?

Dr Clara Wing Yee Wong

Wrist 12 - Ulnocarpal Abutment, Eureka Room 2 and 3, March 14, 2020, 10:30 AM - 1:00 PM

Ulnar impaction syndrome (UIS) is a degenerative condition of the ulnar wrist related to excessive load bearing across the ulnar carpus, TFCC and ulnar head. Chondral and subchondral pressure, mechanical impingement of the TFCC/ulnar head/proximal lunate & proximal triquetral produce symptoms.

Ulnar shortening osteotomy (USO) effectively unload the impaction between the ulna and ulnar carpus with good or excellent clinical results. It has the advantages of correcting significant ulnar positive variance, secondarily tightening the ulnocarpal and distal radioulnar ligaments in patients with associated lunotriquetral (LTq) or distal radioulnar joint (DRUJ) instability, and avoiding iatrogenic intra-articular ulnocarpal injury or subsequent ulnar styloid impingement in patients with prominent ulnar styloid process. However, USO bears the risks of delayed union and nonunion at the osteotomy site, symptomatic hardware, longer rehabilitation and time off work, re-fracture after implants removal, secondary DRUJ osteoarthritis after DRUJ alteration.

The wafer resection of the distal ulna had also been demonstrated the same effectiveness in decreasing the pressure on the ulnocarpal joint with good symptom relief while avoiding USO related complications. Arthroscopic wafer procedure (AWP) excels the open wafer surgery by its minimal invasiveness and shorter rehabilitation. However, complications of extensor carpi ulnaris tendon irritation, persistent ulnar wrist pain which needed later USO, destabilization of DRUJ from over-resection, subsequent ulnar styloid-carpal impaction were reported.

Although previous studies comparing the USO and AWP for UIS have reported similar clinical outcomes, there were no comparable groups in the previous studies, and no prospective or long term study comparing USO versus AWP is available yet. Actual clinical outcomes are difficult to interpret and compare because there are so many variables affecting the clinical function e.g. patient’s occupation, ligamentous laxity, psychology, social factors and etc.

So far, there are still many uncertainties. With the advancement of specialised plating system nowadays, should the USO related disadvantages be cancelled out? How many mini-meters of ulnar head can be maximally resected in AWP? Is the evidence strong enough to believe that centrally resecting a non-perforated TFCC in addition to AWP produces good pain relief? Can the USO adequately stabilises the DRUJ or LTq instability to alleviate pain symptoms? Does the DRUJ configuration really determine symptomatic DRUJ osteoarthrosis after USO?

Without strong clinical evidence, USO or APW should not be inter-changeable, and decision should still be relied on logical clinical judgement. Patient’s factors, including age, hand dominance, smoking habit, occupation, athletic commitment, and etc, and wrist factors, including degree of ulnar variance, DRUJ stability, LTq stability, alignment of DRUJ configuration, and TFCC status, should be the considered and treatment path should be tailored to each individual.
Dealing with the ulna in Madelung's deformity

Mr Kemble Wang

Wrist 12 - Ulnocarpal Abutment, Eureka Room 2 and 3, March 14, 2020, 10:30 AM - 1:00 PM

Madelung’s deformity can result in complex structural abnormalities of the distal radioulnar joint and wrist joint. The physeal tether occurs on the volar-ulnar aspect of the distal radius, leading to relative shortening of the radius, increased radial and volar tilt, loss of radiocarpal support, volar subluxation of the carpus, as well as a rotational deformity in severe cases.

The goal of surgery in Madelung’s deformity is to achieve skeletal rebalancing of the radius and ulna and realignment of the radiocarpal joint for carpal support, including reconstruction of the lunate fossa as much as feasible for volar support. Pain in Madelung’s can come from radiocarpal instability and subluxation, as well as from ulnar abutment secondary to relative ulnar overgrowth. Therefore, improving variance is an important part of the procedure. This can be achieved through relative radial lengthening at time of radial osteotomy, concurrent or delayed ulnar shortening osteotomy, or distal ulna epiphysiodesis in age-appropriate patient groups. Wrist arthroscopy can be useful in assessing integrity of TFCC, which is often abnormal. Standard radiological markers for ulnar variance can be difficult to apply in Madelung’s. However, several radiological markers specific for Madelung’s have been described that may be associated with need for ulnar shortening procedures.
Combined ulnar shortening and TFCC repair

Prof Joo-yup Lee

Wrist 12 - Ulnocarpal Abutment, Eureka Room 2 and 3, March 14, 2020, 10:30 AM - 1:00 PM

Abstract
Ulnar impaction syndrome (UIS) and triangular fibrocartilage complex (TFCC) tear are common causes of ulnar side wrist pain. As a standard surgical treatment, ulnar shortening osteotomy (USO) and TFCC repair are used respectively. Patient spectrums of UIS accompanied by distal radioulnar joint (DRUJ) instability or traumatic TFCC foveal tear with UIS symptoms exist, and both USO and TFCC repair are necessary for treating these spectrums. However, there have been few reports on the procedure for performing these two operations concurrently. We introduce a combined procedure to concurrently perform USO and TFCC repair. We performed USO in the ulnar metaphysis using an LCP Distal Ulnar plate (Synthes, Oberdorf, Switzerland) and arthroscopic TFCC knotless repair using a PushLock Anchor (Arthrex, Naples, FL) at the ulnar fovea. In this technique, USO is conducted in metaphysis that is favorable to union, a small plate that is easy to handle is used for fixation, and knotless TFCC repair can be performed simultaneously through a single small incision, which saves operation time. Our technique may be useful if concurrent USO and TFCC repair are required.
Regeneration of the TFC after ulnar shortening

Prof Toshiyasu Nakamura

Wrist 12 - Ulnocarpal Abutment, Eureka Room 2 and 3, March 14, 2020, 10:30 AM - 1:00 PM

Ulnar shortening procedure is widely indicated to degenerative tear of the triangular fibrocartilage complex (TFCC) with the positive ulnar variance. We evaluated recovery of the degenerative TFCC through first and second look arthroscopy.

Methods: 663 wrists had undergone ulnar shortening by single surgeon. Among them, 282 wrists of 276 patients who indicated Palmer 2A to 2D degeneration on the TFCC were included in this retrospective analysis. There were 128 males, 148 females with an average age of 42 (24-78). Right wrists were 140, left 136 and 6 bilateral. Pre-operative ulnar variance indicated 2.48 (0-11.5) mm. All wrists underwent wrist arthroscopy including DRUJ arthroscopy at the time of ulnar shortening. At the time of plate removal, all wrists underwent second look arthroscopy. We evaluated the first and second look arthroscopic findings and clinical outcome using DRUJ evaluation system.

Results: The first look showed Palmer 2A in 173 wrists, 2B in 33, 2C in 68 and 2D in 8 via radiocarpal arthroscopy. DRUJ arthroscopy indicated partial dorsal RUL avulsion in 9 wrists and degeneration of the proximal surface of the TFCC in 266. The second look demonstrated recovery of the Palmer’s classification in 115 wrists (41%) and perforation at the triangular fibrocartilage (TFC) was fully covered by synovium in 55 wrists (73%) among 76 perforations. Recovery of proximal surface of the TFC was noted in 250 wrists among 266 (94%) through DRUJ arthroscopy.
Metaphyseal shortening osteotomy for ulnar impaction syndrome.

Prof Joo-yup Lee

Abstract
Ulnar shortening osteotomy (USO) has been considered the gold standard treatment for ulnar impaction syndrome (UIS). The most common site for osteotomy is diaphysis, and although the results have been satisfactory, complications such as delayed union or nonunion have been reported. As an alternative, osteotomy can be created in the metaphyseal region around the distal ulnar and fixed with either plate and screws or headless screw alone. Metaphyseal osteotomy has many advantages over diaphyseal one. First, metaphyseal osteotomy provides better bone healing potential. Metaphyseal region has abundant cancellous bone which shortens time to union. Second, smaller incision is enough by using less bulky implants which lessen the chance of implant removal. Third, concomitant pathologies can be treated within one incision. Some patients complain about the site of diaphyseal osteotomy because it is away from their wrist pathology. By using metaphyseal osteotomy, triangular fibrocartilage complex (TFCC) tear and extensor carpi ulnaris (ECU) subluxation and ulnar styloid nonunion can be addressed simultaneous via either open or arthroscopic manners. We will present our experiences with this technique and discuss the pearls and pitfalls when performing this procedure.
Conceptualisation and in vivo validation of a scapholunate ligament scaffold.

Prof Randip Bindra

Griffith University School Of Medicine, Bundall, Australia

The Future 2 - Regenerative Medicine in Hand Surgery, Goldfields Theatre/Plenary, March 14, 2020, 2:00 PM - 3:30 PM

This study reports on the use of the rabbit knee medial collateral ligament as a model for testing a 3D-printed bone-ligament-bone (BLB) scaffold with a view to clinical application for reconstruction of the scapholunate interosseous ligament.

3D-printed medical grade polycaprolactone (PCL) scaffolds were implanted in 36 rabbit knees after removal of the MCL. The knee joint was fixed in flexion using 1.4mm K-wires for 4 weeks prior to mobilisation. Samples were harvested at 4 weeks (n=18) and 8 weeks (n=18). Mechanical tensile testing (n=5/group) and in vivo characterization of the constructs were conducted.

The scaffold remained intact after 4 and 8 weeks in vivo. Mechanical testing of the BLB scaffolds showed that they were capable of withstanding reported physiological forces. After 4 weeks of mobilisation of the knee joint, the scaffolds improved in strength when compared to the controls. In vivo study in the rabbits demonstrated that the scaffold was biocompatible and displayed good tissue integration and vascularization. At each time point, bone formation and ligament remodelling was observed in the corresponding compartments.

It is possible to synthesise a 3D-printed BLB graft with properties similar to the dorsal scapholunate interosseous ligament. Implantation of the scaffold into a rabbit model has demonstrated bone formation and ligament remodelling in the relevant compartments.
OBJECTIVES
Traumatic brachial plexus and spinal nerve/cord injuries cause devastating functional loss in the upper limb. Nerve transfers are a promising treatment for restoring upper limb function in these patients. CelGro™ is a collagen membrane designed to generate an optimal microenvironment for tissue regeneration after surgical repair. It may improve the success of nerve transfer by supporting axonal regeneration and reducing the risk of adhesions and/or neuroma formation. The objective of this study was to evaluate if augmenting nerve transfer with CelGro™ could improve the predictability and consistency of outcomes in a challenging cohort of patients with nerve injury.

METHODS
This study prospectively enrolled patients requiring surgical restoration of peripheral nerve function in the upper limb. Patients received single or multiple nerve transfers augmented with CelGro™ in one or both upper limbs. Motor function (MRC grade) was assessed at baseline and for up to 24 months post-treatment by an independent assessor.

RESULTS
Twenty-one nerve transfers augmented with CelGro™ were performed in nine patients. Six had brachial plexus or spinal nerve injury and three were tetraplegics (C4/5, C5/6, C6). After 6 months, 9/21 transfers were grade 3 or better at the most proximal target. At 12 months, muscle function improved for all transfers, with 13/21 reaching grade 3 or better. At 24 months (N=5), 4/5 transfers were grade 4 and 1/5 was grade 3.

SUMMARY
Patients with brachial plexus/spinal nerve injury or tetraplegia experienced meaningful motor recovery as early as 6 months after nerve transfer augmented with CelGro™ collagen membrane.
This study aims to evaluate alternative replacement for nerve autografts using amnion tube and stem cells in the process of nerve regeneration. Sciatic nerve from 30 Wistar rats underwent neurectomy and 10 mm defect, and were divided into control group (autograft) and treatment group (amnion tube and amnion tube combined with mesenchymal stem cells). Evaluation of motoric function using walking tract analysis was done on day 1, 7, 14 and 21. On day 21, histological examination of nerve cross-sectional area and level of neuregulin-1 expression using ELISA were performed. The study showed higher levels of neuregulin-1 expression in the treatment group with amnion tube containing stem cells (p<0.001) as well as those with amnion tube only (p<0.001). The high level of neuregulin-1 expression correlate with the high level of Schwann cells activities in the process of nerve regeneration. This study also showed that the proximal and middle part has a larger cross-sectional area in the treatment group with amnion tube containing stem cells (p<0.001) and those with amnion tube only (p<0.001), compared to the control group. On motoric function evaluation, significant differences were found between the control and treatment group starting from day 7 until day 21 post repair (p<0.001). In conclusion, amnion tube can be used as alternative treatment for nerve defects and the addition of stem cell could improve nerve regeneration.

Keywords: nerve defect, amnion tube, mesenchymal stem cells
Clinical Application of Stem Cells in Orthopaedics - what works?

Prof Roohi Syed Waseem Ahmad

The Future 2 - Regenerative Medicine in Hand Surgery, Goldfields Theatre/Plenary, March 14, 2020, 2:00 PM - 3:30 PM

Stem cells are the miracle of the 21st Century: they are what antibiotics were to the 19th Century. However, there is a lot of “fake” or sub-standard material that is making claims in the medical circle and due to ignorance or lack of strong supportive data, is being applied in the hope of a miracle “cure”.

This lecture attempts to outline the sources, define their roles, touch on the ethics, describe the sub-types and tries to elaborate on their use in Orthopaedics. Their possibilities are endless – the question is what to use and when. Finally, a word on what should be taboo and the line not to be crossed.
ReGeneraTing Agents (RGTA) based Matrix Therapy for Wound Healing & Soft Tissue Regeneration in Hand Surgery.

Prof Roohi Syed Waseem Ahmad

The Future 2 - Regenerative Medicine in Hand Surgery, Goldfields Theatre/Plenary, March 14, 2020, 2:00 PM - 3:30 PM

Trauma destroys the cellular structure and this destruction of the extracellular matrix (ECM) releases a cytokine response resulting in inflammation. It also exposes the structural proteins to degradation enzymes.

ReGeneraTing Agents (RGTA) are a group of compounds that restore the scaffolding by mimicking Heparan Sulphate required to build upon to regenerate destroyed tissue. Because they work on the building blocks of tissue components, all tissue types may be rebuilt. The possibilities are mind-boggling. We have used the liquid compound in amputations (dead tissue), infections and burns for remarkable results. This reagent does not replace antibiotics or other adjuvant therapy, but it does hasten the healing process and encourages regrowth of similar tissue in a particular area. We will present some of these interesting cases to support our case.
Electrospun Nanofibers on Collagen as nerve conduit

Dr Shalimar Abdullah

The gold standard to repair nerve defects is still the patient’s own nerve graft. Existing allografts or synthetic conduits are either expensive, difficult to obtain or are from materials which are not fully compatible with the body. We aim to develop an aligned biocompatible cell-seeded PLGA on collagen mat as a nerve conduit. We describe the method of constructing a tubular conduit from electrospun PLGA and the addition of collagen layer and human mesenchymal stem cells (hMSC) into this conduit. The hMSC were obtained from bone marrow of orthopaedic interlocking nail procedures. We aim to demonstrate that the constructed nerve conduit has the potential to substitute or replace existing commercial grafts in the future.

The electrospun fibres were relatively aligned with a diameter of average length of 0.96μm. The constructed aligned fibres were successfully seeded with skin fibroblasts cells as demonstrated by normal cell distribution under microscopic analysis. The nerve conduits developed measured 40.0mm long conduit with an internal diameter of 2.0mm (hollow conduit) and thickness of 1.03mm. The collagen sheet thickness obtained were from 0.05 – 0.08mm. The degradation study of nerve conduit showed the PLGA fibres reached a plateau by 12 weeks and did not degrade further. This study proves that our artificial conduit seeded with neural cells has the potential to improve growth and assist migration for nerve regeneration in vitro.
Current biologics in hand surgery: What really works

Prof Randy Bindra

The Future 2 - Regenerative Medicine in Hand Surgery, Goldfields Theatre/Plenary, March 14, 2020, 2:00 PM - 3:30 PM

Several biological tissues are available for use by the hand surgeon for dealing with tissue loss of various types. Not all available material is without complication and the surgeon should be aware of the process of preparation, material properties, risk if any of viral disease transmission and clinical data before considering clinical use.

Biological material may be human or allogeneic usually sourced from bovine or porcine tissue. The material may be treated to remove the antigenic material or re-engineered. Newer technology using biological printers allows creation of scaffold for biological ingrowth.

The role of "biologics" tissue in bone, skin, nerve and ligament reinforcement will be discussed with examples of the authors personal experience.
Biological augmentation of axonal regeneration with the use of dermal derived Mesenchymal Stem Cell in Sciatic nerve repair

Mr Heri Suroto

The Future 2 - Regenerative Medicine in Hand Surgery, Goldfields Theatre/Plenary, March 14, 2020, 2:00 PM - 3:30 PM

Purpose: To explore the potency of dermal derived Mesenchymal Stem Cell (MSC) for peripheral nerve repair

Materials and Methods: Isolation of MSC from rabbit skin and human preputium. MSC cultured from Rabbit skin and human preputium. The characterization to see specific MSC by flowcytometry. PKH26 Labelling to see MSC migration. Dermal derived MSC transplantation on Sciatic nerve repair by the application of 4 x 10^5 MSC to the distal of the repair site using hamilton spuit 10µ. The observation of Sciatic nerve repair augmented by MSC PKH26 labelled by processed of Sciatic nerve cutting to visualize on Flourescence microscope and inverted microscope. The healing of Sciatic nerve repaired augmented by MSC, seen as spreading integrated MSC detected by immunohistochemistry observation of GFAP antibody.

Results: Dermal derived Mesenchymal Stem Cell (MSC) from rabbit skin found 30 % that expressed CD105,CD73,CD90 ,compared by human preputium (45 %). Preputium derived MSC that expressed Nestin and GFAP (40%) are higher than dermal derived MSC from rabbit skin (20%). There were proliferation and differentiation process in the wound augmented by MSC. There were tissue integration in the repaired nerve augmented by MSC, compared by nerve defect in the repaired nerve without MSC. There were motoric recovery as shown in NCV jitter.

Conclusion: Dermal derived Mesenchymal Stem Cell have the potency of axonal regeneration in Sciatic nerve repair.

Keywords: Mesenchymal Stem Cell, nerve repair
Upper limb amputation and prosthetics. What's new and what can we do?

A/Prof Hyun-Joo Lee

Prosthetics 1- Upper limb prosthetics, current and future directions, Courtyard Room 1 and 2, March 14, 2020, 2:00 PM - 3:30 PM

To overcome the upper limb amputation, patients usually use a nonfunctioning but esthetic prosthesis even though the myoelectric prosthetic arm has gained popularity with the advantage of multiple motions. The reason upper extremity prosthesis has not been widely used is that the function of the prosthetic arm is not comparable to the original body part. However, the state-of-the-art technique is approaching to the prosthesis with substantial hand function. With targeted reinnervation (TR) surgery, intuitive motor control became available. Moreover, the patient who underwent TR surgery reported restored sensation in the pectoral area. The restored sensation has been used to provide haptic feedback. After the first and second steps, many researchers have developed new techniques such as split muscle for more EMG sites, regenerative peripheral neural interface (RPNI), and even direct neural signal analysis.

Amputation has been considered easy and the first step surgery for novice surgeons. However, regarding the development of prosthesis, surgeons should consider the prosthetic choice after surgery. In addition to maintaining the length of the amputee, future human-machine interface can be generated in the initial surgery for use of high technology prosthesis. Targeted reinnervation surgery or RPNI during the first amputation surgery is possible, which can be done as a secondary surgery. This procedure might relieve the neuropathic pain from the exposed nerve end and can provide EMG sites in the future. In terms of relieving the neuropathic pain and phantom pain, TR and RPNI both were proven as excellent options.
Experiences with hand transplantation in Taiwan

Mr Jui-Kun Chang

Prosthetics 1 - Upper limb prosthetics, current and future directions, Courtyard Room 1 and 2, March 14, 2020, 2:00 PM - 3:30 PM

Objective:
Hand transplantation, is a rare procedure performed by only a few surgical teams around the world. The first hand allotransplantation case in Taiwan was performed in 2014. The intensive rehabilitation program for the hand transplantation was setup and reviewed by the hand transplantation team. The post-operative rehabilitative intervention and functional recovery were analyzed.

Methods:
The rehabilitation protocol consists of 4 phases with distinct goals, frequency, and modalities. The F/U evaluations including sensation, grip & pinch power, DASH & STEF (Simple Test for Evaluating Hand Function).

Results:
The protocol modified to address each transplanted recipient’s unique needs. It builds on universally used modalities of hand rehabilitation such as splinting, edema and scar management, ranged of motion exercises, activities of daily living training, cognitive training, mirror therapy, strengthening and hand activities. Continuing intensive rehabilitation and regular follow-up at outpatient clinics after discharge are arranged. The case performs excellent outcomes in grip, pinch power, STEF, and hand manipulation, with moderate result in sensory recovery post-OP 2 years. The patient has returned to work for 4 years and continuing F/U by OT clinic. The transplanted hand has better performance in dexterity rather than sensory recovery during 5 years period.

Conclusion:
Early intervention of hand therapy is an important issue for functional recovery after hand transplantation. Careful documentation of progress and outcomes is essential to demonstrate the optimized therapy protocols. The experiences support the idea that, for properly selected individuals, hand and upper extremity transplantation should be considered an important treatment option.
Hand Transplantation. Here to stay?

Dr Scott Levin

Upper extremity limb loss is catastrophic. It affects nearly every activity of daily living, leaving patients with substantial disability. Despite high rates of rejection of upper extremity prostheses, hand transplantation remains controversial. The indications for hand transplantation remain relatively ill defined. The American Society for Reconstructive Transplantation (ASRT) and the International Registry on Hand and Composite Tissue Transplantation (IRHCTT) have been founded to advance the science, to educate, to report outcomes, and to define the indications for vascularized composite allotransplantation.
Bionic Arm Dream or Reality

Dr Frank Bruscino-Raiola

Prosthetics 1- Upper limb prosthetics, current and future directions, Courtyard Room 1 and 2, March 14, 2020, 2:00 PM - 3:30 PM

Multi-articulating myoelectric prostheses: functional application

Ms Lisa Robin

Prosthetics 1- Upper limb prosthetics, current and future directions, Courtyard Room 1 and 2, March 14, 2020, 2:00 PM - 3:30 PM

Multi-articulating myoelectric upper limb prostheses represent an advancement in the technology available for individuals with upper limb loss and limb difference. With a broad range of grip patterns these hands are a departure from the simple open-close myoelectric prostheses that preceded them. Although these hands provide increased dexterity and varied grip patterns, these may be gained at the expense of strength and robustness. Recent developments focus on increased strength and water resistance to enable participation in domestic and community tasks. While the individual cost of these hands remains high, the question remains, how useful are they in everyday life? Case examples including the experience of a young adult using bilateral multi-articulating prostheses are provided to explore the functional application of this technology and highlight areas for future development.
Midcarpal Instability is a form of CIND (carpal instability non-dissociative) with an unclear incidence and no gold standard of treatment. Patients present with pain, weakness and a possible clunk at end range ulnar deviation.

Randomised control trials have been published on the knee and ankle joint suggesting that proprioceptive rehabilitation or unconscious neuromuscular rehabilitation (NMR) is useful in improving pain, function or balance, and in recent years published case studies have been able to support the use of NMR in the wrist as well.

Concepts of conscious and unconscious NMR will be discussed, in addition to an exercise protocol to trial with your patients in the future.
Mid-carpal instability is an uncommon form of non-dissociative carpal instability. It should not be an uncommon cause of ulnar wrist pain that we sometimes overlook. Diagnosis can be difficult. Aetiology, pathomechanics and optimal treatment remains uncertain. Systemic method of detailed clinical evaluation helps arriving the diagnosis. Conservative treatment is the priority. A de novo surgical technique of dorsal radio-carpal ligament reconstruction with split FCU graft is simple and provides long term relief of symptoms.
Kinematic disorders of the Proximal Carpal Row. A new concept that may help in the understanding of most clunking wrists.

Dr Marc Garcia-Elias

Kinematic disorders of the proximal carpal row (PCR dyskinematics) in which the wrist is not capable of inducing a smooth shift of the proximal carpal row from flexion into extension as the wrist ulnarly deviates are not rare and frequently not symptomatic. They have been often categorized as “carpal instabilities non-dissociative” (CIND) and also as "midcarpal (MC) instabilities", even though they are not truly carpal instabilities (in kinetic terms) nor they affect only the midcarpal level. The problem in these are usually manifested at both the midcarpal and radiocarpal (RC) joints, and need to be distinguished from carpal instability dissociative (CID) by the lack of disruption between bones within the same carpal row. There are three major subcategories of PCR dyskinematics: palmar, dorsal and combined. In the palmar variety, the PCR tends to displace in block into flexion to jump into extension abruptly at the extreme of ulnar deviation. When nonsurgical management fails, surgical options include arthroscopic dorsal RC and palmar MC capsulorrhaphy, soft-tissue reconstruction, or limited radiocarpal or intercarpal fusions. In dorsal disorders, the capitate subluxates dorsally from its reduced resting position in ulnar deviation. Dorsal dyskinematics usually respond to nonsurgical management; in refractory cases dorsal MC capsular reefing may be necessary. Cases with signs of both palmar and dorsal PCR dyskinematics can be treated with soft-tissue or bony procedures.
Arthroscopic repair of DIC ligament

Prof Toshiyasu Nakamura

Wrist 13 - Proximal Carpal Row Instability, Eureka Room 1, March 14, 2020, 2:00 PM - 3:30 PM

We arthroscopically treated avulsion of the DIC ligament with the capsule. There were 17 wrists of 17 patients who were diagnosed as dorsal capsular detachment by midcarpal or radiocarpal arthroscopy. Male were 11 and female 6, right 12 and left 5 with a mean age of 40 (range: 14-56). MRI delineated avulsion of the dorsal capsule from the lunate in 7, and AG-CT indicated dye inclusion in 11 out of 12 wrists. All cases indicated dorsal wrist pain and 7 patients complained ulnar side wrist pain. Wrist arthroscopy indicated avulsion of the dorsal via midcarpal arthroscopic view in 16 cases and via radiocarpal arthroscopy in 1. There was no DISI or VISI deformity, and no widening of the scapholunate or lunotriquetral gap. Arthroscopy indicated dorsal capsular avulsion from the lunate in all wrists. There was one dorsal capsular scapholunate septum (DCSS) rupture. Partial tear of scapholunate or lunotriquetral ligament injury was seen in one wrist each. Nine wrists had TFCC injury. Arthroscopic suture anchor reattachment of the DIC ligament with dorsal capsule to the lunate was done in 9 wrists. Eight wrists underwent debridement of the dorsal lunate surface with 5 weeks cast immobilization. Second look arthroscopy was performed in 6 wrists that confirmed repair of the capsule to the lunate and torn TFCC. Modified Mayo Wrist Score obtained 15 excellent and 2 good. DIC ligament detachment from the lunate can be a cause of dorsal wrist pain, may be related with midcarpal instability and well treated with arthroscopic control.
DCSS ligament injury and the stable central column

A/Prof Michael Sandow

A critical feature of the stable central column is the intercalated lunate which must remain stable but mobile. The lunate is acted upon by the LRL (long radio-lunate ligament) creating a volar proximal load to pull the lunate into flexion thereby preventing the natural tendency of the lunate to rotate into extension, and a load couple by its connection dorsally to the DCSS (Dorsal Capsulo-Scapholunate Septum). The DCSS is a relatively constant structure that connects the Dorsal Inter carpal ligament, the dorsal radiocarpal capsule, and the dorsal aspect of the SLIL to the lunate.

The patterns of carpal disruption can vary. For the lunate to collapse into extension some or all of the structures that would normally prevent such motion need to be disrupted. However, as part of a CIND/DISI collapsed deformity, the scaphoid moves radially, as does the lunate creating a physiological lengthening of an intact LRL ligament allowing the lunate to go into extension.

The critical stabilising effect of the DCSS is quite consistent with the Stable Central Column Theory of Carpal Mechanics and surgical restoration of the CIND/DISI pattern may require restabilisation of the dorsal connection of the lunate to the dorsal intercarpal ligament as well as attempts to stabilise the scaphoid. This can be as part of an open dorsal capsular reconstruction, or in the pre-dynamic stage injury, using an arthroscopic approach, as described by Mathoulin.

To achieve stability of the central column, the integrity of the DCSS must be maintained or restored.
CIND and distal radius fractures

Dr Margaret Fok

Wrist 13 - Proximal Carpal Row Instability, Eureka Room 1, March 14, 2020, 2:00 PM - 3:30 PM

Adaptive carpal instability following mal-united extra-articular Colles’ fracture is a well-recognized condition. Yet carpal instability non-dissociative (CIND) after intra-articular distal radius fractures or radiocarpal dislocation has not been reported.

We identified a new CIND entity that may present after acute wrist injuries. 12 patients with CIND, 9 after intra-articular fractures and 3 after radiocarpal fracture-dislocations between 2013 and 2018. They were young and were involved in high energy trauma. Ten patients exhibited CIND-palmar while 2 patients exhibited CIND-dorsal. Eight out of these 12 patients suffered from severe wrist pain underwent additional surgery. Three patients with reducible CIND-palmar had open capsular repair and temporary radiocarpal trans-fixation while 5 patients with fixed non-reducible malalignment were treated with radioscapholunate arthrodesis. At an average follow up of 2.3 years, pain relieved was noted, together with an improvement in the grip strength and a functional range of movement of the wrist. Radiographically the wrist alignment was corrected and maintained in all 8 patients.

In cadaveric dissections, CIND-palmar displacement could be reproduced by applying an axial loading and dorsal shearing force on a wrist with sectioned short radiolunate ligament and dorsal radiotriquetral ligament. For the intra-articular fractures with CIND-dorsal malalignment the cause is most likely a result of a volar radiocarpal extrinsic ligament injury combined with intra-articular incongruity of the scaphoid fossa. Early detection of the malalignment can preserve the joint mobility by capsular repair. In cases with fixed deformity, a limited radiocarpal fusion is recommended for treatment.
A Comparison of MRI Imaging and Arthroscopy in the Diagnosis of Triangular Fibrocartilage and Scapholunate Pathology

Mr Jeff Ecker¹,², Ms Courtney Andrijich¹
¹Hand And Upper Limb Centre, Claremont, Australia, ²Curtin University, Bentley, Australia

Objective: To evaluate the accuracy of magnetic resonance imaging (MRI) in detecting triangular fibrocartilage (TFCC) and scapholunate ligament injuries confirmed using arthroscopy.

Methods: Between June 2018 and June 2019 (12 months) 65 patients had arthroscopic surgery for wrist pain after having an MRI scan performed. This retrospective analysis compares the pre-operative MRI diagnosis with the arthroscopic diagnosis obtained at the time of surgery.

Results: The pre-operative MRI diagnosis was consistent with the arthroscopic findings in 12 cases (18%). The pre-operative MRI diagnosis was partially consistent with the arthroscopic findings in 16 cases (24%). The MRI diagnosis was inconsistent with the arthroscopic findings in 33 cases (51%). The pre-operative MRI scan produced a false positive in 5 cases (7%).

Summary: MRI interpretation was inconsistent with arthroscopic findings in 38 cases (58%). The diagnosis of wrist pathology must be based on the history, clinical examination, imaging studies and arthroscopic findings. As such, arthroscopy has a dual purpose; the first purpose is to confirm that the diagnosis is accurate, and the second purpose is therapeutic. This is important when explaining the diagnosis to the patient and formulating treatment plan.
Surgeon Performed Diagnostic Ultrasound in Hand and Wrist Surgery Practise

**Mr Paul Jarrett**

Radiology - What Are We Seeing?, Eureka Room 2, March 14, 2020, 2:00 PM - 3:30 PM

**Introduction**

Ultrasound is a commonly utilised imaging modality for hand and wrist surgeons. High quality high frequency ultrasound machines are available that are suitable for use in an out-patient clinic and theatre.

In 2016 ultrasound was introduced into my practise at Murdoch in Western Australia following consultation with other medical practitioners who used ultrasound in their practise, considerable reading of ultrasound publications and attending a course on MSK ultrasound.

**Learning Curve**

Initially I performed 40 ultrasounds in patients who had already had a recent ultrasound and compared my findings with the radiologists ultrasound report as a learning exercise. Thereafter I commenced formal ultrasound examinations for easier pathologies such as trigger digit, ganglions, DeQuervain’s and foreign bodies and with time have expanded to more complex ultrasound examinations such as flexor tendon pathologies, ligament injuries, vascular pathologies and injections. My ultrasound findings are frequently compared with any potential patient information such as MRI findings, operative findings and histopathology reports to provide constant feedback to improve ongoing learning.

**Discussion**

There are some considerable benefits to the surgeon and the patient alike for surgeon performed ultrasound. It is more convenient for patients to have instant access to ultrasound during their consultation with their surgeon. Surgeons have excellent understanding of anatomy, especially in the post-operative setting for their own patient’s anatomy. During the ultrasound examination, a surgeon’s explanation of the findings to the patient are more likely to be relevant and appropriate compared to those given by a sonographer or radiologist.
Wheat from the Chaff - Dual Energy & Cone Beam CT

Dr Marcus Pianta

Radiology - What Are We Seeing?, Eureka Room 2, March 14, 2020, 2:00 PM - 3:30 PM

This presentation reviews what’s new in Hand and wrist CT imaging including the utility of Dual Energy CT in assessing bone vascularity and the clinical application of Cone Beam CT for fracture and variant anatomy evaluation.
SPECT scans

Mr Simon MacLean

Radiology - What Are We Seeing?, Eureka Room 2, March 14, 2020, 2:00 PM - 3:30 PM

Single photon emission computed tomography and computed tomography scanning is a hybrid imaging modality, combining the specificity of a bone scan and the osseous detail of a CT scan. SPECT-CT scanning has been shown to have higher accuracy than MRI in the diagnosis of complex upper limb pathology.

We have collaborated over 40 cases of SPECT-CT scans. We find SPECT-CT to be of use as a third-line investigation when clinical assessment and standard investigations are non-diagnostic. In our experience SPECT-CT may change clinical management in a significant proportion of these cases.
Tendon Subluxation after Surgical Release of the First Dorsal Compartment in De Quervain Disease

Prof Jong-pil Kim, Prof Ji Hyo Kim, MD Jae Uk Jung, MD Jeong Sang Kim

1Department of Orthopedic Surgery, Dankook University College Of Medicine, Cheonan, South Korea, 2Department of Career Education, College of General Education, Dankook University, Cheonan, South Korea

Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

Objectives: We aimed to determine whether dorsoulnar incision elevating radial flap and immobilization for the treatment of de Quervain disease have an advantage over simple midline incision and early mobilization, respectively, in terms of tendon subluxation and clinical outcomes.

Methods: Forty-six patients with de Quervain disease were randomly divided into 2 groups (midline incision vs dorsoulnar incision) and 2 subgroups (immobilization vs early mobilization). Subluxation of intracompartmental tendons was measured in dynamic wrist positions at 12 and 24 weeks using ultrasonography. The DASH (Disabilities of the Arm, Shoulder, and Hand) and visual analog scale scores and grip and pinch strengths were evaluated.

Results: At 24 weeks, the tendonswere displaced volaradially in wrist volar flexion (1.25 mm in midline incision vs 0.36 mm in dorsoulnar incision, P = 0.001), whereas the tendons were displaced dorsoulnarly in wrist extension (0.95 mm in midline incision vs 1.78 mm in dorsoulnar incision, P = 0.041). There were no significant differences in tendon displacement between early mobilization and immobilization groups. Clinical outcome measures showed no variation between the groups, and no significant correlation occurred with tendon subluxation.

Summary: Dorsoulnar incision and postoperative immobilization do not have advantage over midline incision and early mobilization, respectively. However, tendon subluxation after release of the first dorsal compartment for de Quervain disease does not affect clinical outcomes.
A Review of Cyclical Testing Protocols for Flexor Tendon Repair

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Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

Cyclic testing of flexor tendons aims to simulate post-operative rehabilitation and is more rigorous than static testing to characterize the biomechanical properties of flexor tendon repairs. However, there are many different protocols, making comparisons difficult.

Literature search was performed to look for cyclic testing protocols used to evaluate flexor tendon repairs. Preload, cyclic load, number of cycles, frequency and displacement rate were categorised.

Thirty-five studies with 42 different protocols were included. Thirty-one protocols were single-staged, while 11 protocols were multiple-staged. Twenty-nine out of 42 protocols used preload, ranging from 0.2 to 5N. Preload of 2N was used in most protocols. The cyclic load that was most commonly used was between 11-20N. Cyclic load with increment of 10N after each stage was used in multiple-staged protocols. The most commonly used number of cycles between 100 to 1000. Most protocols used a frequency of less than 1Hz and displacement rate between 0-20 mm/min.

We propose two single-staged protocols as examples. Protocol 1: cyclic load of 15N to simulate passive mobilization with preload of 2N, number of cycles of 2000, frequency of 0.2Hz.; Protocol 2: cyclic load of 38N to simulate active mobilization, with the same above preload, number of cycles, and frequency. This review consolidates the current understanding of cyclic testing. This may help clinicians and investigators improve the design of flexor tendon repairs, allow for comparisons of different repairs using the same protocol, and evaluate flexor tendon repairs more rigorously before applying on patients.
Flexor Tendon Repairs: Outcomes from a Generalist Orthopaedic Service at a Peripheral Hospital in New Zealand

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Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

Objective:
We analysed flexor tendon repairs performed at a peripheral hospital in New Zealand by a generalist Orthopaedic service. The purpose of the study was to evaluate the management, outcomes and follow up (including complication rates) of these patients, in comparison to international standards.

Methods:
Our retrospective case series examined 47 patients who underwent primary flexor tendon repair between January 1 2014 and January 1 2018. We included all patients over the age of 15 years with zone I and II injuries. Data was extracting using patient records, including their admission notes, operation notes, discharge summaries and clinic follow up letters. The data was then processed using the statistics software, SPSS.

Results:
The majority of flexor tendon repairs occurred in young males, of which accidental trauma was the most common mechanism of injury. Most of our patients received standardised care with the use of four-core tendon repair which was performed in a timely fashion. The re-operation rate at our hospital was 19.1% (p=<0.05) and the re-rupture rate was 8.5% (p=0.28). Hand therapy follow up notes were difficult to obtain due to incomplete documentation.

Summary:
Most of our patients received four-core tendon repairs within 72 hours of presentation. Our re-operation and re-rupture rates were relatively high when compared with complication rates reported in international meta-analysis data. However, due to limited sample size and incomplete documentation, confounding factors cannot be excluded as a contributor for our results.
FLEXOR TENDON DEGENERATION: DOES IT INFLUENCE THE OUTCOME OF OPEN TRIGGER FINGER RELEASE?

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Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

OBJECTIVE

Flexor tendon degeneration in trigger finger may be caused by repeated frictions of flexor tendon and narrow-restricted A1 pulley. In open trigger finger release, we often found features of tendon degeneration, however, the association between tendon degeneration and the surgical outcome was unknown. This study attempts to assess the association between flexor tendon degeneration and outcome of open trigger finger release.

METHODOLOGY

From February 2017 to August 2018, open trigger releases were performed in 136 patients (162 digits). Fourteen patients (20 digits) defaulted follow up. Intraoperatively, flexor tendons were inspected for degeneration features. Patients were assessed preoperatively, then at first, third and sixth months for; pain score, active motion of joints, grip and pinch strength, DASH score and complications.

RESULTS

We identified eight features of degenerations, including irregular surface, fraying, intertendinous tear, nodule, synovial thickening, hyperaemia, adhesions and tendon dryness. Total 117 fingers (72.2%) had tendon degeneration feature(s) while other 45 fingers were normal (27.8%). Irregular tendon surface and fraying were significantly correlated with duration of symptoms. Active PIPJ motion was significantly limited in tendon dryness group at preoperative and 1-month post-surgery. Pre-operative DASH score was significantly high in tendon fraying, dryness and intertendinous tear groups, and remained high in intertendinous tear group at 1-month post-surgery. At 6-month, there was no significant correlation between tendon degeneration and outcome of surgery.

SUMMARY

Tendon degeneration has correlation with early outcome of surgery, but no significant correlation at long term. Open trigger finger release has high success rate despite severe flexor tendon degeneration.
Clinical Outcomes and Biomechanical Comparison of Modified Lim/Tsai Tendon Repairs

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Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

The most common modification of the Lim-Tsai flexor tendon repair technique is addition of an extra-tendinous knot instead of intra-tendinous knot. There has been no biomechanical and clinical study of the popular modification. The biomechanical properties and clinical outcomes of techniques were compared.

The ultimate tensile strength, load to 2mm gap force, stiffness, mode of failure, location of failure, and time taken to repair each tendon were recorded during a single cycle loading test in 20 tendons with each repair method. The retrospective clinical study included zone 2 flexor tendon repairs made using the modified Lim/Tsai technique from January 2008 to December 2014. Clinical outcome was assessed using the revised Strickland and Glogovac criteria.

We found that the ultimate tensile strength and 2mm gap force of the modified Lim/Tsai repair with extra-tendinous knot (56.5 ± 5.2 N and 13.9 ± 2.1 N respectively) were statistically significantly higher than that of the modified Lim/Tsai repair with intra-tendinous knot (50.6 ± 7.1 N and 11.4 ± 1.7 N respectively). The overall satisfactory outcome of the modified Lim/Tsai technique was 81.1%. The rupture rate of the modified Lim/Tsai technique was 2.7%.

We conclude that the modified Lim/Tsai repair with extra-tendinous knot is stronger biomechanically, despite having the same number of core strands. However, based on this retrospective study of patients with zone 2 flexor tendon injuries, the clinical outcomes of modified and original Lim/Tsai techniques are comparable. As such, there is no clinical evidence favouring one over the other.
Spontaneous rupture of flexor pollicis longus tendon by tendolipomatosis in proximal phalanx: A case report

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Free Papers 11 - Tendon, Eureka Room 3, March 14, 2020, 2:00 PM - 3:30 PM

Spontaneous rupture of flexor pollicis longus tendon by tendolipomatosis in proximal phalanx: A case report

Young-Keun Lee MD, PhD¹, MOOHEON JEON MD¹, Kyung Tae Kim MD².

Abstract

Objective: Spontaneous flexor pollicis longus (FPL) tendon rupture is rarely reported and the exact etiology is unclear. We want to present a case of unusual spontaneous FPL tendon rupture due to tendolipomatosis.

Method: A 64-year-old right-handed retired male teacher was referred to our clinic with an inability to flex the interphalangeal joint of his left thumb. Upon examination, no specific painful swelling in the left thumb was detected. However, the patient was unable to actively flex his thumb at the interphalangeal (IP) joint. He had full passive range of motion of IP joint. Magnetic resonance imaging (MRI) revealed complete FPL tendon rupture at the level of the distal one-third of the proximal phalanx.

With the patient under general anesthesia, the FPL tendon was explored through a volar zig-zag incision. During the operation, the FPL tendon was found to be ruptured completely. Gross examination revealed a slightly yellowish denaturated tissue at the distal end of the ruptured tendon. We excised the denaturated tissue from the distal end of the ruptured tendon and sent it for histological examination. FPL tendon was repaired primarily via modified Becker method.

Postoperatively, the left thumb was immobilized in a below-elbow plaster splint with extension block for 1 week, followed by dynamic splinting recommended for another 6 weeks and unrestricted full active motion at week 7.

Result: Histopathological examination revealed normal vasculature in the tendon tissue and degenerative changes associated with lipid deposits in the tendon tissue. At 12-month follow-up, the patient was completely asymptomatic and had excellent IP joint range of motion (0° to 40°) in his left thumb. The wrist grip strength was 30 kg (28 kg in the Rt.) and the thumb pinch strength was 5.7 kg (4.7 kg in the Rt.). The Quick DASH score was 0.

Conclusion: Spontaneous rupture of the FPL tendon, attributed to degenerative changes caused by tendolipomatosis, is the first report of its kind, in the authors’ opinion. Early diagnosis followed by debridement and primary tendon repair provides an effective outcome.
Severity of common Hand injuries and varieties of affecting occupations at a specialized rehabilitation centre (CRP) in Bangladesh

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¹Centre For The Rehabilitation Of The Paralysed, Dhaka, Bangladesh

Hand Therapy D3 - Trauma, Sovereign Room, March 14, 2020, 2:00 PM - 3:30 PM

Objectives:
This study objectives has given a snapshot of the severity of the people who are affecting hand injuries from varieties of occupation over the last five years. It help us to know the common causes and incidence period of these injuries.

Methods:
The quantitative method was used. This was a non-experimental study design. So the cross sectional method was appropriate for this study. Data will be collected by written questionnaires from registration book & assessment of the patients.

Result:
The average age of the participants of this study is 34.55 years old. Where the lowest age is 3 months and higher age is 87 years old. Men are more vulnerable to have had hand injuries then female in Bangladesh. This is probably because of the type of work that male do in our country is far more risky than female. Among the causes of injuries the trauma was more significant which is a big concern for the work and safety issues. Road traffic accident and repetitive movement is the other leading causes of injuries. One can easily said that this are very much preventable and take to reduce the risk of hand injuries.

Summary
The hand is the most common body part to be injured. Hand injuries can have devastating and long-term social and economic consequences, affecting not only an injured individual's health and functioning, but also hindering his/her family's livelihood and society as a whole.
Prospective Assessment of Meaningful Functional Recovery After Nerve Transfer in Traumatic Brachial Plexus and Spinal Cord Injury

Mrs Jaslyn Cullen1, Dr Clair Lee2, Dr Minghao Zheng2, Mr Alex O’Beirne3

1Jaslyn Cullen Occupational Therapy Services, Leederville, Australia, 2The University of Western Australia, Crawley, Australia, 3Western Orthopaedic Clinic, Murdoch, Australia

Hand Therapy D3 - Trauma, Sovereign Room, March 14, 2020, 2:00 PM - 3:30 PM

OBJECTIVES
Nerve transfer is an attractive treatment for brachial plexus and spinal nerve/cord injuries. Its advantages over conventional tendon transfer are: 1) there are more donor options, 2) more than one muscle can be reinnervated per transfer, and 3) more functions can be restored. The objective of this study was to prospectively assess upper limb functional recovery in a cohort of patients receiving nerve transfer augmented with CelGro™ collagen membrane.

METHODS
Patients received single or multiple nerve transfers augmented with CelGro™ in one or both upper limbs. Individual rehabilitation plans were created and supervised by a specialist occupational therapist. Assessments of pain and nerve/upper limb function were performed at baseline and for up to 2 years post-surgery.

RESULTS
Twenty-one nerve transfers were performed in nine patients. Six had brachial plexus or spinal nerve injury and three were tetraplegics (C4/5, C5/6, C6). All tetraplegics recovered MRC grade 3 or 4 triceps function by 12 months, and were able to commence training in assisted slide-board transfer into/out of a wheelchair. Wrist extension was grade 3 or better in 6/6 transfers at 12 months and patients achieved sufficient hand function for simple activities of daily living, including teeth cleaning and drinking from a cup. Significant reduction in the use of opiate and neuropathic pain medication was also observed.

SUMMARY
Meaningful improvements in pain and upper limb function were observed at 12 months in a cohort of patients who received nerve transfer with CelGro™ collagen membrane for traumatic brachial plexus, spinal nerve/spinal cord injuries.
Venous congestion using negative pressure dressing

Dr Margaret Fok

Hand Therapy D3 - Trauma, Sovereign Room, March 14, 2020, 2:00 PM - 3:30 PM

Venous congestion remains to be a major factor in causing digit replantation and flap failures. The established solutions are: use of medical leech, local application of heparin gauze, continuous nail bed massage in digit replantation and re-exploration of free flaps. However each method has its drawbacks.

We propose the use of negative pressure wound therapy (NPT) to promote continuous bleeding from the venules of the applied area, resulting in the relief of congestion. We present our case series of using NPT in replanted fingers suffering with venous congestion. Techniques of applying NPT are discussed. Survival of fingers are noted without additional surgery.
“Holding your Nerve”: therapist and patient perspective on nerve transfers for regaining upper limb function after SCI

Ms Cathy Cooper

Hand Therapy D3 - Trauma, Sovereign Room, March 14, 2020, 2:00 PM - 3:30 PM

The introduction of nerve transfers has resulted in a paradigm shift for upper limb reconstructive surgery in tetraplegia. Here in Melbourne, we see earlier and more frequent presentation of patients considering surgery - usually within the inpatient rehabilitation admission. Nerve transfers do not take the place of traditional tendon based procedures but give alternative and often combined surgical options increasing potential for superior outcomes.

Restoration of elbow extension, grasp, pinch and release are the key goals of reconstructive surgery in tetraplegia whether via nerve or tendon transfer. Procedure selection is dependent on availability of donors and careful, timely assessment and decision making by the multi disciplinary team. The role of the therapist in referral, assessment and work up pre surgery plus management guidelines following nerve transfers are clearly outlined.

The Upper Limb Program at Austin Health recently published results from a 5-year prospective case series – the largest in the world looking at nerve transfer in tetraplegia outcomes. This research and continuing clinical practice confirm that early nerve transfers in people with tetraplegia are both safe and effective with statistically significant improvement demonstrated in all standardised outcome measures.

The most important outcome measures discussed here are patient satisfaction and the functional gain following surgery that is critical for people with tetraplegia. Here we take a close look at one case study, a young man who will personally present his own take on the experience of nerve transfer surgery 17mths ago and answer questions from the audience.
Outcomes following free functioning muscle transfer for management of pan-BPI: An Australian sample

Ms Sara Brito

Hand Therapy D3 - Trauma, Sovereign Room, March 14, 2020, 2:00 PM - 3:30 PM

Background:
Adult traumatic brachial plexus injuries (BPIs) are frequently caused by motorcycle accidents and result in severe injury. Pan-plexus injuries (C5-T1) results in motor impairment of the shoulder, elbow and hand resulting in global upper limb deficits sometimes referred to as a flail limb. These are managed with a range of surgical strategies including in some cases a free functioning muscle transfer.

Objectives:
This current study aimed to report long-term outcomes from a patient-centred perspective and be the first Australian study to do this. Comparison to previous studies’ findings and to normative population data availed contextualisation and comparison of outcomes for this rare population.

Methods:
A quantitative, cross-section design study of adults with pan-BPI who underwent FFMT surgery between 2007 and 2015 was employed. Measures included: clinical measures, SF-36; Disability of the Arm, Shoulder and Hand; Brachial Assessment Tool; and the modified Satisfaction with Appearance Scale.

Results:
Eight men, on average 8 years post injury, participated. The findings indicate that this Australian, BPI population’s scores are similar to other BPI populations, but are significantly lower than normative populations’ scores on the measures utilised. Participants reported significantly poorer physical health, social functioning, satisfaction with body image, and ability to complete day-to-day activities.

Conclusions:
Whilst reconstructive surgery can now restore movement that was not possible previously, individuals still experience significant disability post-surgery, and disablement and poor functioning continue over the long term. As such, long-term access to health services and community support are suggested in order to better outcomes for this population.
Outreach in Vietnam

Dr Peter Scougall

Surgery 5 - Outreach Services in the Asian Pacific Region, Goldfields Theatre/Plenary, March 14, 2020, 4:00 PM - 6:00 PM

Vietnamese-Australian Hand Surgery Training Program

In the mid-1990s, the population of Vietnam was 75 million, but there were no specialist hand surgeons and no hand units in the country. This program was started by the Rotary Club of Mosman and A./Prof. Bruce Conolly to help address the shortfall. Our team has visited Vietnam annually since 1996.

The population is now 95 million. There are many experienced Vietnamese hand and microsurgeons and numerous hand units, the first of which was opened with our assistance at Hue Central Hospital in 2002. It has been a pleasure to observe and participate in their journey.

Our courses at Hue Central Hospital are attended by up to 60 surgeons and numerous therapists from across the land. The program would not be possible without the support and organisational skills of Hand Unit Directors Drs Pham Dang Nhat and Ho Man Truong Phu, and their extremely supportive hospital administration. We are very grateful for their input.

This talk reviews aspects of our 24 year program, and reflects on the ongoing relevance of our involvement moving forward.

We would like to thank the many clinicians, administrators, fundraisers and others who have been involved. Special thanks to core team members Damian Ryan, Richard Lawson, Jagdeep Nanchahal and Rosemary Prosser. Thank you to our generous sponsors, including Mosman Rotary, Orthopaedic Outreach, The Australian Hand Surgery Society, St Lukes Hospital Sydney, Medartis, Synthes, Covidien and Johnson and Johnson.
Outreach in Cambodia

A/Prof Graham Gumley

Surgery 5 - Outreach Services in the Asian Pacific Region, Goldfields Theatre/Plenary, March 14, 2020, 4:00 PM - 6:00 PM

Following the devastating Pol Pot regime in the late 70s decimating the population and leaving the traumatised population with only 4 doctors in country in 1979. After more than a decade of occupation the country has then emerged into a fledgling democracy, under and at times, including now under substantial stress.

Hand Surgery and Hand Therapy has been supported by a number of Australian Surgeons over the last 20 years and are particularly grateful for financial assistance from the AHSS for some years. AHSS/ASHT members Mark Allison, Damian Ireland, Bruce Conolly, Bill Cumming, Beth McNeish have all served in the past with Anne Wajon, Cathy Merry, Marin Graham, Damian Ryan, Nick Smith, David Stewart, David Graham and Graham Gumley all continuing to serve yearly.

Cambodia remains effectively a low income country with a burden of untreated congenital conditions, failed trauma care, advanced malignancies and infections in a context of limited resources yet with a dynamic group of surgeons and therapists eager to learn the advanced techniques required for restoring function and productivity.

The ongoing support of the AHSS and Hand Surgery community will be appreciated by many Cambodian surgeons who will learn surgical skills, integrated Hand Therapy care and accurate clinical evaluation and will actively apply techniques learned between our outreach visits in a setting where untreated surgical issues remain a major cause of disability and, in turn, poverty.
Joint perspectives of outreach: "Helping Hands in Bhutan"

Ms Suzanne Caragianis

Helping Hands in Bhutan Project started over 10 years ago. It is a unique program started by Suzanne Caragianis, Certified Hand Therapist in 2009. Suzanne developed the program with the aim of achieving a sustainable Hand and upper limb rehabilitation model to attain better outcomes for patients with burns, trauma, congenital anomalies and overuse type injuries. Suzanne initially organised teams of hand surgeons, both Plastic and orthopaedic surgeons to join in the training and development of Orthopaedic and General surgeons along with physiotherapists and physiotherapy technicians. The establishment of a charity allowed for significant fund raising to provide training of both orthopaedic surgeons, training Doctors and therapists throughout Bhutan along with supplying surgical equipment and setting up 2 hand therapy clinics. In 2014 Suzanne and Dr Phillip Griffin approached Interplast Australia and NZ to take over the program. The Interplast program has lead to greater capacity to teach, operate and collaborate with our local partners to build their knowledge, skill and capacity. The success has been possible with our hard working local partners who we work closely with to empower them to achieve better outcomes. Mentoring via what’s app has provided ongoing support and training for our local partners. Success has also come through close ties with all the stakeholders within Bhutan and relationship building over many years. The Ministry of Health now acknowledge the need for training of Plastic and reconstructive surgeons for Bhutan and see Interplast as having a vital role.
Introduction to Outreach in the Asian Pacific Region

Inequality across the Asia Pacific region in education, living standards and access to medical/surgical care leads to a great disparity in outcomes from injury, congenital deformity and degenerative disease.

The impact of high quality outreach programs with a focus on teaching and transfer of surgical skills is leading to major advances in treatment options and outcomes throughout the region. This has a growing and marked impact on quality of life, productivity and community wellbeing, far outpacing the cost and logistic challenges involved.

The following presentations illustrate the needs, care, effort and the impact of Hand Surgery and Hand Therapy outreach programs across our region, including first hand accounts of the positive influence these selfless caring service programs have made in the lives of so many.

Despite many of the successes we may present here, the needs are widespread and longstanding, with positive outcomes that will only be advanced and sustained with continued and expanding programs and the ongoing enthusiasm of experienced and, particularly, new Therapists and Surgeons willing to be involved in support and service.
The vascularized dorsal periosteal curtain for corrective osteotomy of the distal radius

Prof Mark Ross¹,²,³, Dr Alexa Potter¹,²
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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Objectives
Corrective osteotomy of the radius frequently requires significant soft tissue releases. We propose a technique that utilises the releases to create a dorsal curtain of vascularized periosteum over the osteotomy site.

Methods
Surgery is performed through the usual volar approach to the distal radius. Following the usual release of brachioradialis, the periosteum is elevated over the dorsal radius for approximately 2 cm proximal to the osteotomy site. The osteotomy is performed taking care not to damage the dorsal soft tissue envelope. The proximal radius shaft is then pronated to allow further exposure and elevation of the dorsal periosteum. This is separated from the extensor tendons and divided 2cm proximal to the osteotomy and left attached to the distal radial fragment. When the correction is made the distally based periosteal flap hangs down proximally over the osteotomy site, separating the bone graft from the extensors and providing vascularity for the graft.

Results
We have utilised this technique for many years without any significant complications. The correction of the radial deformity is usually straightforward because the technique ensures a thorough dorsal release. The cancellous graft appears to unite and remodel extremely rapidly and patients can usually return to activity at six weeks post osteotomy when union is seen.

Summary
We recommend this technique for all distal radius osteotomies. It facilitates the requisite soft tissue releases, protects the extensor tendons from the bone graft, and encloses the bone graft with a vascularised layer of periosteum to expedite union and graft incorporation/remodelling.
Distal screw penetration in volar locking plate fixation for intra-articular distal radius fractures

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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Objectives
This study aimed to investigate details of distal screw penetration after volar locking plate (VLP) fixation for intra-articular distal radius fractures (DRF) via CT scans and to compare the relationship between severity of fracture comminution and frequency of screw penetration.

Methods
This was a retrospective case series of 143 wrists in 141 consecutive adult patients who underwent VLP fixation for AO type-C DRF from 2015 to 2018. The mean age of the participants was 62.8 years, and of the participants, 40 were men and 101 were women. Postoperative CT scan was performed to examine the distal screw penetration. We compared the radiological and clinical outcomes of the AO type C1 and C3 groups. The radiological and clinical outcomes between the AO type C1 and C3 groups were compared using t-test and chi-square test.

Results
Distal screw penetration was observed in 80 (55.9%) wrists, intra-articular perforation in 20 (14%) wrists, and dorsal cortex penetration in 65 (45%) wrists. The incidence rate of intra-articular screw penetration was significantly higher in the AO type C3 group than in the AO type C1 group. None of the patients presented with tendon rupture during the final follow-up.

Summary
In the present study, 56% of patients presented with distal screw penetration. Furthermore, a significant association was observed between the rate of intra-articular screw penetration and fracture comminution. These results indicated that the detection of screw penetration via fluoroscopy alone had limitations in intra-articular DRF; therefore, we must pay attention to screw penetration for comminuted DRF.
Functional outcome between early and delayed wrist mobilization after volar fixed-angle plate fixation of distal radius fracture: a randomized controlled trial

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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Objectives: Postoperative immobilization protocols after volar fixed-angle plate fixation of distal radius fractures (DRF) are varied among surgeons. This study is aimed to compare functional outcomes between early and delayed mobilization after volar fixed-angle plate fixation of DRF patients.

Method: Forty-eight DRF patients were randomly allocated into early or delayed groups after volar fixed-angle plate fixation. Early group was allowed for wrist motion exercise immediately after surgery. Delayed group was allowed for wrist motion exercise after 2 weeks of short arm volar slab immobilization. Functional outcomes were evaluated by patient-rated wrist evaluation (PRWE), disabilities of arm, shoulder and hand (DASH), wrist range-of-motion, visual analog scale (VAS) pain score and grip strength at 2, 6 and 12 weeks after surgery.

Results: PRWE score at 3 months after following surgery was slightly higher in early group (17.24 ± 13.04) compare to delayed group (15.70 ± 12.15), however, there was no statistical significance (p = 0.688). No significant difference of DASH score, VAS pain score, grip strength and complications were found at any time point. However, pronation of forearm and change in ulnar variance at 12 weeks follow-up had statistically increase in early group without clinical important difference.

Conclusion: From the findings of this study, short-term functional outcomes were similar between groups. Immediate post-operative wrist range of motion exercise can be safely initiated after volar fixed-angle plate fixation of DRF.
Gait analysis of patients with distal radius fracture using a novel Laser-TUG system

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Objectives: Patients with distal radius fracture (DRF) are at risk of consequent fragility fracture. Gait analysis of patients with DRF can provide useful information to prevent a fall and resultant fracture. The timed up and go test (TUG) is a clinical test, often used to evaluate functional mobility; however, the detailed steps information during the test is not well assessed. We conducted research to analyze the gait characteristics of DRF patients during TUG using a new system.

Methods: We developed the Laser-TUG system, which uses a single-laser range-sensor, and can track and measure the foot contact positions to obtain the walking parameter during TUG without using any instruments on patients. The system Using the Laser-TUG system, we compared the gait of 20 patients with DRF who had surgery (the fracture group), and 40 age-matched healthy non-fractured volunteers (the non-fracture group).

Results: The total time of TUG in the fracture group was lesser (8.5 vs. 7.4 seconds, P=0.03). The length of stride was smaller (0.51 vs. 0.62 meter, P<0.01), and the number of steps in total was greater (14.3 vs. 11.7, P<0.001), especially at the turning around phase (3.2 vs. 2.3, P=0.04) in the fracture group.

Summary: With this system, gait can be visualized without the use of a sensor on the patients. The time of TUG in the fracture group implied normal gait speed; however, they walked with more steps and experienced difficulty turning around during TUG. These results suggest the cause underlying the tendency to fall in DRF patients.
Possibility of fixation of a distal radius fracture with a volar locking plate through a 10 mm approach.

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Objectives: The management of distal radius fractures has dramatically improved due to the development of a locking plate system. Additionally, mini-invasive surgery has been performed in a lot of surgical fields in recent years. The aim of the present study is to investigate the possibility of fixation of a distal radius fracture with a volar locking plate through a 10 mm approach.

Methods: Eighteen patients with distal radius fracture (mean age: 66 years (28 – 88); 8 males and 10 females) were operated on using a volar locking plate. The incision for plating was always 10 mm long. The clinical, cosmetic and radiological outcomes were investigated.

Results: At three months’ follow-up, the range of motion of the wrist joint was 67.5° in flexion, 65.6° in extension, 88.3° in pronation, and 88.3° in supination. The % grip strength compared to the healthy side ranged from 35 - 100%. The VAS, Q-DASH, and modified Mayo scores were 0.7, 8.5, and 93.3, respectively (excellent in all 18 patients). Bone union was achieved on plain X-ray radiography and cosmetic problems were satisfied in all patients.

Summary: Our results suggest that it is possible to achieve fixation of a distal radius fracture with a volar locking plate through a 10 mm approach. However, its applicability to surgery must be carefully examined. If any difficulties in plate installation or approach occur during this intervention, it will be necessary to consider switching to a conventional approach. We believe that surgeons must not adhere to a mini-invasive approach.
“Stepwise” AARIF of intra-articular distal radius fractures - evolution of technique and instrumentation

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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Introduction

Arthroscopic visualisation of articular fractures of the distal radius can allow accurate reconstruction of the articular surface whilst minimising disruption of the dorsal capsular structures. In minimising the iatrogenic injury, this may lead to improved outcomes, though this remains unproven.

Technically, one of the most challenging problems is how to hold the reduction while definitive fixation is employed. Where a volar locking plate is used, typically the plate is applied with proximal fixation, prior to the arthroscopy and articular manipulation. Two technical difficulties often ensue. Firstly maintaining accurate reduction of volar fragments after applying traction. Secondly, inserting distal locking fixation whilst holding the articular reduction under arthroscopic visualisation with the wrist in traction. It is difficult to simultaneously maintain traction for arthroscopy, and retraction to allow safe introduction of the drill and screws.

Method

The stepwise technique and the newly evolved fixation are presented.

Results

Some cases will be briefly presented to illustrate the technique.

Discussion

The technique may bring this technically challenging method into the repertoire of most capable wrist arthroscopists. As each step of the surgery is completed, the articular surface is brought closer to anatomical alignment, with increasing stability. The chance of a backwards step is minimised, decreasing frustration and optimising the result.

Conclusion

An evolution of surgical technique and instrumentation for arthroscopic reduction and stable fixation of exploded articular fractures of the distal radius is presented.
Flexor tendon complications in distal radius fracture fixation with a Variable-Angle Volar RIM Plate are not frequent despite its plate prominence over the water-shed line

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Objectives: Flexor tendon rupture is a serious complication of volar locking plate for distal radius fracture fixations. Plate prominence over the watershed line contributes to the risk of flexor tendon rupture, where the DePuy Synthes variable angle LCP® Volar RIM Plate needs to be placed in order to capture comminuted volar lunate facet fragments. The aim of this study is to clarify the effects of plate design and positioning to flexor tendons by comparing four different plate designs.

Methods: Total of 84 patients with volar locking plate fixation from 2016 to 2018 were analyzed retrospectively (Far-distal type: RIM in 14 cases, Juxta-articular type: AcuLoc2 and Dual-Loc in 20 and 25 cases, Extra-articular type: VA-TCP in 25 cases). Primary outcome was an occurrence of adverse events. Plate positioning was graded according to Soong’s classification. Flexor tendon appearance was observed by ultrasonography and direct observation during the surgery for hardware removal.

Results: The mean follow-up was 390.1 days. All four groups showed comparable outcomes in radiographic and functional parameters without any serious adverse event. Closer relationship of flexor tendon to plate surface was observed in RIM without evidences of change in tendon morphology. In surgical finding, there was no tendon damage or adhesion with high frequency in RIM.

Conclusions: Smooth profile of RIM can decrease the potential risk of tendon complications that would be developed by its prominence over the water-shed line.
Wrist hemiarthroplasty in traumatology: early results in the elderlies with type C3 fractures

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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Introduction

Distal radius hemi-arthroplasty is a surgical option not widely used in the management of comminuted fractures of the distal radius in elderly patients. The aim of this study was to report the short- and mid-term results of distal radius hemi-arthroplasties in C3 distal radius fractures in elderly patients.

Methods

From July 2016 to May 2019, 17 patients, mean aged of 79 years (68-89), were treated with a cemented radial hemiarthroplasty; in 16 cases with a REMOTION prosthesis (SBI) and in one case with a SOPHIATM prosthesis (Biotech). Ulnar distal resection (Darrach procedure) was done at the same time in 14 patients.

Results

The average time from injury to surgery was 8 days (2-35). The mean time for hospitalisation was 11 days. 71% of patients came back home without rehabilitation. The mean follow-up was 8 months (3-24). Mean wrist range of motion was 33 ° (20-60° flexion, 48 ° (30-70°) extension and a mean pronation-supination arc of 160 ° (140-180). Mean grip force was 11 kg (5-20). 3 complications (18%) occurred during the follow-up. A case of early infection (2 weeks) required irrigation and debridement with retention of the implant and antibiotherapy for 3 months. One patient had a distal radioulnar arthritis treated by ulnar distal resection (Darrach procedure). Finally, radiocarpal instability occurred in one patient with anterior radiocarpal dislocation treated by radius osteotomy.

Discussion

Distal radius hemi-arthroplasty provided rapid recovery, satisfactory early outcome for pain relief and functional wrist motion in elderly patients with C3 distal radius.
Result of Surgical Treatment of Distal Radius Nonunion With or Without Distal Radioulnar Joint Derangement: A Report of Nine Cases

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Free Papers 12 - Distal Radius Fractures, Courtyard Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

Objectives Surgical management of distal radius nonunion is rarely presented but complex for associated with a distal radioulnar joint derangement and technique challenged to reduction and fixation of a poor bone stock of distal fragment.

Methods We retrospectively reviewed the surgical outcome of nine patients with distal radius nonunion (four associated with distal ulna nonunion) after a distal radius fracture. The surgical procedures included nonunion site debridement, realignment, bone grafting and stable fixation, aiming to restore the congruity and stability of the distal radioulnar joint. Five patients underwent volar T-plate fixation, one with orthogonate plate, two with volar locking plate fixation and another one underwent screw change only. Four of the un-united distal ulnar fractures was treated with the Darrach procedure in one, plate fixation in two and the other one was untreated for fibrous nonunion.

Results All patients treated for distal radius nonunion showed radiographic union within 3 months. The average flexion arc(45° to 101°), rotation arc (72° to135°) and ulnar variance (2.8 mm to 1 mm) was improved from preoperatively to postoperatively. No patient required a secondary intervention to achieve bone union. Outcome of functional result was rating excellent in one, good in six and fair in two.

Summary The evolved of fixation methods or surgical techniques for distal radius fractures are mendable to realigning the radial shortening and stable fixation of complex un-united fractures to achieve union. However, other distal radioulnar joint reconstruction method is required to treat the associated chronic distal radioulnar joint derangement.
Lessons learned in fracture fixation of the hand and wrist

Prof Randy Bindra

Surgery 6 - What Have I Learnt Over The Past 25 Years, Eureka Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

The attitude to hand and wrist fracture management has changed considerably in the last 25 years. This has been fueled by increased patient expectation and backed by innovation in imaging and technology for fracture fixation. I will cover changes in hand fracture care, newer surgical approaches and tactics I have learned, and the evolution of fixation techniques in distal radius and scaphoid fracture management.
The Orthoplastic Approach to Upper Extremity Reconstruction

Dr Scott Levin

Surgery 6 - What Have I Learnt Over The Past 25 Years, Eureka Room 1 and 2, March 14, 2020, 4:00 PM - 6:00 PM

It has been half a century since Susumu Tamai reported on the first thumb replantation. The evolution of reconstructive microsurgery has continually added new applications of the operating microscope for reconstructive surgery and has had profound impact on countless patients. From the time of Harold Gillies until today, the reconstructive ladder has evolved to a reconstructive elevator with the “penthouse” floor being represented by vascularized composite allotransplantation.
The classifications of thumb hypoplasia will be reviewed with possible surgical intervention, as well as, the pre- and post-surgical therapy interventions.
Splinting options and effectiveness in thumb CMC OA

Ms Miranda Buhler

Hand Therapy D4 - Thumbs, Sovereign Room, March 14, 2020, 4:00 PM - 6:00 PM

Thumb carpometacarpal (CMC) osteoarthritis (OA) is a highly prevalent condition that causes pain, functional limitations, restricted participation in life roles, emotional impact, and altered sense of self. Splinting is a non-pharmacological, non-surgical intervention that is speculatively recommended by international guidelines. This presentation outlines types of splints available for thumb CMC OA, reports what is understood about their mechanism of effect, reviews evidence for effectiveness in reducing pain and improving function and quality of life, and appraises ongoing studies investigating splinting for thumb CMC OA.

Systematic review of studies completed to date found low quality evidence for effectiveness of splinting to reduce pain (moderate to large effect) and improve function (small to moderate effect) in the medium term (3-12 months) but not in the short term (<3 months). No studies reported HR-QoL.

In conclusion, splinting may have a key role (in addition to minimum usual care of education, advice, and exercises) in meeting the needs of people/patients with thumb CMC OA. However, the quality of evidence is low. High quality evidence is needed to inform funders, health services, clinicians, and patients/public.
Exercise and stability considerations for the thumb

A/Prof Anne Wajon

Hand Therapy D4 - Thumbs, Sovereign Room, March 14, 2020, 4:00 PM - 6:00 PM

The joints of the thumb are synovial joints; impairment of any part, including degeneration of joint cartilage and subchondral bone, impaired ligament function, inadequate reflex control of periarticular muscles or disturbed innervation, may contribute to instability and ultimately the development of pain and osteoarthritis.

This presentation will discuss the importance of proprioceptive exercises for the thumb, ensuring that patient education and exercises enhance stability and precision during motion. This approach addresses the patients’ individual signs and symptoms, and endeavours to enhance conscious proprioception awareness, conscious neuromuscular control, as well as unconscious neuromuscular control, to prevent disproportional loads during ADL.
Understanding How the Thumb Moves

Ms Judy Colditz

Hand Therapy D4 - Thumbs, Sovereign Room, March 14, 2020, 4:00 PM - 6:00 PM

Gain new insight into the sophisticated anatomy and multi-directional movement of the thumb through a brief review of the bony and ligamentous structures of all three thumb joints while learning how a muscle that only crosses one joint can create movement at other joint/s. This brief review explains how imbalances at the CMC joint interplay with imbalances at the other joints.
Mobilizing orthoses in the management of post-traumatic elbow contractures: a survey of Australian hand therapy practice

**Ms Germaine Sim**¹,², Prof Jennifer Fleming², Dr Celeste Glasgow³

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Study design: Mixed methods survey

Background: Elbow stiffness and contractures often develop after trauma. There is a lack of evidence on mobilizing orthoses and the factors guiding orthotic prescription.

Objectives: To investigate hand therapists’ orthotic preferences for varying extension and flexion deficits, and describe the factors affecting orthotic choice for post-traumatic elbow contractures.

Methods: An electronic survey was completed by 103 members of the Australian Hand Therapy Association. Five post-surgical scenarios were used to gather information regarding hand therapists’ orthotic preferences, reasons and orthotic protocol: 1) Week 8 with 55° extension deficit; 2) Week 12 with 30° extension deficit; 3) Week 12 with 55° extension deficit; 4) Week 8 with flexion limited to 100°; 5) Week 12 with limited flexion.

Results: Most responders (89.9%) used mobilizing orthoses, predominantly for extension (88.5%). Orthotic preferences for scenarios 1-5 were: 1) serial static (78.3%); 2) custom-made three-point static progressive (38.8%); 3) custom-made turnbuckle static progressive (33.8%); 4) “no orthosis” (27.9%); 5) custom-made hinged (27.1%) and non-hinged (27.1%) dynamic. Choices were based on “effectiveness”, “ease for patients to apply and wear”, and “ease of fabrication/previous experience/comfortable with design”. The recommended daily dosage for extension was 6-12 hours.

Summary: Mobilizing orthoses are used routinely in post-traumatic elbow management in Australia. Extension deficits are managed with serial static and static progressive orthoses at weeks 8 and 12 respectively. Research is needed to assess whether orthotic intervention before 12 weeks is beneficial in reducing elbow contractures.
Sonoelastographic evaluation of the origins common extensor tendon in provocation test

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Objective
Sonoelastography is a new, non-invasive ultrasonographic method used for evaluation of the elastic properties of the tissues quantitatively. We applied this method to evaluate the elasticity of attachment site of the common extensor origin (CEO) in normal volunteers.

Methods
12 healthy volunteers (6 males and 6 females) who had no initial episode of elbow pain and no abnormal images confirmed by ultrasonography with a mean age of 26.5 years (range; 21-34 years old) were included. Sonoelastographic evaluation were done at rest, Thomsen test and Middle finger extension test. Then we measured the elasticity of the insertion and muscle-tendon junction of CEO, and extensor digitorum communis (EDC) by high resolution ultrasonography with long axis images (Aplio i700; Canon medical systems, Tochigi, Japan). During the evaluation, the elbow and the shoulder joints were positioned at 90° flexion, while the wrist joint was left free. The strain ratio was analyzed by Mann-Whitney’s U test (p<0.05).

Results
The average strain ratio of CEO insertion, muscle-tendon junction and EDC were 1.87, 1.91, 0.84 (at rest), 2.97, 1.35, 0.77 (Thomsen test), 2.90, 1.90, 0.86 (Middle finger extension test). The averaged strain ratio of insertion of CEO was increased at Thomsen test and Middle finger extension test, however, there was no significant change among all parameters.

Summarys This study demonstrated sonoelastographic evaluation has a potential to detect the elastic change in CEO at provocation test for lateral epicondylitis. This may help to elucidate the pathology of tendinopathy in CEO.
Subtle Elbow Instability Associated with Lateral Epicondylitis

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Objectives
In lateral epicondylitis, even in the absence of apparent instability, subtle instability can be found under anesthesia. We wanted to ascertain the following: (1) how many elbows showed subtle instability during examination under anesthesia (EUA), (2) how effective MRI was in predicting subtle instability, and (3) if any difference existed between elbows with and without subtle instability during EUA.

Methods
122 elbows diagnosed with intractable lateral epicondylitis underwent surgical treatment. Under general anesthesia, the elbows were examined and divided into unstable and stable groups. Potential prognostic factors and functional scores were assessed retrospectively. The MRIs were reviewed again by two radiologists.

Results
Seventeen elbows (unstable group, 13.9%) had subtle instability in EUA, while 105 elbows (stable group, 86.1%) did not. Lateral collateral ligament (LCL) complex injury was noted in the MRIs of 28 elbows. Fifteen elbows showed subtle instability among 28 elbows with abnormal MRI, while 81 elbows did not show subtle instability among 82 elbows with normal MRI. The preoperative VAS score was higher in the unstable group than in the stable group (p<0.001), and a history of multiple corticosteroid injections (≥3) was related to subtle instability in EUA (p=0.042).

Summary.
Subtle instability resulting from LCL complex injury was noted in elbows with lateral epicondylitis. This could be visualized with fluoroscopic EUA, and preoperative MRI could be used to exclude subtle instability. Surgeons should consider checking for subtle instability, especially when patients have a history of multiple corticosteroid injections (≥3) or severe pain and MRI indicates instability.
Symptoms, functional outcomes and ultrasonographic findings in 31,000 images in Epicondylitis patients

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

The Aim of this study was to Identify the prevalence of 10 ultrasonographic criteria in epicondylitis and its association with symptomatology and functional outcome.

Methods: Cross-sectional and cohort study. Using 30,977 ultrasound images of epicondylitis belonging to 4,324 exams. 10 ultrasonographic criteria were defined and the magnitudes of the tears in 3 dimensions were register. Subsequently, in a sample of 82 patients with epicondylitis, association between each of these ultrasonographic criteria were analyzed and correlated with results of the Patient Rated Elbow Evaluation Scale (PRTEE) in its three areas. Regional Ethics Committee approved.

Results: 68% of the 82 patients were men, age (\(x\bar{\cdot}: 49.6; \) SD: 10.3), 51% practiced tennis or golf. 76% have pain for more 3 months. 92% presented up to 3 findings in US exam. Hypoecogeneity 51%, hypervascular 28%, enthesisopathy 20%, calcification 7% and tendon tear 57%. Length (\(x\bar{\cdot}: 22.6; \) SD: 8.5), width (\(x\bar{\cdot}: 23.9; \) SD: 13.6) and depth (\(x\bar{\cdot}: 14.8; \) SD: 8.4) of the tears. The total score of PRTEE was (\(x\bar{\cdot}: 41.8; \) SD: 18) points. Evidence of association was found between the magnitude of pain and the presence of a tear (Beta = 80, 95% CI 0.12 to 8.98, p = 0.04). No statistical evidence was found of the association between magnitudes of the tears and the other areas of the questionnaire.

Summary: We found evidence between the presence of a tendon tear and pain, but there is no correlation with the size of the tear and the other areas of PRTEE.
Radiological characteristics of Kienbock’s disease in the Korean population

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Objectives:
In Kienbock’s disease, the wrist displays certain characteristic radiological parameters, which have been reported to differ among countries. In the present study, we aimed to identify specific radiological parameters of the unaffected wrists in patients with unilateral Kienbock’s disease and to determine the extent of the association of each parameter with the disease in Korea.

Methods:
This retrospective case-control study assessed the radiological parameters of patients with Kienbock’s disease (n = 53) and controls (n = 53), who visited our institution between January 2000 and May 2013. Ulnar variance (UV), radial inclination, lunate fossa inclination, lunate diameter, lunate height, lunate tilting angle (LTA), lunate covering index (LCI), and Sta°hl index (SI) were measured and analyzed using a binary logistic regression model.

Results:
We observed that wrists with a high LTA and LCI, and low UV and SI had a tendency to develop Kienbock’s disease.

Summary:
In the Korean population, a high LTA and LCI, and low UV and SI of the unaffected wrists on plain radiography might be associated with Kienbock’s disease. The radiographic characteristics of the unaffected wrists can differ between patients with unilateral Kienbock’s disease and normal individuals.
New Technique of Distal Humerus Reconstruction after Malignant Peripheral Nerve Sheath Tumor Resection: A Case Report

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Objectives
Malignant peripheral nerve sheath tumors (MPNST) are rare soft tissue sarcomas of neural origin which comprise 5-10% of all soft tissue sarcoma. Surgery is the mainstay of treatment either by limb salvage with wide excision or limb ablation to prevent local recurrence and distant metastases. Reconstruction after distal humeral sarcoma resection is somewhat challenging due to the complexity of elbow anatomy which requires both bony and soft tissue procedures to restore functional anatomy of the elbow.

Methods
We presented a 46-year-old male with painful growing mass on left elbow which has been diagnosed as MPNST. We performed wide excision by resecting the tumor, part of triceps, brachialis and biceps insertion and origin of forearm flexors along with distal humerus bone. The 14 cm bone defect was reconstructed with free vascularized fibular graft (FVFG). We conduct a new technique to provide elbow stability by olecranon resurfacing, interpostitional arthroplasty, box-loop ligament reconstruction, capsuloplasty, and triceps tendon plication.

Results
Upon existing options for the limb salvage surgery, FVFG sparing the limb offered good functional outcome in many cases. Our patient had good functional outcome observed at 6 months follow up by improved DASH score, range of motion and stability.

Summary
FVFG with elbow reconstruction is a good option for management of bone and corresponding soft tissue defect after resection of malignant tumor involving the distal humerus articulating surface.
Transverse Divergent Dislocation of the Elbow in Children: A Report of Four Cases

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Divergent dislocation of the elbow is not common in children. This often leads to misdiagnosis or inappropriate treatment. We report 4 cases of transverse divergent dislocation of the elbow after 2007. All of 4 cases (3-8 years old) injured by fall, visited to our hospital and diagnosed as transverse divergent dislocation of the elbow by radiograph. In all cases, closed reduction was performed under sedation immediately. In 3 cases of all, the reduction were successes. But in the other case, the open reduction was needed due to the interposition of the annular ligament between the radiohumeral joint. In all cases, full range of motion were regained without pain at the final follow-up (3 months-4 years after injury). Closed reduction for the transverse divergent dislocation of the elbow has been successful in a majority of reported cases. However, it is important to recognize the possibility of incomplete reduction due to interposition of soft tissue of bony fragment. The surgeon should check the stability of the joint carefully after closed reduction.
Neurovascular Complications in Hinged External Fixator of the Elbow

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Purpose: To report the result of hinged external fixator surgery in patients with instability elbow conditions focusing on the neurovascular complications.

Methods: A retrospective review of patients with applied hinged external fixator of the elbow between April 2011 to May 2017 at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University in Nakhon Nayok province was performed. The data of complications were collected since immediately after surgery until 16 weeks after procedure.

Results: Thirteen patients of traumatic elbow had hinged external fixator applied. The authors found that neurovascular complications occurred in 4 cases (30.8%). There was 1 case developed a major neurovascular complication which was permanent radial nerve damage (7.7%) and 3 cases that developed minor neurovascular complications which were 2 transient radial nerve injuries and 1 transient ulnar nerve injury (23.1%). There was 1 case developed ulnar fracture associated with hinged external fixator (7.7%).

Conclusion: Hinged external fixator of the elbow is considered an effective device. But the high complication rates have been detected therefore the practitioner should be aware of complications especially the radial and ulnar nerve injury.
Transolecranon fracture-dislocation of the elbow associated with a comminuted distal humeral fracture: a case report

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Poster Session 1 - Touch Screen 1, March 11, 2020, 1:15 PM - 2:00 PM

Introduction
We report the rare case of a patient with transolecranon fracture-dislocation and comminuted distal humeral fracture.

Case presentation
A 54-year-old man presented to the accident and emergency department of our hospital after a roadway accident. The clinical and radiologic examination revealed an open transolecranon fracture-dislocation and a comminuted distal humeral fracture. The radial head is dislocated anteriorly and an olecranon fracture was classified as Gustilo grade II and Colton classification group 4, and the distal humeral fracture was classified as AO/OTA types C3-2. The patient was promptly taken to the operation theatre for stabilization using external fixators. Three days after, open reduction and internal fixation were performed using anatomical locking plates. We tried anatomical reduction and particular attention to restoring the ulnar length and greater sigmoid notch. The fractures healing was complete in 16 weeks. Finally, the elbow flexion 132 degrees and flexion contracture was -25 degrees. Pronation and supination were 60 and 80 degrees. Radiographs confirmed articular congruity but ulno-humeral arthrosis and mild pain was remained.

Discussion
In the transolecranon fracture-dislocation, most of failure of the ulnohumeral joint is a result of the bony disruption rather than the ligamentous component. The osseous injury is commonly a complex and comminuted fracture involving the trochlear notch and, sometimes, the coronoid process as well. Anatomic reduction with particular attention to restoring the ulnar length and greater sigmoid notch is essential in the treatment. We had good results by stable fixations and anatomic reduction in this case.
Comparison of Isokinetic power between Pronator quadratus sparing technique and conventional technique in simple Distal radial fracture using Volar plate fixation

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Poster Session 1 - Touchscreen 2, March 11, 2020, 1:15 PM - 2:00 PM

Objectives: We compared the isokinetic power between the patients who had pronator quadratus sparing and conventional technique done when they went through internal fixation using volar plate after distal radial fracture.

Methods: The subjects were the patients who had internal fixation using volar plate done for simple distal radial fracture in our hospital from January 2014 to January 2016 and whose follow-up was available more than at least 6 months. The subjects were 34 patients whose muscle power was measured 6 months after the surgery. 16 patients who had pronator quadratus sparing technique done were classified into group 1, while 12 patients who had pronator quadratus excised as the conventional way were classified into group 2. We compared pronation, supination, grip strength which were measured at the time of 6 months after the surgery of both affected and unaffected sides in the two groups, we measured isokinetic power to check muscle power. For statistical management and analysis, comparative analysis was done with independent T-test.

Results: There was no significant difference between the two groups regarding follow-up period, age and sex. The mean peak torque of pronation, supination, and grip strength also showed no statistically significant difference.

Summary: Using pronator quadratus sparing technique in internal fixation with volar plate after radial fracture is considered to be able to preserve pronation power.
The diagnosis of non-displaced distal radius fractures using ultrasound

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Poster Session 1 - Touchscreen 2, March 11, 2020, 1:15 PM - 2:00 PM

Objectives
Non-displaced distal radius fractures are difficult to diagnose by radiography. Ultrasonography has been shown to have high sensitivity and specificity in the diagnosis of distal radius fractures. We retrospectively examined non-displaced radius fractures to find the optimal method of diagnosis using ultrasound.

Methods
In total, 319 distal radius fractures were examined for five years. Non-displaced distal radius fractures that were difficult to diagnose by radiography were examined by computed tomography. Fracture lines of non-displaced distal radius fractures were assessed by computed tomography.

Results
There were 43 non-displaced distal radius fractures (average age, 70 years; 30 women and 13 men). The fracture type according to AO classification were as follows: type A, 32 cases; type B, 2 cases; type C, 9 cases. There were no fracture lines on the volar aspect of the distal radius in 29 cases. All non-displaced distal radius fractures revealed a fracture line near the Lister’s tubercle.

Summary
The diagnosis of non-displaced distal radius fractures can be difficult with radiography alone. If radiography fails to confirm the diagnosis, computed tomography or magnetic resonance imaging is used to detect fractures. However, these imaging modalities are costly and time-consuming. Ultrasound is an affordable and useful imaging modality to diagnose fractures. When a non-displaced distal radius fracture is suspected, the patient can be easily diagnosed with ultrasound by confirming whether there is a fracture line near the Lister’s tubercle.
The utility of an index metacarpal cortical thickness measurement application as a screening tool for osteoporosis

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Following wrist fracture, it is desirable to identify patients with osteoporosis. A smartphone-based application (BoneGauge) that uses the index metacarpal cortical thickness ratio [2MCP] measured on x-ray has been proposed. This study aims to validate this application using DEXA scan in a cohort of patients with distal radius fractures. Thirty subjects aged 50 and over who sustained low-energy fractures of the radius were recruited and measurements were completed by two independent observers using the application. The interrater reliability as a screening tool was insufficient (κ = 0.61). Using the 2MCP threshold of 60% for detection of osteopenia or osteoporosis, we found insufficient correlation between the DEXA scan and the two sets of readings using the application (κ= 0.28 and 0.35 respectively). Based on these results, 2MCP of 60% is not sensitive enough to be used as a screening tool via a smart-phone application for assessment of osteoporosis risk.
We present the case of a 25-year-old male, right hand dominant, winemaker. While playing with his dog at home, this gentleman degloved his entire right antecubital fossa on a doorhandle. At first glance the patient appeared to have sustained a large, simple laceration. In theatre, exploration of his wound revealed 100% shredding lacerations of FPL and FDP muscle bellies, extending down to the distal third of his forearm. Thankfully his median nerve and brachial artery were preserved. His muscle bellies were repaired. 2 weeks later the distal skin flap became necrotic necessitating debridement and split skin grafting. At 3 months’ post injury, the patient is back at work, but progressing slowly due to a tight FPL. This case highlights, with photos, the inherent dangers of doorhandles, which may have previously been thought of as benign objects.
Computed Tomography Evaluation of Forearm and Hand Muscles in Patients with Distal Radius Fracture

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Objectives: Computed tomography (CT) can be used to assess bone status with measurement of Hounsfield unit (HU). The objective of this study was to evaluate whether HU of muscle might be associated with parameters of bone and muscle status.

Methods: We reviewed 71 women aged over 50 years of age who had distal radius fracture and underwent CT evaluation of affected wrist. We assessed HUs of forearm and thenar muscles and bone HUs at the capitate and the ulnar head. Other parameters included femur neck and lumbar bone mineral density (BMD), upper extremity lean mass, hand grip strength, and muscle fiber cross-sectional area. We performed correlation analyses to determine associations between variables.

Results: Thenar and forearm muscle HUs were significantly correlated with each other, but not with other parameters. HUs of the capitate and ulnar head were positively correlated with femur neck and lumbar BMDs and inversely correlated with age. Ulnar head HU was positively correlated with hand grip strength.

Summary: HUs of forearm and thenar muscles did not show significant correlations with bone or muscle parameters, although bone HUs correlated well with bone mineral densities. These results support the opportunistic use of CT for evaluating bone fragility, although its usefulness for muscle evaluation is still limited.
THE ROLE OF ULTRASOUND IN HAND SURGERY PRACTICE

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INTRODUCTION
The modern technological era is characterised by expanding accessibility and affordability of computing devices. Ultrasound (US) has emerged as a low-cost, radiation-free and effective imaging technique to detect joint abnormalities and guide percutaneous procedures. Being superficial, the anatomy of the hand and wrist is easily imaged using US.

OBJECTIVE:
This paper will present some of the uses of the US in the hand surgery daily practice.

METHODS:
We aim to demonstrate a series of cases which ultrasound was an important tool for diagnosis or treatment decision in the daily practice of a busy service in WA.

RESULTS:
The time required for hand surgeons to achieve a functional level of proficiency in the use of US is relatively short in duration. A thorough understanding of anatomy is fundamental in performing hand surgery. Furthermore, hand surgeons are often experienced in interpretation of advanced imaging modalities, including cross-sectional modalities such as computed tomography and magnetic resonance imaging, such that interpretation of US images may be rather intuitive.

SUMMARY:
Ultrasound has been shown to have potential value in hand surgery, improving the ability of surgeons to diagnose and treat pathologies affecting the hand and wrist. It also increases procedure accuracy when compared to palpation-guided procedures. This study highlights and exemplifies the application of ultrasonography in a hand surgery practice.
Comparison of the Thickness of Pulley and Flexor Tendon between in Neutral and in Flexed Positions of Trigger Finger

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Objectives
This study aims to compare the morphology of the A1 pulley and flexor tendons in idiopathic trigger finger of digits other than the thumb between in neutral position and in the position with the interphalangeal joints full flexed and with the metacarpophalangeal (MP) joint 0° extended (hook grip position).

Methods
A total of 48 affected digits and 48 contralateral normal digits from 48 patients who initially diagnosed with idiopathic trigger finger were studied sonographically. Sonographic analysis was focused on the A1 pulley and flexor tendons at the level of the MP joint in the transverse plane. We measured the anterior–posterior thickness of A1 pulley and the sum of the flexor digitorum superficialis and profundus tendons, and also measured the maximum radial-ulnar width of the flexor tendon in neutral and hook grip positions, respectively. Each measurement was compared between in neutral and in hook grip positions, and also between the affected and contralateral normal digits in each position.

Results
In all digits, the anterior-posterior thickness of flexor tendons significantly increased in hook grip position comparing with in neutral position, whereas radial-ulnar width significantly decreased. Both the A1 pulley and flexor tendons were thicker in the affected digits comparing with contralateral normal digits.

Summary
The thickness of flexor tendons was significantly increased anteroposteriorly in hook grip position comparing with in neutral position. A1 pulley also thickened. In trigger finger, mismatch between the volume of the tendon sheath and the tendons, especially in anterior-posterior direction, might be a cause of repetitive triggering.
The Aging Carpus

**Objective:**
The objective of the current study was to investigate carpal bone anatomy to find age related differences in carpal size in males and females.

**Method:**
Low risk ethics granted by Peninsula health to access CT wrist scans from Frankston Hospital radiology department. The volumes of all carpal bones were derived by creating 3D surface models from the CT scans using 3D slicer. Further data sets of carpal bone volumes were obtained through research groups at Brown and Auckland Universities. Data analysed using statistical package stata v13.

**Results:**
The total data set contained 180 patients (n=60 Peninsula health, n=60 Brown University and n=60 Auckland University). 49% of the population were female. 47% aged < 30, 36% aged 31-60, and 17% aged > 60. A positive Spearman correlation (between 0.37-0.611) was found between age and carpal bone (scaphoid, lunate, triquetrum, pisiform, hamate, capitate, triquetrum and trapezium) volume. All results were statistically significant P<0.05.

**Conclusion:**
Increase in trapezial volume maybe explained by presence of base of thumb osteoarthritis and presence of osteophytes, a disease which effects older people and women at a greater prevalence. However, increase in carpal volume was seen across all carpal bones and both genders irrespective of presence of osteoarthritis. In conclusion, it is possible that carpal bones may continue to grow as a normal part of aging, independent from the presence of osteoarthritis
Task time as a metric to assess learning and skill transfer using a microsurgical skill trainer

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Objectives

Surgical simulators are useful for skills acquisition. We used time to complete a task to assess learning of microsurgery and skill transfer from a simulated microsurgical repair task to an in vivo microvascular repair.

Methodology:

Novices attending a microsurgery training course were studied. On Days 1,3 and 4, the participants were tasked and timed to place 9 sutures in a prefabricated 4mm synthetic strip under the microscope. On Days 3,4,5, participants were timed anastomosing 4 rat femoral vessels (2 arteries and 2 veins) each day under the microscope.

Results

Strip suturing and vessel anastomosis were completed faster by the end of the course. Participants were 6.8 minutes (p=0.0) faster on Day 5 for the synthetic strip, and 6.2 minutes (p=0.00) faster on Day 5 for their vessel anastomosis. There was positive correlation between time taken for suturing on strips and vessel anastomosis throughout the course.

Discussion

Time to complete a task provides an objective and separate perspective of skills training. It assesses the process, and complements other assessment metrics like the product of the task. In this study, the rate of improvement over the training days of both the training and actual tasks, and their correlation points the strong similarity between the tasks. Time to task completion is a useful metric in assessment of microsurgical task training. It is simple and objective to measure, does not require any specialized equipment, and can be easily measured during self-practice to facilitate feedback to the trainee.
Developing a Patient Focused Acute Hand Service – an Opportunity for Change

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Objectives: Optimal care in a teaching hospital requires surgery in a timely manner and adequate supervision. Our acute hand surgery service is currently run separately by Plastics and Orthopaedics both sharing a general acute theatre with other specialties. We aim to analyse our acute hand surgery management to inform service improvement.

Methods: Acute hand operations performed under the Plastic Surgery service from 1st June 2018 to 31st May 2019 in a single tertiary centre were included. A detailed analysis of the injury, the operation, delay to theatre, level of supervision and complications was performed from the electronic medical record.

Results: Acute hand operations were predominantly for injuries in males (75%) of a working age. Of 273 operations, 170 patients (62%) had a delay to theatre with a median delay of 1 day (mean = 1.9 days). Only 30% of operations had Consultant supervision in theatre. 18.3% of operations were completed after hours (1700-0800), 6% of these were supervised. The overall complication rate was 11% with only 2.6% needing further surgical intervention.

Summary: The majority of patients with acute hand conditions had delayed operative treatment and the minority of these operations had Consultant supervision, particularly after hours. This analysis assists design of a patient focused surgical hand service by optimising available theatre capacity aligned with Consultant supervision. A change to daily planned acute operating sessions with regular Consultant oversight should improve the service. This should benefit both surgical training and most importantly, the surgical management of our patients’ acute hand injuries.
Distraction osteogenesis following collapse of metacarpal after MCP joint replacement in dual pathology of rheumatoid arthritis & Dupuytren’s disease

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Introduction

Dual pathology of rheumatoid arthritis and Dupuytren’s disease is uncommon, even more so in a situation requiring MCP joint replacement. Furthermore, rheumatoid patients present with reduced bone density, predisposing to a higher risk for complications following surgical intervention.

Discussion

Authors present the case of a female patient presenting with a dual diagnosis of rheumatoid arthritis and Dupuytren’s disease. MPJ joint replacement had successfully been completed for 2nd and 3rd MCP joints several years prior to her current presentation, with initially good postoperative function.

The patient presented to Bedford Hospital hand clinic complaining of reduced flexion at the MCP joint on the middle finger. X-rays demonstrated a shortened 3rd metacarpal. Initial patient request was for amputation, however, the surgical team encouraged an alternative option for distraction osteogenesis.

With patient consent, distraction was progressively carried out using a standard approach, over a 6-week period using ortho-fix device, achieving a total distraction of 8mm. Following removal and healing the patient achieved good flexion and a significant return to hand function.

Summary

Distraction osteogenesis proved to be an effective method for the management of metacarpal collapse following MCP joint replacement in a patient with dual pathology of rheumatoid arthritis & Dupuytren’s disease.


A Study on Tracking Microsurgical Skills of Residents with Repetitive Training in a Laboratory Setting

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Poster Session 1 - Touchscreen 3, March 11, 2020, 1:15 PM - 2:00 PM

Objective

Microsurgery is an intricate skill that requires a high level of hand-eye coordination. Few residents have the opportunity to perform microsurgery on patients on a regular basis and hence need to practice in a non-clinical setting. However, there is scarce literature on tracking a resident’s microsurgical skills over time. Our hypothesis is that the microsurgical skills of residents improve with regular practice over time.

Methods

4 residents at different stages of training in the Hand Surgery Residency Program at National University Hospital were recruited. The study spanned across 18 sessions and the task in each session was to place 9 sutures in a prefabricated 4mm elastic strip under the microscope using Digital Surgicals MicroTrainer. A computer program from Digital Surgicals was used to objectively assess the spacing between the sutures and the spacing between each suture and wound. The duration taken was also recorded. This scoring method has previously been validated.¹

Results

All residents demonstrate improvement in their total scores over 18 sessions, with increased consistency, reduced variability and took a shorter duration to carry out the same task. Residents who are more advanced in their training attained higher mean scores with reduced variability.

Discussion

This study is the first of its kind to objectively track improvements of microsurgical skills in residents at regular intervals over a prolonged period of time, with the use of a validated computer program. This study can be extrapolated to monitor clinical progress of physicians in a dry lab setting across all specialties.
Hand Therapy in Vietnam - a volunteer Hand Therapist perspective

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Objectives:
To identify the level of clinical knowledge and skills of therapists, working with hand injuries and trauma in Vietnam, and to provide education accordingly by volunteer occupational therapists. To build upon the knowledge base held by therapists and work towards sustainable training within the hospital setting.

Method:
All authors participated in volunteer based trips to Ho Chi Minh City from 2013 to present with the Australian Vietnam Volunteer Resource Group (AVVRG) and individual therapist with Interplast Australia/NZ. A number of trauma hospitals were visited; specifically, the physiotherapy/Hand Therapy departments and burns department were identified as requiring the most collaboration with the Australian therapists.

Results:
Volunteer therapists were able to determine level of knowledge in Hand Therapy as well as skill sets. Education was then targeted accordingly to the need of the specific rehabilitation departments. This was through one on one training as well as group lectures. Each year returning therapists build upon this knowledge base. This was not limited to only the rehabilitation department, the education was also provided to the medical teams, specifically burns and orthopaedics/microsurgery and trauma teams were also included.

Summary:
Australian volunteer occupational therapists working in hospitals in Vietnam have made an influence in the development of targeted learning and management of hand injuries, including complex upper limb trauma and burns. The ongoing goal is for sustainability and instill 'train the trainer' practice with regard to skill development, clinical reasoning and continue to provide education of best current practice and management for hand therapy.
Carpal Tunnel Syndrome (CTS) is the most common entrapment neuropathy, affecting close to 5% of the working population. It is also estimated that the average number of working days lost due to CTS equals and surpasses that of upper limb fractures. Our understanding of such an important condition is only quite recent with the term CTS only appearing in literature in the last 60 years. First described by Paget in 1854 as compression of the median nerve, the first surgical operation was only reported in 1933. Since that time the management of CTS has evolved from simple conservative splinting, corticosteroid injections, open release, endoscopic release and even balloon carpal tunnelplasty. This report looks at the history of carpal tunnel syndrome and the current management options.

OzTag injuries - a retrospective study of incidence, management and outcomes

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Poster Session 1 - Touchscreen 3, March 11, 2020, 1:15 PM - 2:00 PM

OBJECTIVES
The objective of this study was to characterise the nature of >70 OzTag injuries to the hand treated over a 2-year period within the Nepean Blue Mountains Local health district (NBMLHD). The aim of this study is to identify common mechanisms of injury, hand injury severity, management and patient outcomes in a cohort of patients who participate in Australia’s leading non-contact sporting activity.

METHODS
A retrospective review of presentations to the NBMLHD with OzTag related hand injuries between January 2017 and June of 2019 was performed correlating clinical outcomes, operative data and patient outcomes. To the authors knowledge this will be the largest study of OzTag associated hand injuries to date.

RESULTS
Preliminary analysis suggests OzTag is associated with twisting injury of the fingers when an opponent’s finger is caught in the shirt of another player’s uniform. This mechanism results in significantly comminuted middle phalanx fractures (>50% of injuries), which can be challenging to treat, and result in long term impairment. Such severe injuries are unexpected as OzTag is a non-contact sport, and hence, thought to be a safer sport. Similarly, OzTag participants tend to be younger than those who participate in other sports, and these injuries early in life can have a dramatic impact on long term function.

SUMMARY
We anticipate this study to demonstrate that the injuries sustained during OzTag can be as serious as other sporting events, and that additional precautions may be required to ensure that participants are protected during the game.
Integration of the Multi-Disciplinary Hand Meeting in an NHS Plastic Surgery Department

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Poster Session 1 - Touchscreen 3, March 11, 2020, 1:15 PM - 2:00 PM

Objectives

Amongst patients with complex disorders of the hand, multi-disciplinary teams (MDT) represent a new standard of care. Many plastic surgery patients present with highly complex injuries or conditions. In these cases, individuals can be challenging to manage without highly specialised team management. MDT meetings permit the constructive evaluation of complex patients presenting to our services, further facilitating the formulation of an individualised management protocol, and improving patient outcomes.

Methods

Authors successfully developed a specialist hand multidisciplinary team meeting. This process involved gaining support and recruitment of specialist colleagues. In addition, the identification of an appropriate location and timing of meeting permitted maximum representation from all specialities. A dedicated MDT co-ordinator was recruited to organise meetings, and distribute outcomes.

Results

The Multi-Disciplinary Team Meeting, introduced in 2019 in Bedford Hospital NHS Trust plastic surgery department includes; Plastic Surgery consultants, senior hand therapists, MSK specialist radiologist, and specialist nursing staff. Meetings are held monthly, to permit regular discussion of complex and challenging hand patients. Clinicians can book patients for discussion via an MDT co-ordinator. Decisions made during the MDT, published in a summary report for all clinicians, are subsequently integrated into patients care plan.

Conclusion

The introduction of the MDT hand meeting has improved decision making and patient outcomes for patients with complex needs. The process has created a forum for inter-speciality discussion and management plan formulation. Certainly, an improvement in the care of patients has been observed. Authors recommend the development of a MDT meeting for all specialist hand units.

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An intra-neural ganglion cyst is a non-neoplastic mucinous cyst within the epineurium of a nerve, commencing from an adjoining joint. These cysts expand within the epineurium, they displace and compress the adjacent nerve fascicles leading to pain, paresthesia, numbness and muscle atrophy over the innervated region of the affected nerve, which mimics the symptoms of peripheral nerve entrapment syndromes caused by other common aetiologies. Clinically patients often present with mild symptoms at first, subtle physical signs, and easily overlooked.

We present 16 cases of intra-neural ganglion cysts cases which causes relative nerve compression symptoms of common peroneal nerve(7), ulnar nerve(4), deep peroneal nerve(1), common fibular nerve(1), common tibial nerve(1) and radial nerve(1). All patients underwent MRI of the relevant extremity, and most of them nerve conduction study and nerve ultrasound. 10 patients treated with surgical excision, with 6 patients achieved full recovery of the motor and sensory function of the involved nerve, and 4 of them achieved mostly sensory recovery and partial motor recovery. Amongst those 4 patients who didn’t achieve full recovery, 3 of them were noted to have a recurrent intra-neural ganglion cyst.

Although their benign nature, intra-neural ganglion cysts are noted to cause peripheral neuropathy. Hence we recommend here that we shall raise the awareness of this pathology, recognize it early, investigate adequately and perform surgical excision before the permanent axonal damage occurs. The nerve paralysis is usually reversible if surgical decompression is performed early. Prolonged duration of follow-up is advised as recurrence is possible.
The relationship between SWT score and VAS score in carpal tunnel syndrome

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The Semmes-Weinstein monofilament test (SWT) is the only quantitative test that meets reliability and validity as a sensory test for peripheral nerve disorders of the hand. We examined the relationship between SWT score and Visual Analogue Scale (VAS) score before and after endoscopic carpal tunnel release in carpal tunnel syndrome (CTS). The subjects were 29 patients (8 males and 21 females). The SWT score was calculated by dividing the median nerve area of the hand into 11 sections, scoring 3 points of red, 2 points of purple, 1 point of blue, and 0 point of green, and the sum was calculated (0 to 33 points). SWT was examined before surgery and at 1, 4, and 12 weeks after surgery, and VAS was assessed separately at rest, at exercise, and at bedtime. Spearman’s correlation analysis was used to correlate SWT and VAS scores. The SWT score, resting VAS, and exercise VAS showed improvement over time after surgery, and significant improvement over the preoperative level at all observation time points (p <0.05). The bedtime VAS improved dramatically one week after surgery, but the improvement thereafter was slow. There was a significant improvement from the preoperative level at all observation times (p <0.05). A correlation was found between SWT and resting/exercise VAS at all observational times. The results of this study suggest that SWT score may reflect the result of VAS score, and simultaneous evaluation of SWT and VAS is important to evaluate the pathophysiology and treatment outcome of CTS.
A randomized clinical trial of pillar pain after surgery for carpal tunnel syndrome: flexor tenosynovectomy via two minimal incisions versus single-portal carpal tunnel release

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Objectives: This study aimed to compare the outcome of flexor tenosynovectomy via two minimal incisions (m-FT), which requires no transverse carpal ligament division, to that of single-portal endoscopic carpal tunnel release (s-ECTR), in the treatment of carpal tunnel syndrome (CTS).

Methods: A prospective, randomized, single center study was performed on 42 hands of 41 patients with idiopathic CTS. The m-FT was performed on 20 hands (20 patients) and s-ECTR on 22 hands (21 patients). The primary outcome was the presence or absence of pillar pain. We assessed the presence or absence of pillar pain at 1, 3, and 6 months postoperatively. A detailed physical examination, electrodiagnostic study, and self-reported function assessment were also performed at 1, 2, 3, and 6 months postoperatively. We assessed each parameter in groups by surgery (m-FT and s-ECTR) and age (≥65 years old and <65 years old).

Results: Seven patients in the s-ECTR group and none in the m-FT group had pillar pain. Grip strength and side pinch (thumb-index) significantly improved postoperatively only in patients <65 years in the m-FT group. Tip pinch (thumb-index) recovered postoperatively in those aged <65 years in the m-FT group; no improvement was noted in patients aged <65 years in the s-ECTR group. In patients aged ≥65 years, the s-ECTR group had better postoperative two-point discrimination and terminal latency outcomes compared with the m-FT group.

Summary: The m-FT did not result in pillar pain and could be a useful alternative to other surgical methods for patients <65 years old.
CLINICAL PROFILES OF FROSTBITE IN UNIVERSITY AIRLANGGA TEACHING HOSPITAL SURABAYA – A CASE REPORT

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Objectives: We report 3 adults who suffered frostbite of the hand and face following Mount Denali Expedition (6192 meters above sea level). The patients get rewarming and analgetics as a first treatment. All cases presented to our institution on day 11th following the injury. One was performed amputation on day 71st after injury.

Methods: All cases received standard antibiotic treatment as well as 3 days hospital observation. At first, no surgery were performed in any case. Regular wound evaluation and rehabilitation then managed in outpatient basis. On day 71st, amputation of 3rd and 4th finger was performed on one patient.

Results: All cases showed remarkable improvements of wound epithelialization, resolution of edema, range of motion, and general condition. Demarcation of any devitalized tissue showed clear margination during the period of observation. Such a condition was found in one of the case which showed prominent necrotic part on his 3rd and 4th finger. Hence, we perform debridement and amputation of 3rd and 4th finger.

Summary: Although frostbite is rare in tropical countries, it may happen in particular those who partake in extreme cold activity such as mountain climbing and winter sports. Prevention and the right management will ensure a good outcome. After an appropriate conservative management at the onset, surgeons must opt for surgical management provided the demarcation of the wound becomes clear. Long-term follow-up management is necessary to achieve a good functional outcome. Preservation and if necessary reconstruction of the finger should become a priority in the patient management.
Treatment of radial nerve palsy caused by ganglion of the elbow — from open surgery to arthroscopic surgery —

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Ganglion at the elbow caused radial nerve palsy is a relatively rare. Surgical excision should be performed to ensure optimal recovery from nerve palsy. Despite many advances in arthroscopy, arthroscopic excision usually has not been used for the treatment of ganglion at the elbow. We evaluated the results of open and arthroscopic excision of ganglion at elbow causing radial nerve palsy.

Eight patients were studied (6 women, 2 men) with a mean age of 46 years at surgery and the mean follow-up period was 28 months. Five cases underwent arthroscopy, the open excision was performed in 5 cases, and the arthroscopic excision in 3 cases. Postoperative evaluations included the anatomical relationship between the ganglion and nerve, compression site of radial nerve, arthroscopic findings and clinical course.

Ganglion arose from the anterior capsule of the proximal radioulnar joint and it was found against the posterior interosseous nerve just proximal to the arcade of Frohse. The posterior interosseous nerve was involved in four patients, radial sensory nerve in one patient, and both nerves in three patients. Ganglion have a high-intensity signal on MRI T2–weighted images in all cases and multiloclated type was in 4 cases.

On viewing arthroscopy, ganglion and its stalk could not be visualized in all cases except synovitis. Treatment by surgical excision resulted in improvement of symptoms in all patients.

Arthroscopic excision are its less invasive nature, and a better cosmesis, especially for young women.
Objective: MR Findings has helped with indications and also the apt timing of surgery which can help avoid motor weakness.

Method: Assessment based on MR Findings was undertaken for 60 patients. Based on MR findings and criteria, indications and timing of surgery was determined. MRI findings has helped to address those patients surgically who otherwise would have undergone a conservative management but because of certain MR findings were treated surgically. Results: Average Indian measures 10-15mm2 MNCSA. Almost 29% of patients had MNCSA of less than 17mm2 at pisiform bone level with symptoms from mild to moderate hence underwent conservative therapy. 25% of the conservatively treated patients showed poor treatment outcome in follow up period. MR findings in these patients showed increased MNCSA. Hence these patients underwent surgical intervention. 25% of conservatively treated patients lost follow up hence excluded from the study. The surgically treated patients showed satisfactory treatment outcome in their follow up. 76% of total study group had poor score with symptoms from moderate to severe at the time of presentation. MR findings showed MNCSA of 18mm2 and greater at the time of presentation. 96% of the surgically treated patients showed adequate and satisfactory treatment outcome. 4% of these patients showed treatment failure along with biopsy report of sheath revealing other inflammatory anomalies. Patients with an average median nerve cross section area of 22mm2 and above suffered with variable motor deficiencies.

Summary: MRI is an important tool to decide the management protocol for Carpal Tunnel Syndrome. MR findings ruled out patients who were suffering from Tenosynovitis, aberrant median artery hence leading to Carpal Tunnel syndrome.
The pitfall of the treatment for volarly displaced intra-articular distal radius fractures.

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Objectives: In the treatment of volarly displaced intra-articular distal radius fractures, fixation by volar locking plate (VLP) with buttress effect is very useful. The purpose of this study is to determine the outcomes of the treatment with VLP fixation and elucidate the pitfall in the treatment for this type of fractures.

Methods: Seventy two patients with volarly displaced intra-articular distal radius fractures were treated with VLP fixation. All patients were compared by X-ray and CT images to evaluate each fracture accurately. The postoperative functional outcomes, complications were examined (average age: 55.6 years; average follow up: 1.2 years).

Results: According to the CT image, 54 out of 72 cases were type C3 and type B3 (volar Barton fracture) was only 11 cases in the AO/OTA classification. This results showed that most fractures had the dorsal articular bone fragment with volar tilt in addition to the volar articular bone fragment with anterior displacement. Functional outcome using the Mayo evaluation was rated as excellent or good in 59 of 72 patients, poor in 10 patients, and fair in 3 patients. Intraarticular protrusion of distal screws was observed in four cases and one rare case of volar subluxation with a new rim fracture occurred postoperatively.

Summary: Outcome in VLP fixation was almost satisfactory. If the volar tilt of the dorsal articular bone fragment is not reduced, total volar tilt may remain increased. This procedural failure, pitfall may lead to increase the carpal translation, resulting in the postoperative displacement.
Diagnostic value of wrist ulnar deviation radiography on TFCC foveal tear

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When evaluating patients with triangular fibrocartilage complex (TFCC) foveal tears, it is important to assess accompanying distal radioulnar joint (DRUJ) instability. However, it is often difficult to diagnose in plain radiography. In our study, measurement of DRUJ gap distance has been done to determine the efficacy and reliability of wrist ulnar deviation radiographs in patients with TFCC foveal tears.

Our study included the patients diagnosed as TFCC foveal tear in outpatient clinic from 2015 to 2019. 46 patients, 19 males and 27 females were retrospectively reviewed. The mean age of the patients was 42 (range, 19 – 63) years old. The inclusion criteria were (1) ulnar-sided wrist pain, (2) foveal sign (+), and (3) ulnar grind test (+). These patients underwent radiography, including wrist posteroanterior (PA) views and wrist ulnar deviation PA (UD) views of both wrists. We measured DRUJ gap distance in PA and UD views. We analyzed radiographic data and compared them between the symptomatic and contralateral sides.

In both wrists, DRUJ gap distance was significantly increased in UD views than in PA views. (p<0.05) The increase of DRUJ gap distance between PA and UD views was significantly greater in symptomatic sides than in contralateral sides. (p<0.05)

The measurement of DRUJ gap distance in UD radiography can be a simple, reliable, and practical parameter and may be useful for evaluation of TFCC foveal tears.
Arthroscopic evaluation for Palmar 1-B TFCC injury with 2.7mm short 70°degree oblique arthroscope.

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Objectives: We evaluated Palmar 1-B injury with 2.7mm 70° oblique arthroscope. Though foveal tear of TFCC is checked by Hook test from radiocarpal joint is standard evaluation, We compared results of Hook test and actual image of foveal tear in DRUJ.

Methods: The evaluation with 1.9mm 30° and 2.3mm 70° oblique arthroscope was undergone for 11 cases of the distal radius fracture and 1 cases of carpal instability. In DRUJ, the cases that whole image of foveal region was in visible were classified to excellent, the cases partial image of it were good, and the cases no image of it were fair. The cases had difficulty in DRUJ viewing were classified to poor. The foveal region was classified to complete tear, partial tear, or intact. The diagenetic accuracy between Hook test and foveal tear was evaluated.

Results: With 30° oblique arthroscope, there were no excellent view. 5 cases were good, 6 cases were fair. With 70° oblique arthroscope, 6 cases were excellent, 5 cases were good, 6 cases of fair. The 70° oblique arthroscope achieved much better view of DRUJ in All cases. There were 3 cases of complete foveal tear, 6 cases of partial tear, 2 cases of intact. The sensitivity of Hook test for foveal tear including complete and partial tear was 44%, and the specificity was 100%.

Conclusions: The 2.3mm 70 degrees oblique arthroscope was serviceable for class 1-B injury. Hook test was high specificity for foveal tear. When hook test is positive, DRUJ arthroscope was recommended.
Distal radioulnar joint configurations in three-dimensional computed tomography in patients with idiopathic ulnar impaction syndrome

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We retrospectively reviewed 26 patients diagnosed with idiopathic ulnar impaction syndrome and measured the slopes of the sigmoid notch and ulnar head at their centre using their preoperative three-dimensional computed tomography. We found that the slope of the sigmoid notch and that of the ulnar head were not parallel to each other. There was a significant linear relation between the slope of the ulnar head and the changes in the closest joint space of the distal radioulnar joint at the centre of the sigmoid notch after ulnar shortening. We conclude that the slope of the ulnar head is more strongly correlated with changes in the closest joint space in the distal radioulnar joint than that of the sigmoid notch. Our findings suggest that slope of the ulnar head might be as important a predisposing factor as that of the sigmoid notch for the progression of distal radioulnar joint arthritis after ulnar-shortening osteotomy. We should consider the slopes of both the sigmoid notch and ulnar head before the osteotomy.
Factors associated with unions of scaphoid nonunion after surgery; observational study

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Objectives
Surgery of the scaphoid nonunion has been able to obtain bone union by developing of the fracture treatment materials. However, we still experienced the cases that cannot be union. In this study, we retrospectively examined cases treated interference screw with free bone graft for the scaphoid nonunion.

Methods
A total of 61 patients who underwent surgery in the past 10 years were reviewed. Excluding 4 cases because of follow-up less than 6-month after surgery, 57 cases are included in this study. The bone union is confirmed on plain radiograph. Patient demographics and surgical treatment, and radiological findings (sclerotic/cystic changes) were investigated. The cases achieved union after initial surgery are defined as “union (U)”. The cases underwent additional surgeries or without apparent union on plain radiograph are defined as “non-union group (NU)”.

Results
After the first surgery, 46 cases achieved union. Additional surgery was performed in 5 cases out of the remaining 11 cases, and all 5 cases achieved healing, with an overall healing rate of 89%. In the NU group, the time from injury was significantly longer (NU:68 / U:16 months), less DISI correction (NU:8.6/U:13.6 degree) and smoking history was more frequent (NU:60%/U:19%). Age, BMI, fracture site, radiological findings did not affect fusion statistically significantly.

Summary
The union rate was poor in long-term periods from initial injury, insufficient DISI correction and smoking history. In order to improve the healing rate, it is necessary to take care in consideration of the above points.
Epidemiologic features of distal radius fractures in severe trauma patients at the regional trauma center

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Objectives: Distal radial fractures are known to occur in relatively elderly female patients with high osteoporotic ratios, and it is known that fracture is most commonly the result of a fall onto an outstretched hand. However, distal radius fractures associated with high energy trauma, such as traffic accidents and high falls, may be more fractured and distorted. The authors report the cases of distal radius fracture in a simple trauma patient and severe trauma patient.

Methods: From December, 2013 to July, 2018, a total of 111 cases in 104 patients (70 mono-traumas, 42 poly-traumas) who had been diagnosed with distal radius fractures were included in this study. The groups were divided into three groups: mon traumatic low energy, mon traumatic high energy, and polytrauma. Each group was analyzed for differences in gender, ISS score, ipsilateral accompanying injury, radiologic parameter, and AO classification. One-way ANOVA test and Pearson's chi-square test were used for the analysis.

Results: The analysis revealed significant differences in patient gender(p-value < 0.001), age(p-value < 0.001), ISS score(p-value < 0.001), and accompanying ipsilateral injury(p-value < 0.001). Radiologic parameters were significant difference of preoperative vs postoperative fracture site gap(p-value < 0.001). There were no significant differences in other items.

Summary: Polytrauma with a distal radius fracture appears to occur at a lower age compared with mon traumatic, and there is no difference in severity of fracture or radiologic index before and after surgery. However, since the postoperative functional outcome is poor in patients with poly trauma, careful management will be necessary.
Comparative study of postoperative radiological change of ulnar variance and ulnocarpal distance in distal radius fractures with lunate subchondral cyst

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OBJECTIVES: We hypothesized that lunate subchondral cyst findings in patients with distal radius fractures may lead to decreased cortical bone density, resulting in lunate fossa collapse and increased ulnar variance. We set up a patient group with lunate subchondral cyst findings and a control group to evaluate the effect of radiological results after distal radius fracture surgery.

METHODS: 176 Patients who underwent open reduction and plate fixation using DSS procedure from May 2014 to June 2017 were selected. Among them 28 patients with lunate subchondral cyst on preoperative CT findings were selected, and The 28 patients were selected as control group set in consideration of gender, age, fracture classification, and follow-up period. A matched group test was performed and retrospectively analyzed.

RESULTS: The delta ulnar variance of the lunate cyst group was 0.23mm on average, which was less than that of the 0.25mm control group, and was not statistically significant (p-value=0.057). In the lunate cyst group, the delta ulnocarpal distance was 1.58mm on average, which was less than that of the control group 1.69mm and statistically insignificant (p-value=0.681).

SUMMARY: Lunate subchondral cyst findings at the time of fracture are likely to limit the load translation into the radius and may lead to a decrease in cortical bone density of radius. This may lead to reduction of fracture healing and maintenance of bone reduction, leading to increased possibility of lunate fossa collapse and ulnar variance. The authors statistically analyzed the hypothesis and found no significance.
Delayed Buttress plate fixation for the treatment of fracture-dislocation of the fifth CMCJ with fracture of the hamate

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Ulnar carpometacarpal joint fracture dislocations are an uncommon injury and are often misdiagnosed resulting in delayed presentation for fixation [1-4]. Patients with delayed presentation often have ongoing subluxation of the carpometacarpal joint, development of osteoarthritis and chronic pain[1, 3]. This case series reviews the surgical outcomes of treatment for delayed presentation (> 6 weeks) of ulnar carpometacarpal joint subluxation or dislocation with associated hamate fracture using open reduction and internal fixation with a dorsal buttress plate technique. To the authors’ knowledge, no study to date has examined post-operative outcomes for late buttress plate assisted reduction and hamate fracture fixation of these injuries.

The length of time before operative fixation for this case series was greater than six weeks. Surgeries were performed between May 2018 and June 2018 (N=3). A retrospective review of all of the three patients was completed including examination of grip strength, range of motion and ability to return to work. Of our three patients, all were able to return to heavy lifting jobs within two months of procedure and grip strength and range of motion improved to be comparable with the non-injured side. No clinical or radiographic signs of subluxation were noted.

This case series shows that delayed fixation of ulnar carpometacarpal joint fracture dislocations may be used successfully.
Is skyline view accurate for detecting protruded screw in volar plate fixation of distal radius fracture?: A Comparison with intraoperative mobile-mini CT

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Objectives: Our purpose is to compare and analyze intraoperative fluoroscopy (skyline view) and mobile-mini computed tomography (CT) for detecting protruded screw in volar locked plating of distal radius fracture.

Methods: We did a prospectively analysis on 20 patients (6 males and 14 females) who had both intraoperative fluoroscopy(skyline view) and mini CT taken, among the patients who had volar locking plate fixation for distal radial fracture at our institution from January 2017 to March. In all cases 4 to 5 locking screws were used at distal row to fix the plate, and skyline view and mobile-mini CT were undergone before pronator quadratus and skin suture. After axial view parallel to the screw was reconstructed on CT, distance between screw tip and dorsal cortex (STCD : screw tip cortex distance) was measured by saving the images on PACS. STCD measured by mobile-mini CT and skyline view were compared.

Results and Conclusions: In skyline view, STCD was 1.68mm, 2.08mm, 2.16mm, 2.84mm, 4.51mm from radial side, respectively. In mobile-mini CT, it was 1.79mm, 1.22mm, 1.20mm, 1.62mm, 5.79mm, respectively.

Regarding the 2nd and 3rd screws, STCD measured by skyline view was significantly longer compared to that by mobile-mini CT (p value<0.05). 2 cases showed protruded 3rd screw in CT, while they did not seem so in skyline view. These screws were replaced with shorter ones. In our study, screws looked less protruded at skyline view compared with mobile-mini CT. Additional caution is needed especially when inserting 2nd and 3rd screw.
spontaneous bilateral carpometacarpal joint dislocation of the thumbs

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A 72 year-old male was introduced to our institution, who was suffering from the pain at the bilateral carpometacarpal joint of the thumbs. He began to feel pain at the both thumbs 6 months before the presentation. Radiograph and CT revealed dislocation of the carpometacarpal joint of the both thumbs. Osteoarthritic change didn’t seem to be progressed on both sides. He had not had a trauma or connective tissue disease. 2 months later, we performed surgical procedure with using Eaton-Littler’s reconstructing method for both sides. Thumb spica casting and temporary K wire arthrodesis for 4 weeks were applied. At 2 months after cast and wire removal, he complained of aching at the left thumb. Plain radiograph and CT revealed slight subluxation at the carpometacarpal joint of the left thumb. The aching gradually deteriorated, so we conducted arthrodesis at the carpometacarpal joint of the left thumb by the locking plate and screws. The pain at the carpometacarpal joints was relieved. At 8 months after revision surgery, active ROM of the IP and MP joints of the right thumb were 15°/60°, 10°/38°. Active ROM of those of the left thumb were -15°/60°, 10°/38°. Grip strength before surgery was 10/7 Kg and at final follow-up, 21.7/20 Kg.

Articles about the carpometacarpal joint dislocation of the thumb are mostly caused by traumatic injury. Spontaneous or nontraumatic carpometacarpal joint dislocation of the thumb is extremely rare.
Teriparatide can enhance bony union of beta-tricalcium phosphate in cases of corrective osteotomy post distal radius malunion: A case series

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Introduction:
Teriparatide activates osteoblastic bone formation and effectively promotes bony union in distal radial fractures. Here, we report three cases of distal radius malunion simultaneously treated using corrective osteotomy and beta-TCP with daily teriparatide administration for osteoporosis.

Case reports:
Patients included 64-year-old, 57-year-old, and 68-year-old women who underwent osteotomy for distal radius malunion. The surgeries comprised the following steps: 1) an initial opening-wedge osteotomy, 2) an artificial bone graft (beta-TCP) implantation in the bone defect, and 3) radius fixation using a volar locking plate. The patients were administered teriparatide injections (40 μg/day) for osteoporosis. Bony unions were achieved within 3 months, 7 weeks, and 3 months of surgery in the three patients, respectively.

Discussion:
In his report, Aspenberg stated that teriparatide administration could enhance bony union following distal radius malunion. Particularly, autologous bone grafting is considered the gold standard for segmental bone defect management in patients with distal radius malunion treated using corrective osteotomy. However, in patients with osteoporosis, obtaining a high-quality graft, even from the iliac bone, is challenging. Notably, Jacobson, based on his study on an animal model, reported that an artificial bone graft supplemented with teriparatide provides a good bony union. Teriparatide reportedly promotes bony union; however, no study has demonstrated its role in artificial bone graft healing.

Conclusion:
Teriparatide supplementation to artificial bone grafts facilitates early bone union. The study results indicate that teriparatide could help enhance bony union. Further, this method may serve as an alternative for autogenous bone grafting.
Customized distal radius prosthesis: the alternative for post-traumatic unreconstructable intraarticular distal radius malunion: Case report

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Introduction
Severely comminuted intraarticular distal end radius malunion significantly deteriorate the quality of life of the patient. Up to date, there is no consensus on surgical treatment. We proposed the customized distal radius prosthesis as one of the choices for the treatment.

Case report
A 33-year-old policeman presented with left wrist deformity and lost motion for 5 months after he was diagnosed with distal radius fracture AO type-C3 and fixed with a volar locking plate incorporate with external fixation and k-wires augmentation for 2 months. He still needed wrist motion for working. Thus, we fabricated customized distal radius prosthesis based on his contralateral normal anatomy to replace the malunion site.

Results
The patient was satisfied and was able to return to work 2 months after the operation. After thirteen months, the range of motion improved from fixed 40° flexion deformity to 65° flexion, 79° extension, 55° supination, 85° pronation. DASH score from 80 to 14.2.

Conclusion
The unreconstructable intraarticular malunion of the distal radius is the challenging problem with no absolute consensus of treatment. Customized distal radius prosthesis may prove as an alternative treatment, still, long term result has to be followed.
Comparison of low-profile locking plate fixation versus antegrade intramedullary nailing for unstable metacarpal shaft fractures

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Background: We prospectively compared the effectiveness of mini-open anterograde intramedullary nailing (AIN) and open reduction and internal fixation (ORIF) using the low-profile locking plate for angulated metacarpal shaft fractures.

Methods: Group 1 (mini-open AIN) and the other consecutive patients in group 2 (locking plate) who met our inclusion/exclusion criteria were investigated between 2010 and 2016. We compared radiological findings; clinical conditions.

Results: Union was achieved in both groups without any major complications. The final angulation measurements were not significantly different (p = 0.402). The final VAS scores were not different (p = 0.868); however, the final DASH score was better in group 1 than in group 2 (p = 0.034). The plates were removed in 14 patients at 9.6 months postoperatively for various reasons. Mean ROM at the time of hardware removal in these 14 patients was significantly lower compared with the final ROM in groups 1 and 2 (non-removal patients). Final grip strengths recovered significantly more in group 1 than in group 2. Extension lag was found in four patients in group 2, and the mean amount was 15°; however, it was resolved by tenolysis during hardware removal.

Conclusions: Both mini-open AIN and low-profile plate fixation are excellent options for metacarpal shaft fractures without significant radiological or clinical problems; however, some clinical outcomes evaluated at least 2 years postoperatively, such as DASH scores and grip strength, were better in the AIN group than in the locking plate group.
First experiences with the Shark screw in hand surgery

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Objectives: Bone grafts are very common in surgical treatments. Especially osteoporotic bones in elderly patients often make problems with healing and need bone grafts. But all of them need an additional stabilization with plates or screws. These implants can become loose and often has to be removed. So they need a second operation. The Shark Screw is the first human biologic bone screw. She is able to connect bone fragments without any anorganic material (metal). Patients don’t need a removal of implants and get bone for stabilization.

The Shark Screw is made only from the corticalis of the bone for initially more stability.

Methods: 24 patients, treated with the Shark Screw, had several disorders like pseudarthrosis, arthrosis, failed bone fusions and fractures. Minimum 1 year after operation we examined the bone healing rate by X-ray and the clinical outcome.

Results: All patients improved after surgery. The healing rate was 99 %. Pain, measured by visual analogue Scale (VAS), had improved from 4 to 8 (median 6,3) preoperative to 0 to 3 (median 1,8) postoperative. The last clinical and radiological review was performed 1 to 3 years after surgery.

Summary: The Shark Screw is a new implant only consist of human bone. It allows a natural bone contacts and becomes own bone.
Forearm Plate Fixation: Should Plates Be Removed?

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Objectives: Refracture after forearm fracture fixation may vary with or without plate removal. We tested the null hypothesis that there is no difference in the rate of refracture in patients who have undergone open reduction and internal fixation of a diaphyseal forearm bone who have retained implants versus removed implants. We also studied factors associated with plate removal.

Methods: We retrospectively reviewed the records of 645 adult patients with a total of 925 primary fractures that underwent primary plate fixation of an ulnar or radial shaft fracture between 2002 and 2015. Patients with nonunion, pathological fracture or infection were excluded. Independent factors associated with refracture and plate removal were identified using multivariable analysis.

Results: Refractures occurred in 6.3% of the fractures that had forearm implant removal, compared to 2.1% of the fractures with retained plates. Refractures were independently associated with plate removal (OR: 3.7, 95% CI: 1.2-11.7, p=0.023) and appeared to be less frequent in the ulna (OR:2.4, 95% CI: 1.0-5.8, p=0.06). Ulnar plates were removed more often compared to radial plates (OR: 2.6, 95% CI: 1.4-4.7, p=0.002) as were plates used for type A fractures compared to type C fractures (OR: 3.2, 95% CI: 1.1-9.2, p=0.032).

Conclusion: The rate of refracture is higher after plate removal. Although uncommon, refractures of the radius tend to be more common than the ulna. If the implant is symptomatic on the ulnar side, it may be preferable to remove only the ulnar implant rather than remove both plates when possible.
Antimicrobial prophylaxis after traumatic hand laceration

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Objectives
Traumatic laceration hand wounds are one of the most common traumas. Despite extensive debridement and infection control measures infections remain one of the biggest problem during the healing process. We aimed to compare different means of antibacterial prophylaxis and treatment methods after acute traumatic simple hand lacerations trauma.

Methods
Prospective case control study included totally 240 patients (80.2% males, 19.8% females) with simple hand wounds (up to 3 structures damaged) in I-V flexor and I-VII extensor zones, with mean age 38.7 years. All patients underwent proper surgical debridement and irrigation. Exclusion criteria were amputations and severely damaged or contaminated hand trauma, patients with chronic disorders and bite wounds. Three different antimicrobial agents were used: 1st generation cefalo sporin preoperatively, local antibacterial ointment after surgery or oral 3rd generation penicillin antibiotic postoperatively. Patients were randomly assigned to 8 different subgroups according to received perioperative antibacterial prophylaxis and treatment which consisted of: no treatment, usage of one antimicrobial agent or combination of two or three antimicrobial agents.
Post-operative follow-up with documentation of possible wound infection was performed 2 weeks after the surgery.
Differences between groups were assessed by using Mann–Whitney U test.

Results
218 patients completed follow-up, and 5 developed infection (2.30%, 95% CI 2.15% to 2.45%). Infection rate was similar between subgroups (p>0.05).

Conclusions
Usage of antibiotics after simple hand laceration trauma should be discouraged if proper debridement and irrigation was performed as they do not prevent wound infection but can contribute to different side effects and antimicrobial resistance.
Complicated hand reconstruction and the free fibular flap; a case report of a novel triangle construction

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Since Taylors description in 1975 of the free fibular flap, its use in mandibular and long bone reconstruction has been well documented. It is well known as a robust, versatile and highly reliable flap not only for bony deficits but for functional use as well. Its constant vascularity, length and adequate donor-site morbidity make it an excellent choice for complex hand reconstruction in both the acute and chronic setting. In this report we present a case of a 55 year old male seeking functional use as a priority of his severely complicated chronic hand injury. Our novel approach is to use the free fibular as a triangle base construction to mimic metacarpal attachments and provide a more stable attachment for the proximal phalanxes.

Level of Amputation of Upper Limb in Electric Burn Injury: Bangladesh Experience

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Objective: High voltage electrical burn injury is one of the most devastating burn injury involving upper limbs. It causes disfigurement, loss of function and even loss of the whole upper limb. The aim of this study is to see the severity of electric burn injury involving upper limbs pausing amputations which causes permanent disability and disfigurement of the patient and lifelong sufferings.

Method: A prospective observational study was performed in Burn and Plastic Surgery Unit, DMCH from January, 2019 to August, 2019. Hundred and six (106) patients with high voltage electric burn involving upper limb underwent amputation were included in the study. They were studied for level of amputation according to severity of injury which was assessed clinically.

Results: Male predominance (85.5%) was observed in the study. Right upper limb involved in 54.7% cases, 45.2% left and 11.32% were bilateral. About 56.6% patients were children and adolescents (age >20yrs and 38.67% were adult. Below elbow amputations done in 50 cases (47.1%), above elbow amputations in 30 patients (28.3%), Ray amputation in 12 patients (11.3%) and trans-metacarpal amputation done in 11 patients (10.3%). In 3 patients (2.8%) shoulder joint disarticulation done.

Summary: Loss of limb is the most serious complication of burn injury. Most electric burn are generally due to labor accidents and unsafe household connections where children are mostly affected. These injuries are preventable with proper education and strict monitoring. This study will help to support the prevention program, management protocol and rehabilitation program for burn amputees and their welfare.
Usefulness of a spindle shape flap for aesthetic fingertip reconstruction

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Poster Session 2 - Touchscreen 2, March 12, 2020, 1:15 PM - 2:00 PM

Objective  
In fingertip reconstruction, both functional and aesthetic factors are important. Aesthetic factor include good color and texture match of the flap, inconspicuous scar, and good fingertip shape. We present our experience of aesthetic fingertip reconstruction using a spindle shape flap.

Method  
We use a spindle shape free arterialized thenar venous flap. The flap width is 100-120\% larger than the defect, the length is 200-300\% longer than the width. The bone defect is reconstructed with a iliac bone graft. With bilateral mid lateral incision and a curved dorsal finger incision, recipient vessels are prepared. The both edge of the spindle flap is set to the mid lateral incision to cover the whole defect.

Results  
6 cases (3 claw nail deformity, 3 fingertip amputation) were reconstructed with this method. In spite of minor nail deformity, aesthetic result was achieved in all cases.

Summary  
Spindle flap design and larger flap size are the key for aesthetic fingertip reconstruction. Littler stated that the flap size should be from 120\% to 150\% larger than the defect to prevent contracture. In addition, a spindle design flap allows to put two large triangular flaps at the both lateral side of the fingertip, which add more additional tissue and has some kind of Z-plasty effect. These are strongly contribute to aesthetic fingertip reconstruction with good shape and inconspicuous scar.
A study on improvement of functional outcome after post-burn hand deformity correction

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Objective Sessions 2 - Touchscreen 2, March 12, 2020, 1:15 PM - 2:00 PM

OBJECTIVES:
Contractures due to burns severely limit hand function. Release of contractures and followed by therapy enhance functional outcomes. Objective of this study is to find out the extent of functional outcome achievements of commonly done surgical correction procedures and Therapy Intervention.

MATERIALS AND METHODS:
40 patients of which 22 with Dorsal contractures and 18 with Volar contractures formed part of the study. In which 21 patients had flap coverage, 19 patients had deformity correction by k -wire, MCP joint capsulotomy and SSG. Post-operative therapy was started for joint contractures release patients on 2nd day, and for complex deformities correction with flaps after 3 weeks. Pre – operative Range of motion(ROM), Grip strength, DASH and Michigan hand outcome questionnaire were assessed and Post -op assessment was done at 6 months.

RESULTS:
Patients were improved in Total Active Motion from Mean value of 143.5 to 192.6, DASH scores were reduced to 34 from 54. Bilateral hand involved patient who had Pre- op DASH of 95 was reduced to 31, Lowest DASH score of 19 was reduced to 10. Michigan hand outcome score has been increased to 63% from 45%.

CONCLUSION:
There is a considerable improvement in all outcomes scores. All patient are happy with the outcomes and at least they can do 5 activities of daily living which they were not able to do earlier. There is significant improvement in subjective and objective measures after Surgery and therapy management of Post burn deformity patients.
Cross finger flap in orthopedic practice

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Poster Session 2 - Touchscreen 2, March 12, 2020, 1:15 PM - 2:00 PM

Objectives:
The management of simple hand injuries is easy and at the same time when the damage to soft tissues is more the primary healing is difficult. A basic training in hand and plastic surgery is always useful.

Methods:
Conventional cross-finger flap is useful to cover the soft-tissue defects in the palmar aspect of fingers exposing bone or tendon. Reversed cross-finger flap is used for soft-tissue defects in dorsal aspect.

A total number of 36 patients were treated in the past 11 years. Only 26 of these patients had a follow up of 1 year or more.

There were 21 males and 5 females, right in 14 and left 12. The cause of the injuries were

1. Industry- 12
2. Domestic- 4
3. Agriculture- 5
4. RTA- 2
5. Other- 3

There were 20 cross finger flaps and 6 reverse flaps.

Results:
The results were analysed by DASH Score. DASH is a 30 – item self-report questionnaire. The DASH score ranged from 0 to 23.

Summary:
1. The technique of cross finger flap is easy to master by any orthopaedic surgeon with a basic interest in hand surgery.
2. The versatility of the flap makes it an obvious choice for raw areas involving both palmar and dorsal injuries.
3. The reversed flap is an added tool in managing the soft tissue loss of the fingers.
4. Cross finger flap is simple tool to restore structure and function of a soft tissue digital defect.
Mycetoma infection of the hand and reconstruction of first and second metacarpal bone defect with free vascularized first and second metacarpal flap: A case report

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Objectives: To report natural history of mycetoma infection of the hand and a reconstructive procedure for adjacent segmental bone defect

Methods: A fifty-one-year old male presented with soft tissue mass at dorso-radial aspect of his left wrist for 10 years with 5 times of excisions in 9 years before chronic swelling and sinus drainage during the last year. Mycetoma infection was diagnosed from characteristic findings from MRI, intra-operative findings and tissue biopsy. After repeated radical excisions and antifungal chemotherapy infection was subsided but segmental first and second metacarpal defect involving CMC joints left. Bone defect was maintained with temporary pins and antibiotic beads waiting for suitable wound condition. Reconstruction included free vascularized lateral half of first metatarsal and whole second metatarsal from contralateral foot nourished by first dorsal metatarsal artery and fixation with multiple pins.

Results: Transferred vascularized metatarsal bones healed timely without bone resorption or fracture and no evidence of recurrent infection by clinical and MRI examinations at 4 years follow-up.

Summary: Mycetoma infection of the hand is quite rare. Radical excision is essential. Free osteo-cutaneous first and second metatarsal flap is a viable and promising option for reconstruction of adjacent metacarpal bones defect.
Versatility of free vascularized bone grafts in hand reconstruction

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Poster Session 2 - Touchscreen 2, March 12, 2020, 1:15 PM - 2:00 PM

Objective
Free vascularized bone grafts are a therapeutic option for complex bone reconstruction in the hand, particular, if persistent reduced perfusion or lack of bone healing is evident.

Material & Methods
The indications for the use of free vascularized bone grafts in hand reconstructions with selected clinical cases are presented. Bone healing was verified with radiographic imaging. Complications and the donor site morbidity were documented.

Results
Bone necrosis, non-union or tumour are resected as the first step of surgery. Afterwards, small bone defects, such as carpalia, are reconstructed with medial femur condyle grafts [n=10]. Bone defects, which are long, but not wide, such as metacarpalia, are reconstructed with free vascularized scapula bone grafts [n=2]. Free vascularized iliac crest grafts are used for long and wide bone defects of the wrist [n=2]. Free microvascular fibula grafts are performed for reconstructions after wide resection of the distal radius [n=2]. Osteocutaneous lateral arm flap was performed for a composite defect of the thumb [n=1]. Bone healing was observed in over 90% of cases. Sensory disturbance of the scar was stated as the main donor side morbidity in 65% of cases. Surgical revision was necessary in 20% of cases. Patients had reduced hand function of 70% as compared with the contralateral unaffected hand, whereas individual satisfaction was high.

Summary
Free vascularized bone grafts are an important tool in the armamentarium for the treatment of critical-sized bone defects in hand reconstruction, which allow the preservation of hand function, although these are sophisticated surgical interventions.
Using a splint in the therapy for congenital proximal radio-ulnar synostosis: A case study

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Objectives
Congenital Proximal Radio-ulnar Synostosis (PRUS) is a rare disorder caused by bony fusion of the radius and ulna. Surgical treatments are selected for the cases with severely limited of rotation of forearms. Although, unless the therapy is preceded appropriately, functional disorders due to re-contracted forearms will occur again. We report a case of using the splint for increasing the range of rotation after surgery.

Methods
To a 4-year-old child with restricted supination, the mobilization of a proximal radio-ulnar joint, the osteotomy of the radius and ulna and the vascularized fascio-fat graft were performed on his left arm. The passive range of supination improved from 0 to 45 degrees. The therapy with splinting to increase range of supination started from the 5th week post-surgery. The splint was consisted from the wrist immobilization splint and the elbow immobilization splint. Straps connected two splints, and the angle could be changed according to improvement of supination. The connected splint was worn to keep supination at night. And the wrist splint with an extra “toy” part added was worn to increase active supination during daytime.

Results
The passive range of supination improved from 0 to 60 degrees, and the active range of supination improved 0 to 50 degrees at the 20th week post-surgery.

Summary
We showed the effectiveness of the splinting post-surgery for the PRUS. Our splint could be useful to promote both plastic and elastic deformations of forearms by using properly according to its purposes.
Injury patterns and manipulative interventions of pulled elbow in young children

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Objective
It is said that pulled elbow results from a sudden pull on the arm, usually by an adult or taller person. However, pulled elbow can also be caused by various injury mechanisms. The aim of this case series was to assess the data of children with a diagnosis of pulled elbow.

Methods
We present a retrospective study of 124 pulled elbow cases (mean age 2.5 years) examined in our hospital. All patients from January 2016 to June 2019 were reviewed according to mechanism of injury and treatment outcomes.

Results
The cause of injury was forcible traction to the forearm in 68 cases (54.8%) and the other mechanisms in 56 cases. There were 103 cases that required manual reduction. Thirteen cases were spontaneously reduced during radiography and eight limbs were already improved at our medical examination. A 6-year-old fell injured patient was revealed fracture at the second visit.

Summary
Typical traction injury mechanism was only half of the present cases. There were falls and bruises injury in five cases, of which one was diagnosed with fracture. If the patient complained of falling, it is necessary to keep in mind the fracture. 10% of cases were reduced during radiography. When a lateral view of X-ray was taken, the elbow was fixed in flexion and the forearm in pronation. The position was likely to reduce pulled elbow naturally.

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OBJECTIVES: Dislocation fracture of the distal phalanx epiphysis is very rare. The diagnosis and formulating a treatment strategy are difficult to determine due to incomplete epiphyseal formation. The objective of this report is to announce a new pattern of distal phalanx epiphyseal fracture in a child that requires the surgical treatment.

METHODS: We present a case of 9-years-old boy with an unusual case of dorsal dislocation fracture of the distal phalanx epiphysis. He got his right 5th distal phalanx caught between the floor and the chair’s back. Clinically the injury looked like a mallet finger, but X-rays did not show that of the classic mallet fracture. The fracture line was through from growth plate to 2mm proximal and the fragment was displaced dorsally. Closed reduction was unsuccessful. Therefore, an open reduction was performed using a dorsal approach. The fracture occurred in the epiphysis. The fragment with the terminal extensor tendon was rotated dorsally by 90°. There was no damage to the growth plate and the Salter-Harris classification could not be applicable to this fracture pattern. The unstable fracture required Kirschner wire fixation.

RESULTS: Fracture was unioned. Distal interphalangeal (DIP) joint had a full range of motion and had no complication at the final follow-up.

SUMMARY: This case report demonstrated the new fracture type that requires surgical treatment. Though this fracture type is rare, we should consider it when checking the X-rays.
Late bony union with conservative treatment after apparent non-union in paediatric scaphoid fractures

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Objectives

Pediatric scaphoid fractures are increasing in frequency, and like adult fractures, can be complicated by non-union and avascular necrosis. The natural history of pediatric scaphoid non-union is unclear, so optimal treatment is uncertain. We present two cases of pediatric scaphoid fractures which presented late with features of delayed/ non-union. Both were treated conservatively in a cast/splint and both fractures subsequently went on to unite with resolution of symptoms.

Methods

A retrospective chart review of the two patients from the author's clinic was done.

Results

Both patients were teens who presented with radial sided wrist pain some time after the index injury. Clinical and radiographic examination showed findings consistent with scaphoid waist/proximal pole fractures with evidence of chronicity. Both patients were advised for surgical fixation and bone grafting of the fractures but declined. Conservative treatment in cast/splint was continued. In both patients, symptoms gradually resolved and the fracture united. Time to union after the index event was more than six months in one patient and about 3 years in the second. Clinical findings improved before radiological healing in both patients.

Summary

The healing potential of children is well known. These two cases illustrate the possibility of bony union after many months of conservative treatment. This outcome would not be expected in adult scaphoid fractures. There may be a role for more expectant treatment of such injuries in teens and children with scaphoid fracture, particularly if symptoms continue to improve.
ACCURACY OF FIRST CARPOMETACARPAL JOINT INJECTIONS: A COMPARATIVE CADAVERIC STUDY

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Objectives:
Arthritis and pain of the first carpometacarpal joint (CMCJ1) is common. Intra-articular injections for treatment of CMCJ1 pain can be performed using palpation-guided, ultrasound-guided or fluoroscopic-guided methods. We aim to compare these three methods with regards to accuracy of injection in this cadaveric study.

Methods:
15 freshly thawed hand and wrist cadavers were obtained and five were randomly allocated for each of the three different injection methods (palpation-guided, ultrasound-guided and fluoroscopy-guided). Experienced clinicians then performed injections for the cadavers using the one of the three techniques. The cadavers were then dissected and areas of joint or tissue staining were recorded. Time taken for injection was also recorded.

Results:
Except for one specimen injected under fluoroscopy guidance, all cadavers had intra-articular distribution of the injected solution. All three methods also produced tissue staining from the injected solution. The palpation-guided method was the fastest to perform whilst fluoroscopy-guided was the slowest.

Summary:
In sum, accuracy of CMCJ1 injection was similar for each of the three methods used when employed by an experienced clinician. Palpation-guided injection required less time for injection.
Post-burn occupational therapy management on a pediatric hand - A case report.

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Burn injuries will create physical and psychological burden to both the burn victim and family members, particularly for younger children who are at high risk of burn injuries. The management of pediatric burn hand is more complex and challenging when compared to adult burn injury due to their delicate skin and tiny fingers.

Parents/caregivers’ understanding of the scar pathology and the importance of continuation of therapy are vital to the success of management. Furthermore, their psychological well-being also affects the whole treatment of child survivors.

The purpose of this case report is to demonstrate using conservative pressure therapy with a novel smart scar-care pad (SSCP) together with tapping and splinting regime, which could facilitate the home care and continuation of therapy program at home. Parents/caregivers were educated intensively on the handling and application methods during the course of intervention. Two case studies suffering second degree burn injuries on the palm, fingers, and web spaces by the steam at home were treated with the treatment regime. Results demonstrated better results on softening of the scar, reduction of swelling, scar thickness, and increase in the functional finger movements after the intervention.
Objectives
To elucidate causes for postoperative varus deformity, which is a major complication in pediatric humeral supracondylar fractures.

Material and method
22 cases of surgically treated cases with a follow up of over a year were reviewed. Cases presenting more than 5 degrees of varus difference against the contralateral side was defined as varus group (10 cases) and cases with less than 5 degrees of varus difference were defined as control group (12 cases). Baumann angle (BA), Medial Epicondylar Epiphyseal angle (MEE), Tilting angle (TA), Anterior humeral line distance (AHLD), were evaluated on a plain radiograph immediately after surgery, at t pin removal and 3,6,12 months postoperatively. Age, sex, Gartland classification, rotation, comminution of the medial cortex together with the radiographic parameters were analyzed.

Results
No significant differences were seen in age, sex, fracture type, rotation, medial cortex comminution and method for fracture fixation between the 2 groups.
In the radiographic evaluation, varus group showed difference of 7.4 degrees in BA, 4.9 degrees in MEE, 10.7 degrees in TA, 1.9mm in AHLD in comparison with the contralateral side. A month later, these differences further progressed to 3.1 degrees in BA, 7.7 degrees in MEE, 10.9 degrees in TA, and 2.9mm in AHLD, whether as control group showed no differences. After a year, group V showed slight improvement.

Summary
The main cause of varus deformity were inadequate reduction at the time of surgery. However, the deformity can slightly with time, so long term follow-up is required in these cases.
Bilateral Isolated Absence of Flexor Pollicis Longus Tendon: Case Report of Very Rare Case Management

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Introduction. In human the flexor pollicis longus is an important muscle for function of the hand. Thumb aplasia and hypoplasia represent a large spectrum of deficiencies. One of the variant of Type I Thumb Hypoplasia is the absence or hypoplastic of flexor pollicis longus (FPL) tendon without deficiency of other thenar muscle. Although extremely rare, we found several literatures reporting the cases. In treating paediatric thumb disease especially for this condition, we have to carefully diagnose the problem to set our goal of treatment.

Methods.
We presented a case of 8 years old male with bilateral inability to flex both of his thumb at the interphalangeal joint. His parents realized this condition after he was involved in school activity. On physical examination, we concluded that the patient has absence of FPL and proceeded for reconstruction with tendon transfer from 4th flexor digitorum superficialis and dorsal capsule release.

Result. We successfully performed the operation and postoperatively we observed the active movement of interphalangeal joint is now increased. Active flexion is 60 degrees.

Conclusion. The absence of interphalangeal crease is one of the clear sign of flexor pollicis longus absence or hypoplasia. The use of tendon transfer for treating flexor pollicis longus absence and dorsal interphalangeal joint capsule release without any other thenar anomalies is proven to be adequate and feasible.
Analysis of the characteristics for grip motion in patients with carpal tunnel syndrome

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Objectives: Conventional grip dynamometers evaluate only the maximum power of total grip strength and cannot measure the time course of grip motion. We aimed to clarify the characteristics of grip motion of carpal tunnel syndrome (CTS) patients using our newly developed grip system.

Methods: We developed new grip system that can measure each finger’s strength at one time and record the time course of grip motion. This system consists of four pressure sensors on each grip part of the Smedley grip dynamometer. We analysed the time course of grip motion and relationship between finger grip strength and subjective symptoms (DASH and CTSI-JSSH) in 104 volunteer hands and 51 CTS hands.

Results: In the CTS group, the grip time of the index, middle, and ring fingers was long and grip strength of the middle and ring fingers was lost early after it reached the maximum. Patients with severe subjective symptoms tended to not use the index and middle fingers during grip motion.

Summary: We analysed the characteristics of grip motion of CTS patients using a new grip system that can measure each finger’s grip strength at one time and record the time course of grip motion. Our system could show the characteristics of CTS patients easily and objectively. This system could become a useful tool for objective diagnosis and may facilitate the detection of a disease before the appearance of symptoms and the evaluation of the recovery of patient’s hand function more appropriately.
Technique of rerouted extensor pollicis brevis transfer opponensplasty using Guyon’s canal as a pulley

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**Objectives**
We performed opponensplasty using rerouted extensor pollicis brevis (EPB) with Guyon’s canal as a pulley for severe carpal tunnel syndrome. We describe the technique of this method.

**Methods**
After releasing the carpal tunnel, EPB is transected at the musculotendinous junction and withdraw through the metacarpophalangeal incision. Then EPB is pulled subcutaneously toward the Guyon’s canal and passed the canal from distal to proximal. Next EPB and cut palmaris longus (PL) is sutured interlacingly under adequate tension at the proximal of the wrist. Early exercise therapy started at the day after surgery.

**Results**
Kimori reported that the transfer of EPB to PL through a pulley made from flexor carpi ulnaris and PL for opponensplasty showed good results in Japanese. We modified the method using Guyon’s canal as a pulley.

Advantages of our method are listed as follow; First, interlacing tendon suture at the proximal of the wrist provides rigid junction enough for early exercise therapy. Second, it was reported that the angle of pull should be from the location of the pisiform as this approximates the normal contract direction of the abductor pollicis brevis, thus using Guyon’s canal is suitable. Third, it was reported that gliding resistance for Guyon’s canal is lower, thus this method is also suitable for early exercise therapy. Fourth, by using an original structure, procedure become easier and initial pulley strength is expected.

**Summary**
This is an effective method with initial strength of tendon suture and pulley for early exercise therapy and anatomical reconstruction with easy procedure.
Differences in the effects of Triamcinolone and Dexamethasone on Fibroblasts from Idiopathic Carpal Tunnel Syndrome Patients

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(OBJECTIVES) Detailed mechanisms underlying the effects of corticosteroids on SSCT fibroblasts are unknown. This study aimed to explore the effects of triamcinolone and dexamethasone on the expression of fibrosis-related genes in SSCT fibroblasts derived from patients with idiopathic CTS.

(METHODS) This study included 10 postmenopausal women (age: 59–89 years, average: 76 years) who underwent carpal tunnel release surgery. Fibroblasts derived from SSCT were treated with different concentrations of triamcinolone or dexamethasone, and the expression levels of transforming growth factor β (TGF-β)-responsive genes were evaluated. We also compared the expression of each gene between triamcinolone- (250 μg/mL) and dexamethasone- (1×10-4 M) treated cells to evaluate the differences in their effects at the same glucocorticoid titer.

(RESULTS) The expression of Col1A1, Col1A2, and Col3A1 genes was downregulated in cells receiving triamcinolone (100, 250, 500, and 1000 μg/mL) and dexamethasone (1×10-8, 1×10-6, and 1×10-4 M) treatment compared with untreated control cells (P<0.01). Comparison of triamcinolone and dexamethasone at the same glucocorticoid titer showed that Col1A1 gene expression was downregulated after dexamethasone treatment (P<0.01). TGF-β gene expression was upregulated in cells treated with dexamethasone compared to cells treated with triamcinolone (P<0.05).

(SUMMARY) This study reveals the effects of triamcinolone and dexamethasone on SSCT fibroblasts derived from patients with idiopathic CTS. Based on the results of this study, it can be suggested that both triamcinolone and dexamethasone may act by directly inhibiting collagen expression without mediating TGF-β signaling in SSCT fibroblasts derived from patients with idiopathic CTS.
Brachial plexus injury after median sternotomy.

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OBJECTIVES
Brachial plexus injury following median sternotomy is a rare complication. In several published series prevalence varied between 2% and 38%. The purpose of this study is to investigate the prognosis of brachial plexus injury (BPI) after a median sternotomy for open heart surgery.

METHODS
We experienced four cases of BPI after a median sternotomy. We investigated surgical procedures, operation time, affected side, onset of symptoms, injury to roots, muscle strength by manual muscle testing (MMT), sensory disturbance, and recovery time and degree.

RESULTS
There were three males and one female, with a mean age of 68 years. The right upper extremity was involved in one patient, the left upper extremity in two patients, and both extremities in one patient. Symptoms appeared between one and 14 days after surgery. The mean operation time was 333.5 minutes. All cases suffered injury to the lower-trunk (C8-T1). The mean follow-up period was 8.25 months. All cases achieved almost full recovery of muscle strength with conservative therapy or no treatment between 5 and 12 months after the onset of symptoms. Slight sensory disturbance of little finger remained in two cases (50%) at the final follow-up periods.

SUMMARY
It is important to know that BPI may occur after thoracotomy with median sternotomy approach. All cases achieved almost full recovery of muscle strength after 8.25 months on average after the onset of symptoms. Slight sensory disturbance of little finger remained in two cases (50%) at the final follow-up periods.
Atypical presentation of intratendinous tophaceous gout causing carpal tunnel syndrome – A case series

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INTRODUCTION
Carpal tunnel syndrome (CTS) caused by gout is rare. We present 5 cases of CTS caused by isolated intratendinous gouty deposition and our experience in treating them.

METHODS
We conducted a retrospective review of CTS cases treated in our center from January 2013 to June 2019. A total of 452 carpal tunnel releases (CTR) performed. Five patients (6 wrists) had CTS related to gout, which was confirmed, by intraoperative findings and histopathological examination.

RESULTS
All patients were male with hyperuricaemia but not on treatment. All except one had other gouty tophi. All presented with numbness over radial 3 fingers with vague mass over the wrist. Three also had concomitant flexion deformity of the affected digits. One patient had symptoms on both hands. All patients underwent open CTR. Two patients (3 wrists) had surgical debulking and tubularisation of the diseased flexor tendons, one patient with involvement of the flexor pollicis longus underwent tendon excision and grafting, and two patients with diseased flexor digitorum superficialis tendons underwent tendon excision without grafting. There was no direct deposition of tophi on the median nerve in all cases. Numbness improved in all patients and no recurrence was noted at one-year follow-up except for one patient who is currently only 2 months post-operation.

SUMMARY
Gout should be considered as a cause of CTS in patients with history of gout. CTR and individualized surgical treatment on the diseased tendon based on tendon integrity give good outcome in addition to medical treatment for gout.
Effects of Preemptive Analgesia on Tourniquet and Postoperative Pain Relief Following Open Carpal Tunnel Surgery: A Randomized Double Blind Control Trial

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Objective: Efficacy of multimodal Preemptive Analgesia (PA) in Open Carpal Tunnel Release (OCTR) performed under local anesthesia and tourniquet is still controversial. This study will evaluate the effect PA on postoperative pain score at tourniquet site and surgical site.

Methods: 40 patients were randomized into two groups: experimental group received 300 mg of gabapentin, 200 mg of celecoxib and 500 mg of acetaminophen and control group received placebo. All patients were in operation by a single surgeon under local anesthesia with 1% xylocaine injection at surgical site and used a tourniquet at arm for hemostasis. We evaluated tourniquet site pain scores postoperatively, surgical site pain at 6, 12, 24 hours postoperatively and acetaminophen consumption in the first 24 hours postoperatively.

Result: Patients in the experimental group had a lower VAS score of tourniquet site postoperatively compared to the placebo group (mean [standard deviation] 2.3 [3.26] versus 4 [3.28]; p-value 0.224, respectively). The VAS scores surgical site pain at 6, 12, 24 hours postoperatively in experimental group (4.5[3.66], 3.75[3.33], 2.08[2.23]) was less compared to the placebo group (4.67[3.03], 6.92[2.64], 4[2.52]; p-value 0.086, 0.006, 0.096, respectively). No significant differences in total acetaminophen consumed after surgery in first 24 hours were found between experimental group and placebo group (3.5[2.9] versus 6.6[5.07]; p-value 0.081, respectively).

Conclusion: PA tends to decrease postoperative pain at tourniquet site and surgical site, as well as rescue analgesic requirements in patient who received OCTR. However, the decrease was not statistically significant compared to the placebo group.
Carpal Tunnel Syndrome in pregnancy: Is there really oedema in the carpal tunnel?

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Introduction: Compression of the median nerve in pregnancy is thought to be due to fluid retention within the carpal tunnel space. We aim to discover the cause of carpal tunnel syndrome (CTS) in pregnancy using high resonance ultrasonography.

Methods: This is a cross-sectional study where obstetric patients were screened for CTS and subjected to a non-invasive ultrasonic imaging.

Results: A total of 63 patients were seen with 25 diagnosed to have CTS (39.7%) and 38 patients had none (60.3%) based on a screening tool. Age ranged from 20-42 years old with the highest range in the 28-30 year old group (34.9%). In patients with CTS, the cross sectional area of the median nerve inside the tunnel was a mean of 0.908 cm² ie larger, while non-CTS patients had a mean of 0.797 cm² inside the tunnel. The transverse carpal ligament (TCL) measured a mean of 0.0988 cm in the CTS group (ie thinner) and 0.1058 cm in the non-CTS group. Median nerve mobility at equal to or less than one tendon width was 80% in pregnant women with CTS and 92.1% for those without. No fluid was present within the carpal tunnel of all patients. The results were statistically not significant.

Conclusion: Ultrasonographic evidence in pregnant women with CTS shows a larger median nerve, a more mobile median nerve and a less thick transverse carpal ligament. There is absence of fluid retention and synovitis ruling out extrinsic compression of the median nerve as cause of CTS in pregnancy.
Objectives: To report the validity and reliability of using the ultrasound diagnosis of brachial plexus injury lesions and to identify the location and extent of the injured nerve before surgery.

Methods: The ultrasound was done before the surgery and the nerve pathologies seen from the ultrasound were recorded. After the ultrasound was done, the patient went on the normal surgical procedure for nerve exploration. Gaps between the proximal and distal stumps of the nerve were recorded using the same reference points from the ultrasonography procedure. The statistical analyses were calculated using the Student t-test and intraclass correlation coefficients.

Results: The mean difference between the distance of the proximal stump to the reference point measured by ultrasound techniques and the surgical exploration was significant difference. For the ICC between the using ultrasound and surgical exploration, it was found that the proximal stump identification by ultrasound technique had a substantial correlation with the surgical exploration.

Summary: From the report using ultrasound to assess the traumatic brachial plexus lesion can be useful for pre-operative planning especially in the cases where there was no continuous loss of nerve.
BONE LOSS IN SEVERELY CRUSHED ELBOW

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Poster Session 2 - Touchscreen 5, March 12, 2020, 1:15 PM - 2:00 PM

ABSTRACT
Elbow injuries are commonly found in children aged from 3-15 years following a fall from heights up to 3 metres resulting in supracondylar fractures.
In adults, similar injuries occur from motor bike / vehicle accidents, industrial accidents and rarely from falls from heights.
We report a special case of a 24-year-old lady who was involved in a motor vehicle accident on 9/4/2014. The vehicle lost control landing into a ditch. She sustained a compound crush injury of the left elbow with associated bone loss. There was also associated radial nerve palsy. X–rays done showed extensively comminuted distal humerus fracture but barely sparing the elbow joint. She had surgical debridement and stabilisation with Uniplanar External Fixators. In September 2014, the external fixators were removed to manage pin track infection and in readiness for definitive surgery. A POP back slab was applied to support the elbow. Three weeks later, the patient had surgery of bone grafting from the iliac crest and bicondylar reconstruction plating. In May 2016, the fracture was noted to have healed. The final outcome was satisfactory except for elbow stiffness. The radial nerve palsy recovered.
Stability of the first carpometacarpal joint provided by the surrounding ligaments

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Objectives

To determine the role of the ligaments surrounding the first carpometacarpal joint (CMCJ) in maintaining stability.

Methods

Sixteen specimens (mean 52.4 years; 9 right hands, 7 left hands) were dissected. The first and second metacarpals, trapezium and trapezoid were removed, preserving the first CMCJ capsule. Each first CMCJ was oriented in a neutral position using a 3D-printed jig. External loads were applied using an Instron machine equipped with customised jig. Translation of the first CMCJ was measured using linear variable differential transformers. Each specimen was tested while intact and following ligament sectioning. Four ligaments were sequentially sectioned: anterior oblique (AOL), ulnar collateral (UCL), intermetacarpal (IML) and dorsal radial (DRL). Following each sectioning, load that was applied to the specimen in four directions - volar-dorsal (V-D), dorsal-volar (D-V), radial-ulnar (R-U) and ulnar-radial (U-R) were measured - while the joint was compressed with 10N to maintain contact of the articular surfaces. Repeated measures analyses and Friedman tests were applied.

Results

After transection of the IML and DRL, the first CMC joint loses its stability when compared to the intact, AOL and UCL conditions (p<0.05). Instability of the first CMC joint after transection of the IML and DRL occurred when the joint was displaced in D-V, R-U and U-R directions.

Conclusion

Although the relationship between ligament rupture and first CMC joint osteoarthritis remains unclear, this study demonstrates the joint instability resulting from ligament disruption. Absence of the IML and DRL can cause instability, leading to possibility of high stresses in the joint.
The clinical implication of Quick DASH score in trigger finger patients

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Poster Session 2 - Touchscreen 5, March 12, 2020, 1:15 PM - 2:00 PM

Objectives
Trigger finger is a common hand condition of which the incidence is 2% in the general population. The clinical classification, such as Quinnell's, is purely based on the physical examination findings. However, upon observation of our clinical practice, those aren't always reflecting the real impact on patients' daily hand use and was somehow arbitrary in guiding the appropriate treatment. This study aims to look into the correlation between patients' trigger finger severity and their hand functional impairment and to further discuss how we shall treat patients with trigger condition based on the evaluation of patients' hand function.

Methods
The Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH) questionnaire is a validated and widely used 11-item questionnaire that measures upper-extremity specific symptoms and disability. Quinnell's classification is one of the grading systems based on clinical examinations. In this study, we collected the QuickDASH scores for all first-visit patients in our specialist center, meanwhile, we recorded the patients' demographic information and the Quinnell's classification. Statistical analysis is conducted with STATA 11.0.

Results
Based on the preliminary results of the data from 90 first-visit trigger patients, we found that there's a weak correlation between the Quinnell's grades and the QuickDASH score (Pearson's coefficient 0.03). Poorer hand function is observed in patients who have a higher VAS score, with bilateral or multiple digits (>3) involvement.

Summary
Patient with high clinical trigger severity may not necessarily have poorer hand function. This may be taken into consideration while offering surgical treatments to patients.
The use of “Flow test” and “Anastomosis appearance score” for evaluation of vessel patency during basic microsurgical training

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Poster Session 2 - Touchscreen 5, March 12, 2020, 1:15 PM - 2:00 PM

Objectives
To study the relationship between “Flow test”, “Anastomosis appearance score” and “Vessel patency” of microsurgical anastomosis in living specimen and develop the steps of self-assessment for evaluation the patency of anastomosis that can be done both in living and non-living specimens.

Methods
Surgical specimens of rat femoral anastomoses were collected from basic microsurgery course. Each specimen was recorded the result of practicing in living specimen into “Group 1: Success” or “Group 2: Failed anastomosis”. Then all specimens were cut and blindly send to assess the quality of anastomosis by “Flow test” and “Anastomosis appearance score” by using 5-step evaluation including: 1) Anastomosis appearance, 2) Passing catheter, 3) Fluid injection, 4) External appearance, and 5) Internal appearance. The scoring for “Flow test” (10 points), “Anastomosis appearance” (20 points) and overall score (30 points) were recorded and compared between 2 groups. The average score in each group and mean passing score for success anastomosis was calculated and reported.

Result
Total 47 femoral vessel anastomosis were studied. There were 25 success anastomoses and 22 failed anastomosis. The mean score for “Flow test”, “Anastomosis appearance” and “Overall score” were 7.92, 15.08 and 23 in group 1 and 1.55, 9.18 and 10.73 in group 2. The mean passing score that determined “Success anastomosis” calculated by ROC curve was 5 for “Flow test”, 13 for “Anastomosis appearance score”, and 17 for “Overall score.”

Summary
“Flow test” and “Anastomosis appearance score” could be the self-assessment tools for anastomosis evaluation and help new trainee to monitor their result of practicing during basic microsurgical training.
Hand Injury Severity Scale in the Context of Dog Bites – a New Classification System

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Poster Session 2 - Touchscreen 5, March 12, 2020, 1:15 PM - 2:00 PM

OBJECTIVES
The objective of this study was to characterize the nature and patient outcomes of dog bite injuries to the hand treated over a 2-year period within the Nepean Blue Mountains Local health district (NBMLHD). Using the data obtained, a new classification system has been developed and used to analyse the severity of the injuries sustained and likelihood for ongoing dysfunction or complications in the context of dog bites.

METHODS
A retrospective review of patients who were evaluated for dog bite injuries to the hand between January 2016 and June of 2019 in the emergency department of Nepean Hospital. These were correlated with operative findings, investigations, length of stay and patient outcomes.

RESULTS
Preliminary analysis of >150 patient encounters indicates that adverse outcomes are more likely when dog bites are sustained from larger breeds, associated with bony injury, and when surgical debridement is delayed for more than 3 days. In addition, even minor involvement (puncture wound/bruising) of neurovascular structures and tendons is likely to cause significant long term adverse outcomes for patients.

SUMMARY
We anticipate this study will demonstrate the proposed classification system as a robust predictor of the likelihood for adverse outcomes, augmenting clinical decision making in patients who sustain dog bite injuries to the hand.
Objectives: Hand20 questionnaire was developed in Japan as a patient-reported outcome measure (PROM) composed of 20 short questions with illustrations. It has proven its reliability and validity and has been translated into English. In this study, we reviewed literatures that have utilized HAND20 in order to expand upon its potentiality.

Methods: The PubMed and Ichushi-Web databases were selected for the research. The presenters reviewed all of these studies in terms of how to utilize HAND20 and their interpretations of HAND20 scores.

Results: Seventy-five articles that used HAND20 were identified. In almost all literature, HAND20 has been utilized as one of the outcome measurements after some interventions such as splinting. HAND20 has been most commonly used in distal radius fracture and in carpal tunnel syndrome. The disability of the arm, shoulder, and hand (DASH) is the PROM most commonly used, so some studies showed results from both HAND20 and DASH. Some studies mentioned that HAND20 has fewer unanswered questions as compared to DASH because of its illustrations and content of questions. Many of the studies describe statistical improvement in HAND20 scores after interventions, but minimal clinically important difference (MCID) of HAND20 is unclear. HAND20 is region specific PROM, so it is used in a variety of disorders.

Summary: It is recognized that HAND20 is useful and widely used PROM in Japan. MCID of HAND20 and analysis of each of it’s items has the potential to be effective in expanding HAND20’s practical use on a more global level.
OVERVIEW OF VOLKMANNS ISCHEAMIC CONTRACTURE

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ABSTRACT

TITLE
VOLKMANN’S ISCHAEMIC CONTRACTURE: A CASE REPORT

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The authors focus attention on several cases of Volkmann’s Ischaemic contractures lately noted but commonly missed both at the Kenyatta National Hospital and more so at the regional public and private health facilities.

This debilitating condition was first described at the end of the 19th century but has not been given adequate attention with the development and advancement of traumatology.

The authors discuss the pathogenesis, progression, treatment and outcome of the condition. It is emphasized that a non-diagnosed and/or a non-recognized forearm compartment syndrome may result in a symptom collection of varied seriousness which reduce the functions of the forearm, wrist and the hand considerably and which is difficult to handle.

Prevention is considered to be the most important in the management of compartment syndrome and its sequel. The authors suggest that only experienced specialists familiar with the condition should treat the established contracture. These include trauma surgeons and representatives of other disciplines who should be aware of this common but commonly missed condition with serious consequences.

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Validity and Reliability of Thai Version of Patient-Rated Wrist Evaluation (PRWE) in Distal Radius Fracture Patients

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Objectives: Patient-Rated Wrist Evaluation (PRWE) is a specific tool for assessment of wrist function and had been validated and translated into many languages. This study is aimed to translate the PRWE into Thai language and to evaluate its validity and reliability in operatively treated distal radius fracture patients.

Methods: PRWE was translated into Thai language according to linguistic validation protocol by forward-backward translation process. Fifty-three distal radius fracture patients underwent volar locking plate fixation were included. Eight patients were excluded due to multiple injuries. Forty-five patients were prospectively enrolled and evaluated for Thai version of PRWE (TVPRWE) and Disabilities of the Arm, Shoulder and Hand (DASH) within 2 weeks after surgery. Reliability of TVPRWE was assessed by test-retest reliability and internal consistency. Content, concurrent and construct validity of the TVPRWE were measured. At 3 months after the operation, patients were re-assessed for TVPRWE and DASH to identify responsiveness of the tool.

Results: Most of the patients were female (64%) with average age of 55 years sustained distal radius fractures. Intraclass correlation for test-retest reliability of TVPRWE was 0.907. Internal consistency of TVPRWE was acceptable (Cronbach’s alpha = 0.855). TVPRWE had high content validity (Item-objective congruence index = 0.8) and excellent correlation with DASH (Spearman’s rank correlation = 0.809; p-value <0.001).

Conclusion: Thai version of PRWE had excellent validity and reliability. This disease-specific measurement is an efficient tool for evaluation of distal radius fracture patients.

Keywords: Patient-rated wrist evaluation, PRWE, distal radius fracture, reliability, validity, psychometric property
UCL staging revisited: Developing a treatment algorithm

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Poster Session 2 - Touchscreen 5, March 12, 2020, 1:15 PM - 2:00 PM

Introduction
The ulnar collateral ligament (UCL) provides significant hand function with rupture, attenuation and inflammation around this small yet ever so significant structure causing morbidity and creating a socio-economic impact. We present an efficient treatment of assessing, grading and propose a treatment algorithm for each stage.

Methods & Results
Ten patients who present with varying degrees of functional abnormality of the thumb presented to the hand clinic. 5 were acute and 5 were chronic injuries with 4 children and 6 adults. All had MRI scans which have shown full rupture, partial rupture and attenuation.
All patients were treated surgically of which one had a palmaris longus graft. All patients also had an axial k-wire and wires were removed at a set time interval for children and for adults.
Patients were closely managed and followed with a strict hand therapy protocol leading to timely removal of the k-wire and return to full hand function within a 12 week period.

Discussion
Injury to the UCL should thought of at the stage of initial assessment in the emergency department. Delays in treatment can lead to significant patient morbidity; a streamlined algorithm we felt was required to improve outcomes for this type of injury.
A 3-year review of 689 hand and digit procedures using the wide-awake local anaesthesia no tourniquet (WALANT) technique in an urban tertiary hospital in Malaysia

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OBJECTIVES: To review the complications of hand and digit procedures done using the wide-awake local anaesthesia no tourniquet (WALANT) technique, especially digital ischaemia, in an urban tertiary hospital in Malaysia.

METHODS: This is a retrospective study of hand and digit procedures performed using the WALANT technique over a period of three years (June 2016 to May 2019) in an urban tertiary hospital in Malaysia.

RESULTS: There were 689 cases in total, comprising 447 females and 242 males. The mean age was 55. There were 442 digit procedures (trigger digit release, excision biopsy, removal of implant, etc.) and 247 hand procedures (carpal tunnel release, excision biopsy, removal of implant, etc.). There were no instances of circulatory compromise. Neither was there any situation which necessitated reversal with phentolamine.

SUMMARY: Hand and digit procedures done using the WALANT technique are safe while avoiding tourniquet pain. Caution is advised when considering patients with vascular insufficiency or disease.
Epidemiology of distal radius fractures among adults in Malaysia

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OBJECTIVES: To review the epidemiological data of distal radius fractures among adults in Malaysia.

METHODS: This retrospective study included all patients aged 18 years and above with distal radius fractures seen in a year, from January to December 2018, at an urban tertiary hospital in Malaysia. Plain radiographs of the patients were reviewed and classified according to the 2018 AO/OTA classification of fractures by a single hand fellow.

RESULTS: There was a total of 173 cases, comprising 78 females and 95 males. The mean age was 54 years. The peak incidence among females was in the 65-74 range while among males it was in the 35-44 range. By the AO/OTA classification, type A was the commonest (46.24%, n=80), followed by C (43.93%, n=76) and B (9.93%, n=17). Subgroup analysis showed that types A2 and C1 were equally prevalent (36.42%, n=63), followed by A3 (9.25%, n=16), both B1 and C1 (6.94%, n=12), B3 (2.89%, n=5) and lastly both A1 and C1 with one case each (0.58%). By gender, the majority of females had type A fractures (53.85%, n=42) while most males had type C fractures (47.37%, n=95).

SUMMARY: The peak incidence of distal radius fractures was in the postmenopausal group for females and in the middle age group for males. Females were more likely to sustain type A fractures while males tended to have the more severe type C fractures. This reflected the different mechanisms of injury in both genders. Preventive measures should be tailored accordingly.
Comparison of diagnostic accuracies of preoperative versus intraoperative assessments of benign digit tumours

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OBJECTIVES: To compare the diagnostic accuracies of preoperative versus intraoperative assessments of benign digit tumours.

METHODS: The diagnostic accuracies of the preoperative and intraoperative diagnoses of benign solid and cystic digit tumours were compared with the histopathological diagnoses based on data from a database of hand and digit procedures performed under the wide-awake local anaesthesia no tourniquet (WALANT) technique over a period of three years (June 2016 to May 2019) in an urban tertiary hospital.

RESULTS: There was a total of 40 cases, comprising 25 females and 15 males. The mean age was 49 years. The total number of benign digit tumours that were thought to be solid preoperatively were 15 while those that were diagnosed to be cystic were 25. The total number of benign solid tumours that were diagnosed intraoperatively were 16 while the total number of intraoperatively diagnosed benign cystic tumours were 24. The overall diagnostic accuracy preoperatively was 37.5% and this improved intraoperatively to 45.0%. The accuracy of a preoperative clinical diagnosis for a benign cystic digit tumour was 61.5% while for a benign solid digit tumour, it was 25.9%. The accuracy of intraoperative clinical diagnoses for benign cystic digit tumours was 69.2% and this fell to 37.0% for benign solid digit tumours.

SUMMARY: Intraoperative diagnosis was more accurate than preoperative diagnosis for benign digit tumours. The diagnostic accuracies of preoperative and intraoperative assessments were significantly higher for benign cystic tumours in comparison with solid tumours.
Hemihamate arthroplasty for delayed presentations of PIP fracture dislocations- outcome in 11 patients

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Objectives - The PIPJ is prone to stiffness and immobilization as short as 4 weeks can lead to permanent loss of motion. Delayed presentations will make it even more complex. Only treatment option with early mobilization in unstable PIP fracture dislocations is a dynamic external fixator or hemihamate replacement arthroplasty. But the only outcome based option for delayed presentations is Hemihamate arthroplasty

Methods- 11 patients underwent hemihamate replacement arthroplasty for delayed presentations of PIP fracture dislocations. All were dorsal fracture dislocations.8 were males. Average duration from injury to surgery was 7 weeks. Under brachial block anesthesia,volar bruner's shotgun approach was used. Ipsilateral hamate bone was chosen depending on the size of the defect. 2 miniscrews (1.3mm) was used for 8 patients and 1 screw for 3 patients. Volar plate was repaired to periosteum in all patients.Only finger dressing was applied with dorsal splint in 30 degrees PIP flexion for 1 week for edema to subside. Early active motion was begun as early as tolerable. Minimum follow up was 1 year

Results- Congruent reduction was achieved in all. Michigan hand outcome was 100% in 3 patients and > 80% in 8 patients

Summary- The cause for delayed presentations are that, these injuries are missed by primary care physicians due to lack of true lateral view x ray and lack of timely referral. Educating primary care physicians is of utmost importance. The only option with excellent to good outcome for delayed PIP fracture dislocations is hemihamate replacement arthroplasty
Comparison of radiation exposure of major organs between mobile CBCT and MDCT in hand and foot

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Objectives: The purpose of this study was to compare the radiation dose of major organs between mobile CBCT and MDCT and to evaluate the safety and usefulness of CBCT.

Methods: This is a prospective voluntary randomized study. This study was designed for adults who require CT scans for hand and foot disease or trauma from August 2017 to March 2018. The patients were divided into two groups of 20 patients each. Mobile CBCT was performed in group A and MDCT was performed in group B. Reference point corresponding to the major organs (brain, eye, thyroid, thymus, or testis or ovary) was set and attached a thermoluminescent dosimeter chip (TLD chip). After CT scan, the radiation dose irradiated on the TLD chip was measured.

Results: The surface dose at the center was not significantly different between group A and B. In hand CT scan. And there was a statistically significant difference between the two groups. In foot CT scan, Surface dose in gonads was lower in group A. The use of mobile CBCT in the CT of the hand and foot may reduce unnecessary radiation exposure to nearby organs other than the site.

Summary: In the orthopedic area, it is considered that the conventional MDCT for extremity can minimize the damage caused by radiation exposure by performing radiation shielding on the part other than the center of scan.
Open reduction of four ulnar carpometacarpal joints dorsal fracture-dislocation: a case report

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Objectives: Four ulnar carpometacarpal (CM) joints (fracture-)dislocation is relatively rare injuries. Here, we present an irreducible case by closed reduction, which was successfully treated by open reduction.

Methods: A 16-year-old right-handed male was involved in motorcycle-car crash. Radiographic examination and computed tomography scan of his left hand showed dorsal dislocation of four ulnar CM joint associated with a base fracture of fourth metacarpal. The hand was undergone closed reduction and fixed with a splint. However, affected joints remained unstable and easily re-dislocated. Then, the patient was referred to our hospital for further treatment on the next day. Under general anesthesia, the patient went through immediate surgery. Intraoperative fluoroscopy revealed that closed reduction was failed due to the base fracture of fourth metacarpal. Then, surgical exposure was performed by dorsal longitudinal incision. The base fragment of fourth metacarpal was dorsally dislocated and not reduced only by traction. Open reduction of the fragment was achieved and percutaneous Kirshner wire fixation of four metacarpals and carpal bones was carried out. As a postoperative therapy, knuckle cast was applied for four weeks and Kirshner wires were removed eight weeks after surgery.

Results: Fracture site was united and no re-dislocation occurred. After six months, he showed an excellent outcome, including no pain and recovered grip strength and full arc of affected wrist and fingers.

Summary: Dislocated metacarpal base fragments might be irreducible only by closed reduction. In that case, open reduction of fracture site under direct observation should be considered.
Pyogenic Osteomyelitis of the Digit in a One-year-old Boy Due to Delayed Diagnosis of Open Seymour Fracture: A Case Report

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OBJECTIVES: Seymour fractures are often-underestimated injuries that can lead to growth disturbance due to epiphyseal arrest, nail plate deformity, and/or osteomyelitis. However very few studies have specifically described or investigated these cases. We present a case of a one-year-old boy with pyogenic osteomyelitis of the digit due to delayed diagnosis of open Seymour fracture.

METHODS: Case report.

RESULTS: The patient is thirteen-month-old male infant. He had his right ring finger caught in the door. 18 days after the injury he was referred to our hospital. Redness, swelling and pain were observed in the distal part of his right ring finger. The nail plate was subluxated superficially from the nail fold. X-ray and intraoperative CT showed osteolysis of the distal phalanx. Operation was performed at 19 days after the injury. The fracture site was exposed and pus was drained from it. Temporal DIP joint immobilization and antibiotic therapy were performed after operation. At 2 years after the operation, he had no pain and no nail plate deformity and no functional loss. However, the DIP joint had 10 degrees’ radial deviation and the distal phalanx was 2 mm shorter than the opposite site. In our case, the patient lost the chance of early correct diagnosis and resulted in osteomyelitis and growth disturbance. It is imperative to make early diagnosis and appropriate treatment of this special injury.

SUMMARY: We presented a case with pyogenic osteomyelitis of the digit in a one-year-old boy due to delayed diagnosis of open Seymour fracture.
Metacarpal fracture fixation – a comparison of non-locking plate fixation versus Lister's Technique

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Abstract
Aims:
Biomechanical comparison of the strength of two different type of metacarpal fixation techniques ex-vivo in cadaveric metacarpals. To contribute to the body of evidence regarding the different strengths of these techniques.

Methods:
Iatrogenic transverse fractures were created with a saw. 10 metacarpals were fixed with Lister's technique (1 oblique K wire with a tension band loop placed in the coronal plane of the bone), and 10 metacarpals fixed with non-locking plates.

The constructs were then tested with a cantilever bending model to failure.

Results:
Biomechanical testing showed that the fractures fixed with a non-locking plate construct had higher load to failure.

Conclusion:
Both fixation methods showed good load to failure which would likely allow for good stability and healing in the clinical context with appropriate post-operative mobilisation. Non-locking plating as has been demonstrated in the literature shows superior load to failure at the expense of implant prominence.

Further discussion will be made in the presentation regarding the details of the biomechanical testing and fixation method.
A Comparison of Non-vascularized Bone Grafting and internal fixation in the Treatment of Scaphoid Waist Nonunion: preliminary report

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Objectives: We attempted to investigate whether the union rate varied according to the type of non-vascularized bone grafting and internal fixation, when treating nonunion of scaphoid waist.

Methods: We treated 38 nonunion of scaphoid waist with non-vascularized bone grafting and internal fixation randomly selected, dividing them into three groups; cortico-cancellous bone grafting with K-wire fixation group, cortico-cancellous bone grafting with headless screw fixation group and cancellous bone grafting with K-wire fixation group. We investigated time to surgery, smoking, nonunion type (Herbert classification) and radiologic findings such as humpback and DISI deformity in each group. We compared union rate and time to union between groups. We described clinical features of “failure to union” cases.

Results: There was no significant difference in mean time to surgery, smoking rate, and the relative proportions of nonunion patterns and positive radiologic findings (humpback deformity and DISI deformity) between groups. Mean union rate was the highest in cancellous bone grafting with K-wire fixation group, but there was no significant statistical difference in union rate between the groups. The mean time to union was significantly shorter in cancellous bone grafting with K-wire fixation group. All the “failure to union” cases were D2 type nonunion treated by cortico-cancellous bone grafting.

Summary: Cancellous bone grafting with K-wire fixation might be more advantageous in terms of achieving union, especially union time than other type of bone grafting with internal fixation. Cancellous bone grafting + K-wire fixation might be more effective to treat the D2 type nonunion, than cortico-cancellous bone grafting.
Age-related changes in radiologic parameters of wrist

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Degenerative changes in wrist joints usually lead to laxity and instability of ligaments. The aim of this study was to find out whether the radiologic parameters in wrist radiographs are related with age. We retrospectively reviewed the wrist radiographs, a total of 319 cases (131 males, 188 females) with a mean age of 53 years (18 to 91). On the posteroanterior radiographs the carpal-ulnar distance ratio and ulnar variance were measured. On the lateral radiographs the scapholunate angle was measured using tangential method. The radiographs showing the evidence of previous trauma, surgery or congenital anomalies were excluded from the study. The radiologic parameters were measured twice and averaged. The mean carpal-ulnar distance ratio was 0.31. There was correlation between carpal-ulnar distance ratio and age (Pearson's correlation coefficient = 0.535, p < 0.01). The mean ulnar variance was negative 0.8mm. There was correlation between ulnar variance and age (Pearson's correlation coefficient = 0.311, p < 0.05). The mean scapholunate angle was 54°, with 316 angles ranging from 30° to 70° and four having an angle more than 70°. There was correlation between scapholunate angle and age (Pearson's correlation coefficient = 0.367, p < 0.01).

In our study, the radiologic parameters in wrist plain radiographs have significant relationship with age.
The annual clinical and radiological burden of managing acute scaphoid fractures at an Australian public hospital servicing a population of 350 000

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Objectives: To determine the volume of acute scaphoid fractures presenting to our institution over a twelve-month period and quantify the annual clinical burden generated including rate of operative management, number of clinic and hand therapy reviews and number of radiological investigations required prior to discharge from the service.

Methods: All hand and carpal bone fractures presenting to our institution between June 2018 and June 2019 were retrospectively reviewed and all suspected and CT or MRI proven acute scaphoid fractures were identified. The electronic patient record and the radiology server were then reviewed to collate data.

Results: 62 patients with acute scaphoid fractures were identified with an average duration of follow-up of 8.9 months. 16.1% (n=10) required operative management. Patients required an average of 2.9 clinic visits which totalled 3% of the total annual clinic encounters generated by the unit in addition to 2.5 hand therapy sessions, 1.3 X-Rays and 0.8 CT scans prior to discharge from the service with 71.0% of patients requiring more than one imaging modality during treatment. 37.5% of patients were lost to follow-up of which 20.8% were minors.

Summary: Acute scaphoid fractures comprise a significant proportion of the clinical burden of a hand and wrist surgery unit. The investigation of scaphoid fractures also places substantial burden on the institute’s radiology department through the provision of X-Ray and CT services. This burden is, however, truncated by a high rate of loss to follow-up, which requires further investigation to determine underlying cause and demographic risk factors.
Temporary subcutaneous reduction/pinning of acute scapholunate injury during volar locking plating fixation of distal radial fractures

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Background: We performed a prospective comparative study investigating the effectiveness of temporary percutaneous reduction/pinning during volar locking plate (VLP) in distal radial fractures (DRF).

Methods: The first 43 consecutive SLIs were treated concurrently after VLP by closed pinning using (group 1); the next 36 consecutive injuries were treated non-operatively (group 2). Patients were followed for at least 5 years after treatment. Basic demographic data, radiological measurements, arthroscopic findings of SLI, and other clinical outcomes were evaluated.

Results: The mean follow up period was 7.2 years. No significant differences in basic demographic data, were evident between groups. Fracture patterns (AO classification), were not distinctively different between groups. The initial scapholunate angles immediately after surgery were 22.91° / 37.64° for groups 1/2, respectively, indicating a significant hyperextended scaphoid position in group 1. The final scapholunate angles were also significantly different between groups, although the final angles in groups 2 (58.47°) were within normal limits. Final visual analog scale, DASH, Gartland system scores, and wrist motions, were not different between the groups; however, grip strength at the time of final follow-up was closer to that of the contralateral uninjured wrist in group 1. The distribution of arthroses was less advanced in group 1.

Conclusions: Scapholunate temporary fixation for SLI with DRF is an effective option for the maintenance of scapholunate angle. The non-fixed group exhibited a more pronounced collapse of the scapholunate angle, although the difference was still within normal limits, and clinical outcomes were similar regardless of the fixation status.
Effective Period of Conservative Treatment in Patients with Acute Calcific Periarthritis of the Hand

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Objective: We conducted this retrospective study of patients with acute calcific periarthritis of the hand to investigate how long conservative treatment could be effective.

Methods: We reviewed 10 patients who were diagnosed with acute calcific periarthritis of the hand. We recommended the use of warm baths, nonsteroidal anti-inflammatory drugs (NSAIDs) and limited activity. The visual analogue scale (VAS) score for pain at each subsequent visit (3, 6 and 9 months) was compared with that of the previous visit to investigate whether the pain had decreased during each time interval. Simple radiographs taken at each visit were compared with those taken at the previous visit to determine whether any significant changes in the amount of calcification had occurred during each time interval.

Results: All 10 patients with 17 affected joints continued conservative treatments for an average of 11.1 months. The average VAS score for pain at the initial visit was 7, while that at 3, 6 and 9 months was 4.3, 3.3 and 2.9, respectively. There was a significant reduction in the VAS score at 3 and 6 months, but not at 9 months. The simple radiographs also showed a significant reduction in the amount of calcification at 3 and 6 months, but not at 9 months.

Summary: Patients who continued conservative treatment showed pain relief and reduced calcification for up to 6 months. These results suggest that conservative treatment could be tried for at least 6 months before considering other treatment modalities.
Silicone implant arthroplasty using volar approach for Bouchard’s nodes

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Objectives: To evaluate the clinical and radiographic outcome of a silicone proximal interphalangeal joint implant using a volar approach in patients with primary osteoarthritis.

Methods: A total of 31 silicone proximal interphalangeal arthroplasties in 16 patients using a palmar approach were performed at our institution from 2007 to 2016. We were able to identify and carefully follow up a series of 28 joints in 14 patients clinically and radiologically all more than 1 year from the time of implant arthroplasty.

Results: After an average follow-up of 42 months (range, 12-93 mo), pain relief was markedly reduced in all patients. The arc of active motion of the proximal interphalangeal joint improved from 35° to 53°. Radiograph review showed 6 implant fractures. The average deformity in the coronal plane changed from 7.4° (range, -3° to 21°) preoperatively to 9.4° (range, -7° to 25°) postoperatively. No other complications were observed. There was one revision for symptomatic implant fracture.

Summary: The volar approach to proximal interphalangeal joint silicone arthroplasty offers the advantages of maintaining the integrity of the extensor mechanism, providing pain relief, and improving postoperative range of motion with minimal complications.
The prevalence of neuropathic pain and superficial radial neuritis in de Quervain’s tenosynovitis

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Objectives
There has been no previous studies to describe the prevalence of neuropathic pain and superficial radial neuritis in de Quervain’s tenosynovitis. This is the first prospective study on this condition, and this also allows for a comprehensive assessment in patients with de Quervain’s tenosynovitis.

The aim of our study is to examine the prevalence of neuropathic pain and superficial radial neuritis in patients with de Quervain’s tenosynovitis in our local population.

Methods
This is a prospective observational study. Patients who have been diagnosed with de Quervain’s tenosynovitis have been prospectively recruited at our institution. The Douleur Neuropathique en 4 questions (DN4 Questionnaire), QuickDASH, SALSA and GHQ-12 were administered to all patients. Ultrasonographic evaluation of the superficial radial nerve to identify the presence of superficial radial neuritis was also performed on all patients.

Results
There were 25 patients who were recruited in this study. There were 5 patients (20%) who had neuropathic pain and there were 3 patients (12%) who had superficial radial neuritis.

The outcome scores of DN4 Questionnaire, QuickDASH, SALSA and GHQ-12 will be presented.

Summary
There is a high prevalence of neuropathic pain and superficial radial neuritis. DN4 Questionnaire and ultrasonographic evaluation should be conducted in all patients with de Quervain’s tenosynovitis. Furthermore, pain management strategies can be created to address these conditions.
Clinical and Functional Outcome Following Arthroscopically Assisted Transosseus Versus Perifoveal Repair Technique For Triangular Fibrocartilage Complex Foveal Tear

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Objectives
Triangular Fibro Cartilage Complex (TFCC) injury is one of the most common cause of ulnar wrist pain and Distal Radio Ulnar Joint (DRUJ) instability in young patients. Our aims are to compare the perifoveal repair technique and the transosseous reinsertion and to evaluate the influence of the age, the delay before surgery and the ulnar variance on the outcomes.

Methods
This prospective study compared two groups consisted of: 5 Patients were treated with transosseous technique and 4 patients with perifoveal repair technique. The average age was 34-year-old (range 21 to 50). The average follow-up was 8.3 months (range, 5 to 12 months). All patients had foveal tear diagnosed by a positive foveal sign, painful DRUJ instability and positive arthroscopic tests (Hook test and Trampoline test).

Results
A statistically significant improvement of pain, DASH score and Modified Mayo Wrist Score were observed in both groups. Improvement of pronosupination (+42°) and grip strength (+25%) were significantly better with perifoveal repair (p<0.05). Two patients had DRUJ instability recurrence, one in each group. Transient ulnar nerve paresthesia was observed in 2 patients in perifoveal repair technique. Age, delay before surgery nor ulnar variance influenced the postoperative DRUJ stability or the functional outcomes.

Summary
Our study showed that both techniques can provide satisfactory results. In our experience, perifoveal repair technique obtained a better improvement, particularly considering pronosupination. More comparable studies need to be performed to compare different arthroscopic TFCC repair to provide guidelines for the different TFCC foveal tears.
Comparing Kapandji scores with thumb pronation and palmar abduction angles

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OBJECTIVES
The Kapandji score is used to record thumb opposition for the assessment of disorders, such as carpal tunnel syndrome, and it is the only alternative to angle measurements. We aimed to verify the extent to which the Kapandji score reflects the angle of pronation.

METHODS
We recruited volunteers with unaffected upper limbs (33 hands) and patients with carpal tunnel syndrome (20 hands). We attached a small gyroscope on the thumb metacarpal and measured the pronation and palmar abduction angles at each position of the Kapandji score in both groups.

RESULTS
The mean Kapandji scores were 9.9 and 9.5 in the control and CTS groups, respectively. There was no significant difference between two groups. The Kapandji score showed a strong ceiling effect and the increase in both pronation and palmar abduction angle size at each Kapandji score levelled off around a score of 6 in both groups.

SUMMARY
The Kapandji score reflects the pronation and palmar abduction angles up to a score of 6 but not in a score of 7 or more. Kapandji score should only be applied to the assessment of severe impairment of thumb opposition.
Functional Outcome of Early and Late Arthroscopic One-tunnel Transosseous Repair of Triangular Fibrocartilage Complex (TFCC) Foveal Tears

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Purpose: This study compares outcomes at different time points after arthroscopic triangular fibrocartilage complex (TFCC) transosseous foveal repair.

Methods: Eighty patients treated with arthroscopic TFCC foveal repair using the uniform one-tunnel transosseous suture technique were assessed retrospectively. Patients were assigned to 1 of 3 groups according to the time between injury and surgery: group A (< 6 months, n = 38), group B (6–12 months, n = 20), or group C (> 12 months, n = 22). Pain visual analog scale (VAS) responses, grip strength, modified Mayo wrist scores (MMWS), Quick disabilities of the arm, shoulder and hand (QuickDASH) scores, and distal radioulnar joint (DRUJ) stability were assessed at 2 years, along with overall patient satisfaction and complications.

Results: No differences were found among the three groups in pain VAS responses, grip strength, and MMWS and QuickDASH scores (P > 0.05). Overall, patients exhibited significant functional improvement at 2 years (VAS: 3 to 0, P < 0.001; grip strength: 77.1% to 95.6%, P < 0.001; MMWS: 65 to 90, P < 0.001, QuickDASH: 20.5 to 4.5, P < .001). Median changes showed similar improvements among groups (P > 0.05). A total of 78 patients (97%) saw DRUJ stability restored, and 70 patients (87%) were satisfied with treatment.

Conclusions: Patients with a TFCC foveal tear who underwent repair surgery more than 12 months after injury exhibited no differences in outcome measures compared with patients who underwent surgery within 6 months or between 6 and 12 months after injury. Arthroscopic TFCC one-tunnel transosseous foveal repair can therefore be an effective treatment even when performed more than 12 months after injury.

Level of Evidence: Level IV, therapeutic case series
Effect of needle size on the success rate of corticosteroid injection for the treatment of trigger finger: a randomized controlled trial

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Objectives
Trigger finger is one of the most common hand diseases. Corticosteroid injection remains the most reliable method with an average success rate of 57%. We investigate the effect of needle size on the success rate of corticosteroid injection for the treatment of trigger finger.

Methods
Sixty patients requiring corticosteroid injections for trigger finger were randomized to 2 groups. One group received 10 mg of triamcinolone acetonide injected with a 30-gauge needle; the other group received the same treatment injected with a 25-gauge needle. The success rate was determined at 3 and 12 months after injection.

Result
The success rate at 3 months after injection were 80% for 30-gauge needle group and 76.7% for 25-gauge needle group (p=0.754). The success rate at 1 year after injection were 53.3% in 30-gauge needle group and 43.3% in 25-gauge needle group (p = 0.721).

Conclusion
Our study suggests that the needle size does not affect the success rate of corticosteroid injection for trigger finger. Surgeons should use the technique and needle size that they are familiar with to perform a trigger finger injection.
A new technique to determine the tension in extensor pollicis longus reconstruction

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OBJECTIVES: Various suture techniques have been proposed for the determination of tendon suture tensioning in the repair of chronic extensor pollicis longus (EPL) tendon rupture. They are complicated and there is no agreement on which technique is superior. We present an original technique for determining the tension of the EPL tendon after reconstruction.

METHODS: We operated 20 patients with chronic EPL tendon rupture. Among them 7 patients were treated by tendon graft using palmaris longus tendon and 13 were treated by tendon transfer using extensor indicis. Mean time from injury to reconstruction surgery was 7.7 weeks. The tension of the reconstructed EPL was adjusted so that the center of the distal edge of the thumbnail was elevated 2 cm above the operation table in both procedures. All patients were assessed for TAM, thumb elevation deficit, ROM, DASH, pinch strength compared to the unaffected side at least 12 months after tendon reconstruction.

RESULTS: TAM improved after operation from 50% (18-78) to 90% (60-100). Elevation deficit was 1.2cm (0 - 2.5). Flexion deficit was 10°(-12 - 45). DASH improved from 28.6 to 7.7. Pinch strength compared to the unaffected side was 94 % (41-113). There was no statistical significance when comparing the results of tendon graft to tendon transfer. All patients were satisfied with the operation and did not need another operation because of complication.

SUMMARY: Our new technique to determine the tension in EPL tendon reconstruction is easy and simple. It may be addition to conventional techniques.
Comparison of open surgical release versus ultrasound-guided percutaneous release using new instrument for trigger finger

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Objective
We used new ultrasound-guided instrument for percutaneous release with 18-gauge needle for trigger finger. This instrument was developed to avoid the complications of incomplete release and flexor tendon, digital nerve, and digital artery damage under ultrasound-guided. (Double guide-type tendon sheath incision instrument, Nara Seiko INC®, Japan).
We compared open surgical release (Group A) with ultrasound-guided percutaneous release with this instrument (Group B) for trigger finger.

Material and Methods
18 fingers were treated with open surgery (Group A) and 16 fingers were treated with ultrasound-guided percutaneous release with this instrument (Group B). Functional and clinical outcomes of the both groups were evaluated at 1.5, 3, and 6 month postoperatively and were compared between the patients with the Group A and B.

Result
At 1.5 months postoperatively, the average VAS score was 32 mm in the Group A, and 15mm in the Group B, respectively. There was a significant difference between the two groups (p<0.05). The average extension of PIP joint at 3 months postoperatively was -10°in the group A, and -3°in the group B, respectively. There was a significant difference between the two groups (p<0.05). At 6 months postoperatively, there was no significant difference between the two groups regarding the pain level on a visual analogue scale, the Quick DASH, range of motion of PIP.

Conclusion
The ultrasound-guided percutaneous release with this instrument may make sure to complete release and provide earlier recovery of the finger function in the early postoperative period.
Biomechanical Comparison of Four Types of Suture Material for Proximal Weave Reconstruction in Tendon Grafting

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Introduction
The Pulvertaft weave is the technique of choice for proximal juncture reconstruction in tendon grafting. We previously established that a 2-weave Pulvertaft can provide sufficient stability needed to commence early active motion protocol. We aim to study the effects of suture material on the strength of the proximal weave.

Methodology
24 fresh-frozen cadaveric tendons were harvested and divided into 4 groups: Ethilon 3/0, Prolene 3/0, V-Loc 3/0, and Supramid 3/0. The Pulvertaft weave technique was used to create a 2-weave construct and sutured together with 8 stitches in partial-thickness. The tendons were tested on a mechanical tester (Instron 3343), firstly by cycling loading at 5N, then gradually pulled at the rate of 20mm/N until failure. The parameters measured were the ultimate tensile strength and tensile extension at maximum load. A high-speed camera was used to analyze the mechanisms of failure.

Results
The mean ultimate tensile strength for Ethilon was 90.6±21.7N, Prolene 93.8±18.2N; V-Loc 99.3N±20.5N; and Supramid 96.8±28.5N; these were statistically not significant (p 0.916). The mean tensile extension at maximum load was 15.9±2.9mm; 35.2±15.4mm; 28.0±7.8mm; and 19.6±2.2 respectively; these were statistically significant (p 0.004). There was a mixed mechanism of failure with no emerging pattern.

Summary
The results showed that all four types of sutures achieved a maximum tensile strength of more than 75N, the minimum requirement for moderate resisted flexion. This indicates that all can safely meet the criteria needed for early active motion protocol and are reliable options of suture material in tendon grafting.
Background: Flexor tendon ruptures are most commonly caused by hand and/or wrist trauma. It is very rare for flexor pollicis longus (FPL) tendon rupture to occur as a result of scaphoid non-union in a non-rheumatoid patient.

Objective: To report one case of flexor pollicis longus rupture caused by scaphoid non-union which was present for approximately 50 years.

Methods: The patient was treated with removal of palmar scaphoid osteophytes, repair of the wrist volar capsule, a radial artery perforator fat flap to augment the repair site and improve the local vascularization, and FPL tendon repair with a palmaris longus tendon graft.

Results: In this case, the surgery was aimed at restoring FPL function and preventing a repeat rupture. Despite the arthritic pattern present, no further wrist surgery was required, and the patient was asymptomatic at the time of discharge.

Summary: Complete rupture of the FPL tendon secondary to scaphoid non-union is a rare and late complication. It can be easily misdiagnosed as an anterior interosseous nerve palsy, particularly as the original injury may unrecognised or forgotten. There are no guidelines outlining the ideal management of FPL rupture due to scaphoid non-union.
A rare case of a closed traumatic avulsion of both flexor tendons in a single finger

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Objectives:
Closed rupture of the flexor digitorum profundus (FDP) tendon is uncommon. The mechanism is usually a result of forced extension against a flexed finger. Closed avulsion of both flexor digitorum superficialis (FDS) and FDP in a single digit is extremely rare. There are only eight published cases in the literature.
We aim to present a case of this unusual pathology, review the literature on closed avulsion of both flexor tendons in the same finger and propose a unique method of surgical management not previously described.

Methods:
22-year old army officer had his left middle finger caught in the jersey of another officer. He reported a forced extension against a flexed finger and immediately after was unable to flex the finger. Exploration revealed a 100% zone I rupture of FDP at its insertion and a 100% zone II rupture of both the ulnar and radial slips of FDS at their insertions. Primary repair was performed using Mitek bone anchors for both FDS radial slip and FDP which had not previously been described in the literature before. FDP repair was augmented with a pull-through technique over a button on the nail plate. Patient was rehabilitated with the usual flexor tendon protocol with hand physiotherapists.

Results:
Full composite fist was reported at 3 months post operatively. He had a DASH score of 0 at latest follow up.

Summary:
Mitek bone anchor fixation for closed rupture of FDS/FDP in a single digit can be an effective method of repair for this rare pathology.
Treatment of a ganglion cyst of the little finger originating from degenerative wrist joint – A case report.

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Objective
We report a recurrent ganglion cyst of the little finger originating from degenerative wrist joint.

Case report
67 years old female had large ganglion cyst of the pulp of her left little finger, and excision of the cyst was performed. One year after resection, the patient needed the treatment of mucous cyst of her little finger. This lesion was excised and covered with rotational flap. One year after mucous cyst resection, the patient needed the treatment of newly-formed dorsal PIP cyst.

Plain radiographs showed degenerative arthritis of the DRUJ, and trapeziometacarpal joint arthritis. MRI showed low intensity in T1 weighted image and high intensity in T2 weighted image around the flexor tendons in the carpal tunnel. This flexor tenosynovitis in carpal tunnel extended towards the little finger.

We diagnosed this recurrent ganglion cyst of the little finger originated from flexor tenosynovitis around the wrist secondary to degenerative wrist arthritis. The DRUJ was fused according to Sauve-Kapandji procedure, and the palmar approach, flexor tenosynovitis was detected and thorough tenosynovectomy and pisiforectomy was performed.

One year after last surgery, no recurrent ganglion cyst was detected in the little finger. MRI showed no tenosynovitis in the carpal canal and little finger.

Summary
The synovial cyst on the pulp of the little finger could originate from degenerative wrist. Flexor tenosynovectomy and concurrent joint salvage procedure could be a good treatment choice for the ganglion cyst originated from flexor tenosynovitis associated with degenerative wrist joint.
Single incision Technique for tendon transfer in Radial Nerve Palsy

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Objectives / Interrogation: One of the drawbacks of the tendon transfer surgery for radial nerve palsy is the resultant multiple scars of the forearm. To overcome this problem we have adopted a single incision technique by harvesting all the tendons and performing the tendon transfers.

Methods: This improves the aesthetic outcome of the tendon transfer surgery. The functional results of the tendon transfer surgery are not compromised by the single incision. The patients were satisfied with the end results of our modification.

Results and Conclusions: We are describing the planning and execution of the tendon transfer surgery using our modified technique and presenting our results of the procedure.
A Biomechanical Comparison Of Suture Anchors In The Repair Of Extensor Tendon Central Slip Avulsions Of The Hand: Study Protocol

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Objectives:
Injuries involving the central slip of the extensor apparatus of the fingers are common. The development of suture anchors has allowed a significant improvement in the strengths as well as outcomes of central slip avulsion repair. However, little biomechanics data exist comparing recently available suture anchors in the treatment of extensor tendon injuries although they are becoming increasingly popular. We aim to perform biomechanical testing to compare the in vitro pull out strength, stiffness and mode of failure of two recently available suture anchors and the traditional pull out suture repair method in human cadaveric finger models.

Methods:
We will extract and subject 30 cadaveric fresh frozen human finger models to biomechanical testing with two types of suture anchors and traditional pull out suture repair. There will be 10 cadaveric fingers used for each repair method. We will perform testings from September to December 2019 and compare relative biomechanical properties of abovementioned methods in human cadaveric finger models.

Results:
We will test and compare the in vitro pull out strength, stiffness and mode of failure of the three different types of central slip injury repair method: two different types of suture anchors and traditional pull out suture repair method.

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Objectives
Acupuncture is widely practised for treating musculoskeletal disorders, including trigger finger. Its adverse effect has been reported from 6.7% to 15%, ranging from infection, bleeding, organ penetration, nerve injury and death. We are presenting a case of flexor pollicis longus (FPL) rupture secondary to acupuncture for trigger thumb.

Methods
A 48-year-old lady with history of right thumb triggering presented with inability to flex her thumb after two months of acupuncture treatment. She visited an acupuncturist for her right trigger thumb and was given 3 sessions of acupuncture needling along her thumb. She described the needling points to be along the volar surface of her thumb. There was no history of infection. Upon examination, she was unable to flex the interphalangeal joint (IPJ) of right thumb and FPL rupture was diagnosed. Two-stage tendon reconstruction was done, with the distal stump of FPL found at its insertion and proximal stump retracted into zone 5. A2 pulley was fibrosed while oblique and A1 pulleys were collapsed.

Results
She was able to flex her DIPJ after second stage of surgery with range of motion 0-45°.

Summary
Acupuncture in the hands can be disastrous especially manipulation of needles in high-risk acupoints. The incidence of adverse effect of acupuncture in hands could be under-reported in English literature. The disparity of level of competency of acupuncturists need to be monitored by health authority.

Reference
Radiographic assessment for Symptomatic Hand Osteoarthritis

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Objectives:
Previous studies indicated high prevalence of radiographic hand osteoarthritis (HOA), however, it is known that radiographic deformity does not necessarily coincide with the clinical symptoms. The purpose of this study is to evaluate the radiographic prevalence and patterns for symptomatic HOA.

Methods:
We performed a cross-sectional review of 96 patients diagnosed with symptomatic HOA on radiography. Five hand surgeons evaluated bilateral hand radiographs and scored each joint according to the Kellgren Lawrence (KL) classification. The average score of five examiners was calculated for each joint (DIP, PIP, MP, and thumb CMC joint) and the total value of each type joint was defined as DIP score, PIP score, MP score, CMC score and total KL score in each case. We assessed the associations between patient age, body mass index (BMI), and KL scores.

Results:
There was a significant correlation between age and KL score, with a particularly high correlation for CMC score (R = 0.62). There was no significant correlation between BMI and KL score. A positive correlation was found between PIP score and DIP score (R = 0.69), however, CMC score was poorly correlated with other joints. The prevalence of HOA was high in the small, the index, the middle finger DIP, and the thumb CMC joint. The severity of HOA was high in the ulnar digits for PIP joints.

Conclusions:
The frequency and distribution of symptomatic HOA were similar to those of previously reported large-scale studies. Osteoarthritis of the thumb CMC joint developed alone and was strongly correlated with age.
HOOK PLATE FIXATION WITH COMBINED EXTENSOR TENDON REPAIR OF BONY MALLET INJURIES TO ALLOW EARLY ACTIVE MOTION REHABILITATION

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Objectives
1/ Develop a fixation of bony mallet type fractures (greater than 30% articular surface) with or without subluxation, to enable early active motion within 2 weeks of surgery
2/ Minimisation of common reported complications such as stiffness, nail deformity and infection

Methods
1/ Patients were identified who met the inclusion criteria of; acute injury, fracture greater than 30% articular surface with or without subluxation, older than 18 and without any concomitant injuries
2/ Surgery was performed by Dr Sharon Chu, Plastic Surgeon
3/ Patients followed an orthotic and rehabilitation program supervised by Occupational Therapists
4/ Surgery to remove the ORIF was provided to some patients as identified by the surgeon

Results
1/ At 12 weeks post-surgery, the average DIPJ extensor lag was 9.4 degrees and average DIP flexion was 53 degrees.
2/ Grip strength at 12 weeks was within 83% of the non-injured hand.
3/ All patients had returned to work.
4/ Complications recorded included; skin erythema, mild infection treated with antibiotics, tenderness with palpation over the plate, plate prominence and suture irritation of nail.
5/ 12/15 patients had their plate removed.

Summary
The major finding of our study is that the changes in surgical procedure does not lead to a poorer outcome than those already reported in the literature. This technique allows early active rehabilitation exercises, reduces skin breakdown, infection and stiffness of the DIPJ. All patients were discharged by 4 months utilising the above protocol.
Cyclic testing of Asymmetric Flexor Tendon Repair Using 3 Different Suture Materials

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INTRODUCTION/OBJECTIVES
Cyclic testing was conducted to compare the biomechanical performance of 3 different suture materials using the asymmetric flexor tendon repair configuration.

METHODS
Supramid Extra II 4-0, Tendo-Loop 4-0, and FiberLoop 4-0 were used for the repairs. Nine porcine flexor tendons were randomly divided into 3 arms and repaired. A total of 1000 cycles at one Hz was tested and split into 2 stages. Stage I and II consisted of 500 cycles run between 2–20 N and 3–33 N respectively. The survival rate and gap formation were then recorded at the end of every 100 cycles. After testing, the tendons were pulled to failure, where the ultimate tensile strength (UTS) and failure mechanism were recorded.

RESULTS
Tendons repaired by Supramid had a 33% survival rate by the end of stage II, with a mean gap formation of 4.63mm (± 5.04). Significantly, one repair even survived beyond 1000 cycles. None of the repairs from Tendo-Loop and FiberLoop survived beyond 800 cycles with the mean gap formation of 4.50mm (± 1.44) and 5.50mm (± 2.43) respectively at the end of 1000 cycles. The UTS was measured at the end of stage II with values being 55.2 ± 1.44N, 55.9 ± 1.44N and 61.5 ± 1.44N respectively for Supramid, Tendo-Loop and FiberLoop, with most repairs predominantly failing due to suture pull-out.

SUMMARY
Supramid has the best survival rate and FiberLoop retained the highest UTS which is consistent with results from the static testing arm (n = 10) of our Biomechanical study.
Perils of Adrenaline, local anaesthetics and the digits; a case report

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During the 1920s a myth was perpetuated that injecting epinephrine in the finger would always lead to finger necrosis. This dogma has now been fixed into medical school teaching in Australia and worldwide. Even with the push towards evidence-based medicine and the landmark Chowdhry et al 2010 paper defending adrenaline in digital blocks, most medical practitioners steer clear of local anaesthetic with adrenaline when considering options for digital blocks.

We present an interesting case of a 26-year-old female who underwent a nail bed excision biopsy by a general practitioner in the community. She presented with a swollen, erythematous and necrotic right index finger. After probing the history further (including collateral from the Practice) it was ascertained that the general practitioner applied initial local anaesthetic without adrenaline and a finger tourniquet. After inadequate haemostasis, the practitioner injected further local anaesthetic with adrenaline into the pulp leading to what we surmise as necrosis of the pulp. She is currently undergoing hyperbaric treatment, oral calcium channel blockers and hand therapy with marked improvement in both sensation and function.

Reliability of two wearable inertial sensor devices for measuring arm activity during gait

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Objective
Tracking movement with body worn sensors allows clinicians to objectively measure limb dynamics during gait analysis. This is useful in conditions like Cerebral Palsy that alter normal range of motion. Our objective was to determine the reliability of measuring wrist acceleration using a commercially available activity tracker and a laboratory-grade IMU sensor.

Methods
Ten healthy volunteers (6 males, 4 females, mean age=31±15.9) were recruited. Participants wore an Apple Watch 4 (AW4) (Apple Inc, Cupertino, CA) and a Xsens sensor (Enscheded, Netherlands) on each wrist during 3 conditions: self-selected walk, fast-walk, and run. Integrated acceleration data and maximum average acceleration per second was collected per arm and condition. Intraclass correlation coefficients (ICC2,1) and Bland-Altman plots were calculated to measure intra/inter-device reliability and to evaluate agreement. Values less than 0.5, between 0.5-0.75, between 0.75-0.9, and greater than 0.90 are indicative of poor, moderate, good, and excellent reliability, respectively.

Results
Intra-device ICCs showed good reliability during walk and fast-walk (0.79-0.87) and excellent reliability during run (0.94-0.97). Inter-device ICC yielded moderate reliability during walk (0.52±0.22) and excellent reliability in fast-walk and run (0.93±0.02, 1.00±0.01). Bland-Altman plots displayed small biases with most data contained within the 95% CI supporting agreement within and between measurement methods.

Summary
The results indicate that AW4 and Xsens can both reliably capture upper extremity motion data during the study's conditions. This is profound because commercially available motion trackers are inexpensive, user-friendly, and have the capability to provide data on activities of daily living, where traditional motion analysis examinations cannot.
Improving Pain while doing WALANT: Aiming for a hole in One

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Wide Awake Local Anesthesia No Tourniquet (WALANT) has popularized in the last years because of multiple benefits reported in the literature. Anesthesiologist and patients may have concerns of pain during the injection of local anesthesia which could be a problem. The aim of our study was to evaluate the improvement in pain during the injection of local anesthesia with WALANT for carpal tunnel surgery cases.

Methods: 1 orthopaedic surgeon (OS) report the number of painful pricks (0, 1, 2 or 3) after the first injection of anesthesia during WALANT injection procedure according to the technique described by Donald Lalonde, we divided the cases in groups of 50 in a correlative order. Statistical Analysis was made using the Friedman test and a post hoc analysis using the Dunn Pairwise test to compare groups (significant statistical difference was accept with a p value <0,05 with IC 95%) Results: Data collected correspond to the first 250 cases of the OS. Friedman test show statistical difference between the groups (p value 0.0000). With Dunn Pairwise test we could established that statistical difference exist between groups 1 and 3 (p=0.0007), 1 and 4, 1 and 5, 2 and 4, 2 and 5 (p=0.0000), 3 and 4 (p=0.0041), 3 and 5 (p=0.0000) and groups 4 and 5 (p=0.0006).

Conclusion: After 100 consecutive cases of performing WALANT anesthesia improvement in pain is achieved, after that number of cases you get less pain in a constant way.
Fibro-osseous Pseudotumour of the Digit

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INTRODUCTION

Fibro-osseous pseudotumour (FP) of the digit is a rare and benign subcutaneous ossifying lesion of the digits. It often presents as a painful, localised swelling that can grow suddenly or over a prolonged period. FP is often misdiagnosed as it resembles a malignant neoplasm, extraskeletal osteosarcoma.

BACKGROUND

Systematic literature review in Pubmed from 1980 to 2018. Five case series were found in the English literature, almost 100 cases reported globally. Several studies have reported misdiagnosis of the benign lesion leading to inappropriate aggressive amputation of digits.

CASE

We present a rare Australian case of FP on the right middle finger with clinical and histopathological images that would help elucidate the diagnosis.

SUMMARY

FP of the digit is a rare subcutaneous lesion. It can be misdiagnosed as a malignant neoplasm clinically and histopathologically. Surgical excision is the mainstay of treatment. The prognosis of FP is excellent, with no tendency toward local recurrence or malignant transformation. FP is a relevant condition to be aware of in order to avoid unnecessary aggressive surgery.

REFERENCES

Unusual presentation of fibroma of tendon sheath arising in the supinator muscle: A case report

Prof Koichiro Ihara1, Dr Takatomo Mine1, Dr Hiroyuki Kawamura1, Dr Ryutaro Kuriyama1, Dr Yasuhiro Tominaga1, Dr Tomoyuki Murakami2

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(Objectives) Fibroma of tendon sheath (FTS) was first reported by Chung and Enzinger in 1979. The most common sites of involvement in the upper extremity are fingers, hand, and wrist. Here, we reported a rare case of FTS arising in the supinator muscle.

(Methods and Results) A 73-year-old man noticed a mass in his right proximal forearm 3 months before presentation. After 2 months of watchful waiting at a clinic nearby, he began to feel some pain, and was referred to our hospital after taking magnetic resonance imaging, which revealed a mass surrounding the proximal radius. The mass was elastic hard and slightly tender. There was no restriction of motion in his right elbow and forearm.

The mass showed low intensity on both T1 and T2-weighted images, and gadolinium enhancement was delayed and very weak. Therefore, we decided to perform the surgery without biopsy. Henry’s approach was used, and the tumor of 40x30mm, was exposed under the supinator muscle. Meticulous dissection was performed, because a posterior interosseous nerve ran through the capsule. En bloc resection was accomplished, but partial nerve palsy occurred. Pathologic examination confirmed FTS. Complete nerve recovery was obtained 3 months after surgery.

(Summary) FTS commonly arise in the distal upper extremity as a mass under 2cm. Proximal forearm is unusual site as an involvement. Lipoma and ganglion are well known tumor arising in the supinator muscle, which may cause posterior interosseous nerve palsy. FTS should be reminded as one of tumors arising in the supinator muscle.
Well-Differentiated Liposarcoma Disguised as a Recurrent Giant Lipoma of the Forearm: A Case Report

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Objectives
Lipomas are common benign mesenchymal tumor arise from the adipose tissue. Typical lipomas are rubber-like painless mass that grow slowly subcutaneously. Lipomas with the size of more than 5 cm/giant lipomas are rare and usually deep-seated. Symptoms usually occur in upper extremity giant lipoma due to its compression to surrounding structure. Differential diagnosis between the benign and malignant form (liposarcoma) must be made to prevent complication and recurrence.

Methods
We reported a 63-year-old man presented with recurrent giant lipoma on the right forearm with the first presentation approximately 28 years before treated in our center. Main complaints are discomfort, social embracement, and difficulty in clothing. There are no compression symptoms observed. We performed marginal excision and sent the sample for histopathological examination.

Results
Histopathological examination revealed a well differentiated liposarcoma (WDL) with Lipoma-like subtypes. No functional limitation before and after tumor excision. During 6 months of post-operative period, no recurrence was detected and a complete relief of symptoms is as expected.

Summary
Diagnostic challenge in giant lipoma is in differentiating it with the malignant form. Surgical excision is the choice of treatment. However, long-term follow up is needed due to the risk of recurrence.
Intra and extra-articular fibroma of the tendon sheath in the metacarpophalangeal joint of the thumb: A case report.

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Fibroma of tendon sheath is an uncommon benign soft tissue tumor with a predilection for the hand. An extremely unique case involving the inside and outside of the metacarpo-phalangeal joint of the thumb with bony erosion is reported. A 35-year-old patient presented with pain and mild swelling of the metacarpo-phalangeal joint of her right thumb for 6 months. On X-ray, bony erosions of dorsal and volar metacarpal head were present. MRI revealed well-defined intra-capsular lesions seen dorsally and volarly to the metacarpal head with bony erosion. The lesions were slight hyperintense with partially heterogenic hyperintense on T2-weighted and isointense on T1-weighted. The intensity of bone marrow of the metacarpal head between dorsal and volar mass was normal. By dorsal approach, the dorsal extra-articular tumor beneath the extensor pollicis longus tendon and sagittal band was loosely dissected. However, it was excised including some part of the capsule because of dense adhesion to the capsule. After then intra-articular lobulated tumor contiguous to the resected capsule was spontaneously exposed to the operative field. The volar tumor which was separated from dorsal one was curettaged including the normal capsule overlying the tumor by volar approach. Histologically the dorsal and volar tumor represented a fibroma of tendon sheath. At 6 months follow-up, the patient reported no subjective symptoms and there were no signs of recurrence. The tumor is discussed and the relevant literature is reviewed.
DIAPHYSEAL SCREW PROMINENCE IN DISTAL RADIUS VOLAR PLATING

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Objectives
Complications of volar plating are uncommon but screw prominence on the “far cortex” can lead to tendon injury. No studies have addressed the potential for screw penetration in the diaphysis. We describe 2 cases where diaphyseal screws were symptomatic and investigate in a synbone model.

METHODS
Three models were plated using Synthes volar plate. The 3 diaphyseal screws were inserted, 2mm longer than the measured. They were redrilled in 15 deg of ulna and radial angulation and remeasured.

The synbones were placed in a custom clamp with an inbuilt protractor to measure rotation. Lateral XR were taken at 0 deg rotation, 5, 10 and 15 degrees of supination and pronation. The prominence of each screw was measured using the synapse digital ruler in each position to identify when the tip was most visible on XR.

RESULTS
For screws at a neutral angle maximum visualization occurred around 0 degrees’ rotation. With screws angled 15 degrees’ ulna maximum visualization was at 5-10 degrees’ pronation. With screws angled 15 degrees’ radial maximum visualization was between 5-10 degrees of supination. Every 5 degrees of rotation changes the profile of the screw a mean of 0.4mm

Summary.
The diaphysis of the radius becomes trapezoidal. Prominent screws below the “peak” may appear to be the correct length depending on the angle of the XR beam. Screws that are prominent in the 2nd compartment may be symptomatic as the tendons are closely opposed to the bone. We recommend screening in neutral, 10 degrees’ pronation and supination.
Soft tissue tumors of the hand and wrist

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[Objectives] We carried out a review of all patients who underwent excision of soft tissue tumors of the hand and wrist.

[Methods] 43 patients treated with excision of soft tissue tumors of the hand and wrist at the Department of Orthopaedic surgery of our medical center between July 2011 and October 2018 were investigated. The diagnosis was confirmed by pathological examination. Age, gender, location, resection margin, recurrence, and postoperative complications histologic diagnosis were investigated.

[Results] In 8 of them were localized on the wrist, 11 on the hand, 24 on the fingers. 41 were performed with marginal resection and 2 with enucleation. Two patients had a recurrence and 7 patients had a complication (numbness, joint contracture, nail deformation, skin necrosis) after an operation, but none suffered from daily life. All of them were benign tumor, 11 of giant cell tumor of tendon sheath (GCT-TS), 6 of ganglion, 6 of glomus tumor, 6 of lipoma and others.

[Summary] In this study, GCT-TS, ganglion and glomus tumor occupy a large proportion. It shows that is specific in the hand and wrist compared to tumors at other sites.
Acrometastases masquerading as a fingertip infection in a patient with a cystosarcoma phyllodes tumor

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Acrometastases are an extremely rare entity which account for 0.1% of all metastases. Breast malignancies account for 10.2% of these rare lesions.1 Phyllodes tumours are rare fibroepithelial lesions, which account for 0.3% to 0.5% of all breast tumours.2 They are predominantly benign but may be malignant with 10% of cases presenting with metastasis.1 Due to the rarity of acrometastases and the manner in which they present, patients are commonly misdiagnosed with other more common diagnoses such as fingertip infections. We present an interesting case of a malignant phyllodes tumour with acrometastases to the distal phalanx of the left middle finger in a 58-year-old lady, which was diagnosed as a fingertip infection on 2 separate occasions. This report aims to highlight the possibility of acrometastases masquerading as a fingertip infection and the importance of having a high index of clinical suspicion in making an early and correct diagnosis. The authors also aim to add to the limited current literature on malignant phyllodes tumor with acrometastases.

References:
Intramedullary Headless Compression Screw Fixation for 5th Metacarpal Fractures: A Series of 5 cases

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Objectives
We aim to evaluate clinical and radiographic outcomes in patients treated with intramedullary headless compression screw (HCS) fixation for 5th metacarpal fractures.

Methods
We reported 5 consecutives of cases of 5th metacarpal fracture consisted of: 2 neck fractures, 2 neck-sub-capital comminuted fractures, and 1 segmental neck-shaft fracture. All are treated surgically with buried intramedullary HCS fixation.
Pre-operative magnitude of metacarpal angulation averaged 46.2 degrees (range, 17 to 70). Four patients with rotational deformity. Clinical outcomes were assessed by range of motion evaluation and grip strength test. Functional outcomes were determined using the Quick-DASH (Disabilities of the arm, shoulder and hand) score. Time to radiographic union was assessed. Any complication was observed within minimum 3-month follow-up.

Results
At 3 month-follow up, all patients demonstrated full active metacarpophalangeal joint flexion and extension with no rotational deformity. Grip strength measured 90% (range, 85% to 95%) of the contralateral hand. Quick-DASH score were satisfactory. No secondary surgeries or complications were observed. All patients achieved radiographic union by 6 weeks.

Conclusions
HCS Fixation for treating metacarpal fractures is proved to be safe, simple and stable. It also allowed for early return to activity with lesser complication rate.
Comparison of bending strength between plate fixation, Steinmann pin fixation, and headless compression screw fixation group for proximal ulnar shaft fractures in Sawbones

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Background
The objective of this study was to compare the bearing forces of each fixation methods by applying bending forces to ulna saw bones fixed in various ways.

Method
Transverse type fractures (AO / OTA 2U2A3a) were made intentionally at the distal 7 cm from the proximal end of ulna saw bones. Total 21 saw bones were used and were separated to three groups by fixation methods, 7 pieces for each. Three groups were as follows; plate fixation group, headless compression screw (HCS) fixation group, Steinmann pin fixation group. The load to failure curve was obtained by applying bending forces using INSTRON E3000.

Result
Average ultimate bending strength for each group were as follows; 521.7N (range, 339.5 to 675.8N) for plate fixation group, 706.4N (range, 662.9 to 725.2N) for HCS fixation group, and 812.6N (range, 794.0 to 832.7N) for Steinmann pin fixation group. With the Kruskal-Wallis test, average bending strength between three groups showed significant difference (P value <0.001). Post-hoc test was done to compare each combination of two groups. Significant difference was seen in tow combinations; Steinmann pin versus plate fixation group (P values<0.01), Steinmann pin versus HCS fixation group (P value 0.047). There was a significant trend in one combination; HCS versus plate fixation group (P values 0.064).

Conclusion
This study suggests that fixation methods other than plate osteosynthesis such as Steinmann pin and headless compression screw fixation can be possible alternatives for fixation in proximal ulnar shaft fractures.
Conservative treatment for refracture of operatively treated mallet fractures. 2 case reports.

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Mallet fractures are common injuries in the finger, but refracture of post-operative mallet fracture is rare. Traditionally, surgeons recommended surgery for injuries involving more than one-third of the DIP joint articular surface and those with subluxation or displacement. If the patients don't want to choose the operative treatment, only the conservative treatment should be chosen. We reported the conservative treatment for two rare cases of refracture of post-operative mallet fracture in childhood. Case1: 13 y/o female injured her left ring finger during balleyball.4days after injury, closed pinning(Ishiguro method) was performed. X-ray showed good bone heeling after 5weeks, k-wires were removed and she started finger exercise.3months after operation, she injured same finger during balleyball. This time she refused the operative treatment, conservative treatment was started. Case2: 13 y/o female injured her right index finger during basketball.5days after injury, closed pinning(Ishiguro method) was performed. X-ray showed good bone heeling after 5weeks, k-wires were removed and she started finger exercise.4months after operation, she injured same finger during basketball. As the mallet bone fragment was little bit small compared to case1, so conservative treatment was chosen. X-ray and ROM of injured DIP joint assessment were done. Milford criteria was used for clinical assessment. Results and Conclusions: X-ray showed bone union at 4 months’ period for two cases. Each case of the ROM of DIP joint was almost full. Clinical assessments by Milford criteria were excellent in case1, and good in case2. But case 1 showed swan-neck deformity slightly. Conservative treatment for mallet refracture took 4 months period for bone union and showed almost good clinical results, if the DIP joint subluxation was not exist.
Outcomes of Surgical Treatment of AO/OTA type C distal Humeral fractures

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Objectives: AO/OTA type C distal humeral fracture occur various post-operative complications. We investigated the postoperative complication of surgical treatment of AO/OTA type C distal humeral fractures.

Methods: A retrospective study of patients who underwent surgery for AO/OTA type C distal humeral fractures from April 2012 to July 2014 was performed. This multicenter retrospective study was conducted at 11 institutions. Complications of fractures at presentation, surgical procedures, development methods, the presence and timing of bone healing, elbow joint range of motion at the time of final observation, and any post-operative complications within at least 12 weeks were studied.

Results: Twenty-nine surgical cases of AO/OTA type C distal humeral fractures with age ranging from 20 to 84 years (average 65 years) were identified. Out of them, 27 cases had follow-up for at least 12 weeks after surgery. Postoperative complications included seven cases of ulnar neuropathy. The methods of fixation in these cases were as follows: both sides plate installation in six cases, medial plate and lateral Kirshner wire in one case.

Discussion: Ulnar neuropathy was observed in 7 cases (24%) as a postoperative complication. In the cases of ulnar neuropathy, medial plate was used in all cases.
Low-Intensity Pulsed Ultrasound (LIPUS) in Hand fractures: A Case Study

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Low Intensity Pulsed Ultrasound (LIPUS) has been increasingly used in soft tissue and fracture healing. Recent research proposes LIPUS can enhance bone repair, angiogenesis, progenitor cell recruitment and differentiation, callus mineralisation and remodelling (Della Rocca et al. 2018). This non-invasive therapy is advantageous because of reduced healing time, improved quality of life and potentially reduced pain in fingertip injuries (Best et al. 2016). We present a patient case following a traumatic fingertip injury with associated distal phalanx bone loss, to demonstrate the potential improved clinical outcomes for an under-utilised therapy.
Simultaneous trapezium and first carpometacarpal fracture dislocation - A report of Double Percutaneous Fixation technique

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Simultaneous fracture of trapezium and Bennett fracture is uncommon. This condition usually manages by open reduction and internal fixation. We report a case of 20-year-old man, collegian, treated by closed reduction and percutaneous fixation of trapezium and Bennett fracture. There was no post-operative complication. At 1-year follow up, the patient can return to normal function without pain and the radiographic study showed no evidence of osteoarthritis change of first carpometacarpal joint. Closed reduction and percutaneous fixation might be the alternative treatment for this type of fracture.
Ligament reconstruction for traumatic dislocation of the first carpometacarpal using the Mini TightRope: A case report

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Objectives
Traumatic dislocation of first carpometacarpal (CMC) is a rare occurrence. We report an excellent result using the Mini TightRope suture button fixation for this type of trauma.

Method
A 51-year-old Asian male who injured his right first CMC due to falling on his motorcycle. His CMC joint was loose, and further CT examination showed that small bone fragments in the CMC joint. Surgery performed by using the Wagner approach, a longitudinal capsulotomy for exposing CMC and removing cartilage pieces. 2.6 mm suture buttons were tightened up on both radial side of the first metacarpal and the ulna side of the second metacarpal, linked with FiberWire. Last 1.1mm diameter Kirschner wire was inserted into the first metacarpal and the second metacarpal shaft, for the temporary fix. We evaluated postoperative hand function.

Results
Sixty-five degrees of radial abduction and 75 degrees of palmar abduction had maintained at the five weeks after surgery. The Kapandji score was 10 points at 11 weeks. The interval thumb total active motion (TAM) had almost no difference; 100 degrees in the right hand and 105 degrees in the left hands. Patient-rated wrist evaluation score was one point, and 11-item version of the Disability of the Arm, Shoulder, and Hand score (QuickDASH) was 0 point at 1.5 years after surgery.

Summary
The Mini TightRope, which also uses in the thumb deformity of the CMC osteoarthritis, maybe a simple way to fix the traumatic dislocation of CMC.
Validity of the distance between the anterior humeral line and capitellum for supracondylar humeral fracture in children.

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Poster Session 4 - Touchscreen 1, March 14, 2020, 1:15 PM - 2:00 PM

Objectives
The anterior humeral line (AHL) is a radiographic marker in lateral radiographs used to quantify anterior-posterior displacement in humeral condylar fractures. We analysed the distance between AHL and capitellum (AC distance). We investigated inter-observer and intra-observer variability in the AC distance, Baumann angle, and the tilting angle in supracondylar humeral fractures in children. We also compared these radiological parameters in children who underwent lateral pin fixation and those who underwent crossed pin fixation.

Methods
Forty-two patients who had suffered supracondylar humeral fractures were enrolled. Twenty-eight patients were fixed by cross pinning and fourteen patients by lateral or lateral and posterior pinning. AC distance, Baumann angle, and tilting angle were measured in radiographs taken immediately following surgery and following bone union. Correction loss was calculated and defined as a change in AC distance, a change in tilting angle, and a change in Baumann angle.

Results
Intra-observer variability in AC distance, tilting angle, and Baumann angle were 0.93, 0.73, and 0.92, respectively. Inter-observer variability in AC distance, tilting angle, and Baumann angle were 0.84, 0.46, and 0.79, respectively. The change in AC distance in the lateral pinning group was significantly higher than that in the crossed pinning group.

Summary
AC distance is the most reliable method used to measure radiographs as compared to Baumann angle and tilting angle. AC distance is thus useful in conducting accurate quantitative studies in the sagittal plane for supracondylar fracture.
Equol supplement for disorders of hands in menopausal women

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Poster Session 4 - Touchscreen 2, March 14, 2020, 1:15 PM - 2:00 PM

[Objective] Despite menopausal women frequently experience pain or numbness in their hands due to osteoarthritis, entrapment neuropathy or tenosynovitis, there were no specific treatment for these menopausal women’s conditions. We report the treatment of this condition with equol supplement.

[Methods] Thirty-five women who have pain or numbness in their hands were included. The mean age was 53.4 (3 cases between 36-44yo, 26 cases between 45-60yo, and 6 cases between 61-80yo). 9 cases of tenosynovitis, 6 cases of entrapment neuropathy and 25 cases of osteoarthritis were included. 16/26 cases (61.5%) aged between 45-60 experienced systemic menopausal symptoms (ex. hot flashes). 10mg/day of equol supplement was administered for all patients during the follow up periods. We investigated the improvement of hand symptoms for all patients and associated systemic menopausal symptoms for women aged 45-60.

[Results]
Improvement of hand symptoms was found in 61.5% and associated menopausal symptoms in 87.5% for 45-60 yo patients. On the other hand, only 33.3% improved the hand symptoms for 36-44 yo and 16.7% for 61-80 yo.
These patients showed improvement within 3 months after administration of equol.

[Summary]
Equol, a metabolite of the isoflavone daidzein, has estrogen-like properties.
The effectiveness of equol for hot flashes in postmenopausal women was reported in the literature. We speculate estrogen-like properties of equol contributed to the improvement of hands symptoms according with the fact that equol administration was highly effective for women aged around menopausal status.
Equol supplement can be a good treatment option for menopausal women’s various hands symptoms.
An Analysis of Factors that Influence the Severity of Inflammatory Hand Lesions in Diabetes Mellitus Patients

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Purpose: We sought to determine the factors associated with the severity of aggravated hand lesion in patients with diabetes mellitus (DM).

Methods: DM patients with hand lesions ranging from non-suppurative/suppurative to gangrenous (which require surgical treatment) were selected for analysis. Between January 2008 and June 2016, 216 patients with signs of redness, swelling, and pain with lesions between the fingertip and wrist were analyzed retrospectively. Patients were grouped according to whether they received conservative treatment (group 1) or operative treatment (group 2), and univariate and multivariate analyses were performed according to demographic, laboratory data, co-morbidities, and method of diabetic treatment in both groups.

Results: Age, duration of the morbidity, gender, smoking, co-morbidities, body mass index, other laboratory findings, onset time before treatment, and the presence/classification of trauma history, were all not significant. However, Hb1Ac was found to be 5.96%±0.80% and 8.01%±0.82% in group 1 and 2 respectively, which differed significantly (OR=58.5, p<0.001).

Conclusion: It is possible to manage hand lesions in DM patients with a variety of methods, ranging from conservative to surgical treatment. HbA1c level was determined to be the most important contributing factor in selection of the more rigorous surgical treatment. Moreover, it was determined that even subtle lesions should not be neglected in DM patients as they are susceptible to rapid progression if left untreated.
Effects of G-TES and HAL-SJ on the Upper Limb Swelling of Crush Syndrome with Severe Motor Paralysis: A Single-Case Study with Two-Standard Deviation Band Analysis

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Poster Session 4 - Touchscreen 2, March 14, 2020, 1:15 PM - 2:00 PM

Objectives: This case involved a patient with crush syndrome who received occupational therapy that could not activate the movements of the elbow, wrist, and finger joints in the left arm having swelling and motor paralysis. Attempted treatments included elevation, massage, manual edema mobilization, passive ROM exercise, and active-assistive ROM exercise. None of these improved the patient’s swelling. However, when muscle contraction was facilitated by repeat active-assistive ROM exercise with robot suit HAL single joint-type (HAL-SJ) (Cyberdyne) and muscle contraction was induced by a general therapeutic stimulator (G-TES, Homer Ion Laboratory), the swelling improved. The purpose of this study was to evaluate the effects of G-TES and HAL-SJ on swelling with motor paralysis.

Methods: G-TES is a low-frequency treatment device that electrically stimulates skeletal muscle via belt electrodes. HAL-SJ assists joint movement by sensing biopotential signals. This study used an AB design and two-standard deviation band analysis. G-TES and HAL-SJ were not used in phase A (days “6” to “16”), but treatment with G-TES and HAL-SJ occurred throughout phase B (days “17” to “31”). The outcome measure was upper limb circumference.

Results: Following phase B, the patient’s upper limb circumference decreased by more than two standard deviations to average of the phase A. Notably, the patient’s swelling improved.

Summary: Facilitation of muscle contraction by G-TES and HAL-SJ may improve swelling with motor paralysis.
Lifecycle Analysis of Single-Use Verse Multi-Use Surgical Power Tools

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Poster Session 4 - Touchscreen 2, March 14, 2020, 1:15 PM - 2:00 PM

Introduction
The purpose of this paper is to assess the lifecycle, economics an environmental impact of single-use verse multi-use surgical power tools.

Manufacturing
By comparing the GWP100 impact for both sheet metal forming and injection moulding, the multi-use power tool has a much greater impact on the environment during the manufacturing stage.

Packaging
A proposed single-use surgical power tool is to be packaged in a paper-based packaging. A multi-use surgical power tool is packaged in a sterilised aluminium case. This type of packaging has environmental impacts involved in the production of the material.

Purchasing
As single-use devices are typically smaller in size, less complex in design, and made using cheaper materials, this device should cost less in total compared to a reusable power tool.

Sterilisation
Sterilisation of multi-use tools consumes large amounts of electricity, having an impact on the environment.

Maintenance
The cost of maintenance increases the overall cost of a multi-use device.

Disposal
A multi-use power tool is made of stainless steel, which can be recycled, and uses rechargeable lithium ion batteries, which are sent to landfill, but can also be recycled. Single-use devices are usually disposed in hospital waste, which becomes landfill, however they can be recycled if dissembled.

Conclusion
The multi-use power tool has the greatest environmental impact during sterilisation, whereas the single-use power tool is during disposal. Considering the requirement of a larger number of single-use, compared to the high cost of reprocessing multi-use power tools, the total cost of each device could be similar.
What is the influence of purposeful activities on upper extremity motor performance? A systematic review

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Objective: Following upper extremity injury, exercise-approaches are commonly used to address motor impairments. Occupation-based approaches are also used but less widely promoted. Movement performed during activities and occupations with purpose/meaning may yield better motor performance than during non-purposeful tasks such as exercise. This review investigates the influence of participation in activities and occupations with purpose/meaning on immediate upper extremity motor performance in healthy and musculoskeletal populations.

Methods: Four databases were searched for studies in healthy or upper extremity musculoskeletal injured adults, that compared motor performance during occupations with meaning or purpose against occupations without purpose, simulated activity or rote exercise. Quality evaluation was conducted using a modified version of the Downs and Black Quality Index.

Results: Twenty-one studies were included. Most were of moderate quality and conducted in healthy populations. Results suggested that upper extremity movement quantity and quality was enhanced when performed during purposeful conditions. In the majority of studies, participants performed a greater number of repetitions when engaged in purposeful or naturalistic activities compared with non-purposeful or simulated tasks. In general, movement and reaction time was quicker, smoother and more direct in purposeful activity groups or conditions.

Implications: Activities and occupations with meaning/purpose may be used following upper extremity injury to enhance movement and address motor impairments to a greater extent than is currently promoted.
Recurrent Spontaneous Carpal Tunnel Haematoma – A Case Study

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**OBJECTIVES**
The objective of this study was present a case of recurrent spontaneous carpal tunnel haematoma. This case focuses on a patient on anticoagulants, who presented with a haematoma of the carpal tunnel producing median nerve neuropathy, and despite having a carpal tunnel release, re-presented some years later with the same diagnosis.

**METHODS**
The medical records were used to demonstrate the patient’s stay in hospital and their long-term recovery following a second decompression surgery.

**RESULTS**
Haematoma of the carpal tunnel causing median nerve symptoms is thought to be a rare diagnosis, particularly in the absence of trauma. However, with increasing levels of anticoagulation in an aging population; it is a diagnosis that will undoubtedly become more common. This case demonstrates that despite a previous carpal tunnel release, the compressive forces resulting from a haematoma in the wrist can still cause median nerve neuropathy. This highlights the need for this diagnosis to be considered and investigated as should it occur rapid evacuation in theatre will be required.

**SUMMARY**
This interesting case of recurrent spontaneous carpal tunnel haematoma demonstrates the need to consider this seemingly rare diagnosis in patients who present with sudden onset of median nerve symptoms, particularly with increasing levels of anticoagulation in an aging population.
Cost and profile of acute hand and wrist injuries in the Emergency Department

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Poster Session 4 - Touchscreen 2, March 14, 2020, 1:15 PM - 2:00 PM

Background: Injuries to the hand and wrist are estimated to account for 20% of all Emergency Department (ED) presentations. The economic burden placed on the health-care system can be extensive and rise sharply with the increase of severity.

Objectives: This cost-of-illness study was performed with the aim of estimating the economic implications of hand and wrist injuries requiring ED presentation from a health-care system perspective.

Methods: Data from two EDs were retrieved from the electronic records of one large hospital network across two financial year periods (2014-15 and 2015-16) using ICD-10 codes. All costs that resulted from the treatment of any acute hand or wrist injury across the two-year period were calculated and are presented by age, sex, injury type, and mechanism of injury.

Results: A total of 10,024 individuals presented to the two EDs in the two-year period, accounting for approximately 5.4% of all presentations. The most common presentations were males (62.19%); people aged 25-34 years (26.85%); and lacerations (31.15%). The total cost in the two-year study period was $3,959,535.38 ($1,923,852.38 in 2014-15; $2,035,683.00 in 2015-16). The median cost per presentation was $275.97 (IQR $196.05-$412.47) in 2014-15 and $270.14 (IQR $182.07-$420.70) in 2015-16.

Summary: Hand and wrist injuries are associated with a considerable volume of ED presentations and represent a significant component of health expenditure. Further research on how to reduce avoidable injuries should be seen as a priority area to reduce the cost of these injuries to the health-care system and society.
Investigation of schwannomas in the forearms, hands, and digits

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Poster Session 4 - Touchscreen 3, March 14, 2020, 1:15 PM - 2:00 PM

Objectives: This study aimed to evaluate pre- and peri-operative findings and assess the accuracy of diagnosis and surgical outcomes of schwannomas of the distal upper extremities.

Methods: We identified 24 patients with isolated tumors; their mean follow-up time was 10.6 months. Seven patients had schwannomas located in the forearm, eleven in the hand, and six in the digits. We collected data on preoperative findings, provisional diagnosis, surgical findings and procedures, tumor volume, and postoperative findings.

Results: All patients with forearm schwannomas were diagnosed preoperatively by the presence of the Tinel-like sign and suggestive magnetic resonance imaging findings. In contrast, schwannomas in the hands and digits were often lacking these diagnostic features; only five patients with hand schwannomas and one with digit schwannoma were correctly diagnosed. Microsurgical enucleation was the most common treatment. Ten patients reported newly acquired numbness after operation, although this resolved within the follow-up period in all patients. Three out of the four patients with preoperative numbness and the one patient who underwent enucleation with surgical loupes still had numbness at the final follow-up.

Summary: In schwannomas of the distal upper extremities, a more distal location is associated with a lower occurrence of the Tinel-like sign and less suggestive magnetic resonance imaging findings, resulting in lower diagnostic accuracy. However, intraoperative diagnosis is usually straightforward and microsurgical enucleation does not cause iatrogenic nerve deficit. When treating soft tissue tumors in the hand and digits that present without specific or suggestive findings, the possibility of schwannoma should be considered.
MRI ANALYSIS OF THE PATHOANATOMY OF CAMPTODACTYLY

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OBJECTIVES
Many anatomic structures surrounding the proximal interphalangeal joint have been implicated in the pathogenesis of camptodactyly. There is currently no consensus on the cause of camptodactyly and the treatment of camptodactyly remains controversial. This is a prospective case series of patients with camptodactyly undergoing MRI to evaluate these structures.

METHODS
Camptodactyly involved the little finger only in all cases. The ring finger was uninvolved and was included in the MRI for comparison. A 3-Tesla MRI was performed in two positions. First with the little finger in maximal proximal interphalangeal joint (PIPJ) extended posture, and with the normal ring finger PIPJ held at the same degree of extension deficit. Secondly with the fingers in full flexion. All described structural anomalies were examined and analysed by two radiologists with subspecialised fellowship training in musculoskeletal MRI.

RESULTS
Eight patients participated in the study with an age range from 14 to 26 years. The A3 pulley was found to be thinned and non-functioning. Thinning of the volar plate in PIPJ was also observed. No abnormalities were detected in the flexor tendons, lumbricals, extensor tendons, or collateral ligaments.

SUMMARY
Although dynamic assessment of the PIPJ contracture is not possible, this study demonstrated the use of MRI as a comprehensive and non-invasive modality to examine the previously described pathoanatomical anomalies causing camptodactyly.
Vascularised Island Nail Flap for Finger Macrodactyly: A Case Report

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We present a case of isolated finger macrodactyly reconstructed with a single staged, multi-technique surgical procedure. This surgical procedure comprises of a vascularised island nail complex transfer, distal phalanx amputation, epiphysiodesis of middle phalanx and bony cum soft tissue debulking all done in one setting. Follow-up at 6 months revealed a satisfactory aesthetic and functional outcome.
Long term result after multiple reconstructive surgery and adjuvant treatment for giant cell tumor of distal radius with multiple pulmonary metastasis: A case report

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Objectives: We reported our experience for the treatment and long term outcomes of patient with aggressive giant cell tumor of distal radius with pulmonary metastasis.

Methods: A 24-year-old Thai male presented with giant cell tumor of bone at left distal radius. He underwent extended curettage and fixation. Four months later, the tumor recurred and he had repeat multiple extended curettage and fixating operations for 6 times before wide resection of distal radius and fixed it with the ulnar bone but the tumor still recurred. He had multiple pulmonary metastases. He could not be able to work due to pain and dyspnea. We performed wide resection and reconstruction with recycling autograft and fill the bone defected with Zoledronic impregnated bone cement to prevent the local recurrence and use denosumab for treatment unresectable pulmonary metastases. Unfortunately, a fracture occurred along host graft junction. Shorten the affected limb and fusion with locking plate and bone graft were done. The defected soft tissue was closed by local rotating fasciocutaneous flap and the hyperbaric oxygen therapy was performed. Denosumab was given monthly for 3 years and continuously every 3 months for pulmonary metastasis.

Results: He still no local recurrence or progression of pulmonary metastases for more than 10 years. Furthermore, he could work with minimal limitations.

Summary: Good clinical outcomes and life expectancy more than ten years in patient with aggressive giant cell tumor of the distal radius with pulmonary metastases who treated with multiple wide resection, reconstruction and systemic adjuvant therapy.
Object
Congenital proximal radio-ulnar synostosis (PRUS) is a rare congenital anomaly and mobilization is still a challenging problem because of the high tendency of re-ankylosis after separation. Functional evaluation of PRUS is difficult because of few suitable evaluations of forearm rotation for growing child. We mobilized PRUS and evaluated patients with Ryudai PRUS 20 (R-20) developed to evaluate upper extremity function.

Materials and Methods
We mobilized 19 forearms in 16 PRUS patients and followed up over 2 years. There were 8 boys and 8 girls. Age at surgery averaged 6.3 years. The radius head dislocation was posterior in 11, anterior in 6 and none in 2. We examined range of forearm rotation and evaluated upper extremity function with R-20 and WeeFIM (functional Independence Measure for Children) before surgery and over 2 years after surgery. R-20 composed of 20 items which evaluate upper extremity function weighed more in forearm rotation. 100 points means no limitation and 20 points is worst score.

Result
Mean preoperative forearm ankylosis was 40.3° of pronation. Preoperative R-20 is mean 71.3 points and WeeFIM is 124.9 points. There were no re-ankylloses after mobilization. Mean post-operative forearm rotation was 80.8” (31.3” in supination and 49.5”in pronation). Postoperative R-20 was 93.2 points and WeeFIM was 126 points. R-20 was significantly improved after surgery (p<0.05), whereas, WeeFIM was not.

Summary
Mobilization of PRUS improved upper arm function evaluated with R-20.
Case reports clinical use of Static Progressive Splint

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Objectives: The static progressive splint has been used to increase the range of motion of contracted joints. This splint is constructed of a static splint with a non-elastic component; such as screws, belts, turnbuckles etc. The purpose of this study is to report clinical cases of static progressive splint application for the treatment of joints contractures, as well as share clinical reasoning and ideas.

Methods: Two types of static progressive splints were applied for a case of proximal interphalangeal joint contracture of the left Ring finger, post pinning. One splint for increasing extension range of motion was constructed of a non-elastic “screw” component, and the other for increasing flexion range of motion was constructed of a non-elastic “belt” component. This patient was instructed to alternate wearing the two types of splints, and to add torque to the joint by twisting the screw, or tightening the belt every 5 minutes for 6 repetitions per splint. Each session was repeated maximum of 3 times a day, and continued from the 5th week till the 12th week post injury.

Results: Extension range of motion was improved from -15 to 0 degrees at 4 weeks, and at 7 weeks flexion improved from 40 to 90 degrees.

Summary: Static progressive splint allows patients to increase the torque to joints themselves according to changing subtleties. Patient-controlled stress to joints can aid in reduced pain during splinting more so than therapist-controlled treatment. This provides new maximum tolerable length to shortened tissues.
Massive Complex Macrodactyly - What if parents do not agree to amputation? Long term functional outcome of reconstruction and assessment of parental and child satisfaction

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Objectives: Massive macrodactyly associated with syndactyly is difficult to reconstruct. Early amputation is advised to facilitate the function of normal fingers. Reconstruction might involve multiple stages, wound healing complications and unpredictable functional and aesthetic outcomes. In spite of counseling some parents do not agree for amputation. Literature is sparse on techniques and long term outcomes of reconstruction of such children. This paper is to present our experience in decision making.

Methods: Two children, with massive macrodactyly with syndactyly of middle and ring fingers were reconstructed starting at 7 and 8 months of age needing 7 and 6 surgical interventions. Soft tissue and skeletal reduction, syndactyly separation, free nail bed grafting were done. Children were assessed at 8 and 11 years with ROM, morphological measurements, 2PD, grip strength. PROMIS, PODCI and 5 point Likert Scale for hand appearance in MHQ were used.

Results: Children and parents strongly agreed positively to the 4 points of Likert scale for hand appearance (MHQ). In PROMIS children scored high for peer relationship and life satisfaction, had anxiety, depression and upper extremity scores as normal population. In parent reported PODCI, upper extremity function, transfer mobility, sports and physical function, happiness/pain, global function they scored higher than the normal population. There were no wound healing complications.

Summary: Positive functional and aesthetic outcomes show that surgeons can start with hope if parents do not agree for amputation. Radical soft tissue and skeletal reduction, nailbed relocation, and no wound complications are important for success. Parents accepted multiple procedures.
Malignant transformation of Ollier’s disease in the hand
-Case report of 2 cases-

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Introduction: Cases with multiple enchondroma in one side of the body is called Ollier’s disease. Ollier’s disease shows malignant transformation occasionally outside the hand, but malignant transformation of the enchondroma at phalanx bone and metacarpal bone is very rare. Here we report 2 cases of Ollier’s disease of the finger which showed malignant transformation to large chondrosarcomas.

Case 1: 78 years old male, case of ring and little finger. He had undergone surgery of bone tumor of his finger when he was a teenager. He showed a bony tumor with 8 cm in size. The phalanx bone were destroyed with calcification outside the bone. After open biopsy, chondrosarcoma was suspected and amputation of the ring and little fingers were conducted. After 9 years follow up, no recurrence is seen.

Case 2: 71 years old female, case of index and middle finger. She showed a large bony tumor with skin ulcer. Malignant transformation of Ollier’s disease was suspected. Resection of the extraosseous lesion, curettage of the intraosseous lesion and filling with beta-tricalcium phosphonate was conducted. The final pathological diagnosis was chondrosarcoma grade 1. After 3 years follow up, no recurrence is seen.

Discussion: Chondrosarcoma secondary to multiple enchondromatosis is very rare. The signs of malignant transformation are increase in size, onset of pain, cortical destruction associated with soft tissue invasion. Surgical treatment is the only option for treatment. Secondary chondrosarcoma of Ollier’s disease seem to show low grades. Therefore surgical plans must be carefully determined.
Thrombosis of the digital veins

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Objectives
In the 239 surgical patients with soft tissue tumors and diseases of the digits in our study, the sixth most common disease was venous thrombosis (14 patients, 5.9%). However, this disease is rarely studied. Therefore, this study aimed to investigate the features of venous thrombosis.

Methods
We retrospectively investigated the preoperative findings, time from nodule observation to the first hospital visit, provisional diagnoses, and pathological findings in the 14 patients. The mean age at surgery was 48.0 years, and the sex ratio was 1:1. The affected side was not associated with hand dominance. Although one patient had protein S deficiency, no associated comorbidities were found in the remaining patients.

Results
The most affected areas were the ring finger and around the proximal interphalangeal crease. Tenderness was found in seven patients; and skin discoloration, in eight. The mean time from nodule observation to the first hospital visit was 7.5 months. In three patients, the nodule spontaneously became slightly smaller preoperatively. No specific magnetic resonance imaging (MRI) findings were found. All the cases were diagnosed histologically after surgery. The nodules consisted of normal vessel walls and thrombi, with multiphased structures. The above three nodules had less-fresh structures.

Summary
Thrombosis of the digital veins is a common condition but is rarely reported in the literature because it does not attract much attention. It has no specific MRI findings but has characteristic clinical features. Therefore, awareness regarding the existence of venous thrombosis of the digits may facilitate preoperative diagnosis and even conservative management.
Validity of a handprint procedure for functional evaluation of Dupuytren’s contracture

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[Objectives] Meyerding classification and Tubiana classification are widely used for clinical evaluation of the Dupuytren’s contracture. However, these do not accurately evaluate the function of the entire hand because they are based on only the contracture angle of the finger joint. The purpose of this study was to examine whether the handprint procedure could be applied to severity assessment and treatment evaluation of Dupuytren’s contracture. We also examined the relationship between the handprint procedure and patient-reported outcome measure (PROM) such as Quick DASH-JSSH and Hand20 before and after Collagenase Clostridium histolyticum (CCH) injection for Dupuytren’s contracture.

[Methods] The subjects were 33 patients (31 males and 2 females) with one-handed Dupuytren’s contracture who were able to receive CCH injection and follow up for more than 6 months. The handprint was prepared by applying 2 ml of a quick-drying type ethanol hand sanitizer to the palm and finger part and pressing it against a commercially available fax paper for 1 minute. The contact area (CA) was calculated using ImageJ (ver. 1.51). The total extension deficit angle (TEDA) and CA were examined before injection and 6 to 30 months after injection.

[Results] After CCH injection, there was a significant improvement in TEDA, CA and PROM (p<0.001). In Spearman’s correlation coefficient, a strong correlation was found between TEDA, CA, and PROM before CCH injection, but not after injection.

[Summary] This study demonstrated that handprint procedure is useful for the severity and treatment evaluation of Dupuytren’s contracture.
Dupuytren’s disease (DD) is a heritable, benign, chronic fibroproliferative process which affects the connective tissue of the palmar fascia. DD is rare among Asians with a prevalence of 0.004 to 0.032 percent. There are only 74 cases of DD among Asians identified in literature, and there are no published cases from the Philippines. We discuss a rare case DD in a 60-year-old male Filipino presenting with bilateral loss of range of motion of the middle, ring and little finger of the both hands who underwent bilateral radical fasciectomy.
Osteoblastoma of the hand: A case report

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Osteoblastoma is a rare, aggressive benign tumor that accounts for less than 1% of all primary bone tumors with a predilection for the axial skeleton, followed by the craniofacial bones. The peak incidence of osteoblastoma is in the second and third decades with a male-to-female ratio approximately at 2:1. In the phalanges, its incidence is less than 5%.

We present the case of a 14-year-old Filipino female who came in with a chief complaint of little finger mass on the left hand. One year prior to admission, the patient noted a progressively growing mass on the base of her left little finger with inability to extend the involved finger. This prompted consult at our institution where the patient presented with a 2.5cm x 2cm mass with a 50° contracture angle of the proximal interphalangeal joint. Radiographs showed a periosteal reaction described as florid reactive periostitis. The patient subsequently underwent marginal excision biopsy. Histopathologic examination revealed osteoblastoma. This case illustrates the presentation, diagnosis, and treatment of a rare case of osteoblastoma.
Implications of Ledderhose disease in Patients with Dupuytren’s Disease at Peninsula Health

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Purpose: To investigate the implications of Ledderhose disease (LD) on balance and quality of life in a cohort of Dupuytren’s disease patients.

Background: Ledderhose disease (LD) is a rare, benign hyperproliferative disease of the plantar aponeurosis. There is limited evidence on effect on balance and Quality of life in this patient group.

Methods: A prospective comparative cohort study was conducted May to August 2019. 21 participants (7 LD and 14 control) above 18 years of age were recruited from the Dupuytren’s clinic at Peninsula Health. Our primary outcome measure was balance (NeuroCom Balance Master device) and secondary outcome measure was Quality of Life (QoL).

Results: Mean (SD) ages for the LD and control group were 60.86 (22.24) and 65.43 (8.09) respectively. Demographic data were similar. Our study confirmed LD prevalence of 33.3% and incidence rate of 8.85 cases/1000 person-years. Balance was not affected in the LD group, no significant statistical differences between the two groups except for limits of stability. QoL (MOXFQ) was reduced in the LD versus control group and no statistically significant difference in EQ-5D-5L scores. Balance parameters had no significant correlation with pain score, number of nodules, side of LD and QoL.

Summary: There were no static and dynamic balance impairment seen in the LD group and no significant correlation with QoL, pain, number of nodules, side of disease. There was significant statistical difference in QoL (MOXFQ) in the Ledderhose disease group versus control group (p<0.05).
Outcome after the treatment of Collagenase injection for Dupuytren’s contracture; Focusing on therapy before injection

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I. Objectives
To assess the benefit of therapy, including stretch and splint, before collagenase injection for patients with Dupuytren’s contracture.

II. Materials and Methods
We investigated 30 patients, 32 hands and Metacarpophalangeal joint (MP) 29 and Proximal interphalangeal joint (PIP) 6 that received collagenase injection treatment from September 2015 to July 2018. The mean age of the patients was 70.7 years (range, 54-81 years). The mean follow-up period was 350.5 days.
We examined the average extension angle and rate of change of each joint before and after injection treatment. The rate of change was calculated by the following: (pre-injection extension lag angle – post-injection extension lag angle) / pre-injection extension lag angle × 100.
We compared the rate of change in the therapy group to the non-therapy.

III. Results
In the therapy group, the average MP pre-injection and post-injection extension angle were -47.3° and 3.3° respectively (rate of change 122.7%). The average PIP pre-injection and post-injection extension angle were -47.5° and 1.0° respectively (rate of change 99.1%). In the non-therapy group, the average MP pre-injection and post-injection extension angle were -49.0° and -3.0° respectively (rate of change 97.4%). The average PIP pre-injection and post-injection extension angle were -54.5° and -17.3° respectively (rate of change 69.8%).

IV. Discussion
The rate of change in the therapy group tended to be higher than in the non-therapy group. Releasing the flexion contracture by therapy, such as splint and stretch, before collagenase injection can improve post-injection contracture more.
Injectable collagenase therapy for multi-ray multi-cord Dupuytren’s Contracture – Can we avoid open fasciectomy?

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Objectives. Percutaneous Clostridium histolyticum collagenase (XIAFLEX®) has recently been presented as an alternative minimally-invasive treatment for Dupuytren’s Contracture (DC). We aimed to assess outcomes after XIAFLEX® therapy in the management of complex multi-ray and bilateral hand DC.

Methods. A prospective single-arm observational study of 137 patients with DC was undertaken at our institution. A subset analysis of 61 patients with multi-ray multi-cord (MR MC) disease was performed including both MCPJ and PIPJ cords. A standardised dosage of collagenase 0.58mg in 0.25ml was used for the treatment of up to 7 cords at a single occasion. Manipulation under intravenous sedation was performed 48 hours post-injection. Procedural complications, reduction in joint contracture, and patient satisfaction outcomes were assessed 1-month post-treatment.

Results. 61 patients with MR MC disease were treated with 96 standardised doses of XIAFLEX® at a median age of 66+/-9.85 years. Complete passive extension of joint contractures was achieved in 88% (93/96) of joints, partial response in 9% (10/96) of joints, and no response in the remaining 3% (3/96). Major skin tears (>1cm in largest dimension) occurred in 7% (7/96) of joints, and minor tears (<1cm) in 19% (10/96) of joints; all managed conservatively with dressings. There were no major skin infections (requiring intravenous antibiotics) while 2 patients (3%, 2/61) had a minor skin infection (requiring single course of oral Cefalexin).

Summary. XIAFLEX® collagenase is a safe, effective, minimally-invasive alternative for the treatment of complex multi-ray multi-cord Dupuytren’s Contracture. Further studies are required to determine the long-term outcomes of this treatment.
Open book flap method for excision of soft tissue swelling in fingers and hand: a novel and versatile approach

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Objectives: Finger soft tissue swellings are common in practice; however each of them is a unique challenge for the hand surgeon. The primary aim is to preserve neurovascular structures, function and providing stable coverage. Many incision methods and local flaps, even free flaps are described for coverage (1). Our objective is to describe a novel method of incision planning and flap raising for complete excision while preserving native skin for coverage.

Materials and methods: Six patients (male n=2, female n=4) with age group ranging from 16 to 62 (mean age = 46.1) with soft tissue swellings of hand and fingers were operated under local anaesthesia under digital tourniquet control and loupe magnification using the novel open book flap raising technique. In all cases, there was no skin infiltration and skin flaps could be raised in the sub-dermal level. After complete excision flap was trimmed if needed and reposited back to cover the defect.

Results: All patients had satisfactory outcome with good coverage and no complication. HPR reports proved benign nature of the swellings. Functions of the digits were preserved in all cases.

Summary: The novel open book method of flap raising is a simple yet effective way to provide coverage after finger and hand soft tissue swelling excision. Moreover, its flexibility in designing makes it a versatile technique for use in different scenarios.

References
Flap for Hand Defects

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FLAP FOR HAND DEFECTS

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Abstract

Introduction: Soft tissue defects of the hand are a challenge for Plastic and Reconstructive Surgeons because it can closed in various ways. Some defects require early flaps to protect vital structures and maintain hand function. In this study, we used several flaps to cover hand defects.

Methods: At Sanglah General Hospital, from January 2016 to June 2019 we performed various flaps to reconstruct different soft tissue defects of the hands caused by various types of trauma. Flaps used were radial forearm island flap, propeller flap, posterior interosseous artery flap, lateral arm flap, first dorsal metacarpal artery flap, groin flap, abdominal flap, anterolateral thigh free flap and latissimus dorsi free flap.

Results: Patients with different soft tissue hand defects due to trauma underwent reconstruction using different flaps. All the flaps we have done resulting satisfactory outcomes with minor to no complications.

Conclusion: Flaps frequently result optimum functional and aesthetic outcomes on hand defect reconstruction.

Keywords: flap, hand defects, hand trauma
The psychological impact of hand injuries among vulnerable foreign workers - our experience in Singapore

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Foreign workers are essential to Singapore. They are low-skilled and face challenges to work there. In addition to these stressors, an injury to the hand, a primary means of interacting with ones surroundings, may have a profound psycho-social impact. This novel study, aims to shed light on the psychological impact that hand injuries have on an integral, yet vulnerable and neglected population.

This prospective study evaluates the psycho-social impact and functional outcomes of hand injuries among foreign workers. A single encounter interview was conducted for workers. Psychological impact was measured with the DASS-21, symptom severity with the Quick-DASH score. Injury and demographic data were collected.

80 foreign workers were included. Mean age was 32.6 years. Majority of them were male (94.4%), married (58.3%), and had a salary less than SGD1000 per month (58.3%). Most common mechanisms of injuries were cutting (58.3%) and crush (25.0%). Stress, anxiety and depression were positively associated with limitation of daily function (p<0.001). Multivariate analysis found that limitation of daily function was independently associated with stress (95% CI 0.12-0.34; p<0.001), anxiety (95% CI 0.03-0.23; p=0.017) and depression (95% CI 0.04-0.26; p=0.008)

There is a significant psychosocial-impact of hand injuries among foreign workers in Singapore. There is potential for the development of screening and support programmes for workers to cater to their mental well-being. We recommend that there be holistic management and rehabilitation with adequate time and resource allocation. An ancillary benefit of this comprehensive strategy is the improvement of productivity and overall contribution to Singapore’s economy.
The Masquelet procedure to recreate the distal one third of the ulna after excision of a benign bone tumour: a single case study

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The objective is to show that the Masquelet procedure can be used to reconstitute a non-segmental defect, with a successful radiological and clinical result.

The Masquelet method was used to reconstitute the distal one third of the ulna in a young adult after excision of a large benign bone tumour which spared only part of the ulnar styloid process. Prior to surgery, there was no ability to pronate or supinate.

Surgery resulted in the formation of a new distal ulna and, furthermore, an excellent recovery of pronation and supination, despite the secondary deformity of the radius and years of inability to rotate the forearm.

In summary, in this rare case, the Masquelet procedure was used successfully beyond its normal role in dealing with segmental defects only. This has not previously been reported in the literature.
Epidemiology and management of hand injuries during tropical supercyclone FANI in tertiary care centre

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Background: Tropical cyclones are huge masses of windstorms that circulate and gather over the tropical waters that cause massive damage to the environment, human life, property and resources. Odisha, the North-eastern state of India is the eye of such severe storms, as it lies exactly at the point where the Indian coastline curves, especially in the Bay of Bengal. The Super cyclone Fani, being one of the most powerful tropical cyclone, hit Odisha on 3rd may 2019. We aim to highlight the impact of Cyclone Fani on the type of hand injuries, its incidence and management of such injuries, who reported to the Casualty & Plastic Surgery department of our Institute.

Methods: The records of all hand injury patients presenting to Casualty and Plastic Surgery department from 3rd May to 10th May 2019, affected by cyclone Fani were reviewed and information regarding the patient and injury characteristics were collected. Mechanism of injury with timing of injuries with the exact site in the upper limb were noted.

Results: Out of the total 92 patients total of 41 cases that reported were that of isolated upper limb injuries. 32 cases were males and 9 were females affected. The mode of injury was cut injury in 11, lacerations in 5, fingertip injuries in 12 and crush injury in 3 patients. Mechanism of injury were caused while closing doors, cuts by glass pieces and hit by flying asbestos sheet. Management included debridement, primary closure, tendon repair and fracture fixation. Injury occurred maximum during the peak hour 11am -3pm during the highest wind speed of the cyclone.

Conclusion: Despite of proper precautions, the rate of upper limb injuries were most common during the Super cyclone Fani. These findings have implications for injury prevention measures and emergency planning as a part of disaster management.
Flow through fibula and iliac crest bone grafts for closing a defect of humerus. A case presentation.

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Objectives: to demonstrate a rare case of combination of two vascularized bone grafts to save the upper arm of the young woman in a case of chronic osteomyelitis

Methods: Female, 26 y.o., right hand dominant, was presented in outpatient clinic with a deformation of the upper arm, full range of motion in the shoulder and wrist joints, limitation of elbow flexion (95°) and 40° insufficiency of extension as well a 12 year history of haematogenous osteomyelitis of the humerus.

Two different vascularized bone grafts – fibular as flow through graft and iliac crest were harvested to close the defect of the upper arm. Bone grafts were wrapped into the previously prepared periosteal flap. Anastamoses of the complex bone graft were connected end to side to brachial artery and veins.

Aftertreatment included 8 weeks of peroral antibibiotics and workout of ROM which started from the third week after surgery. Scheduled visits were performed every 2 months with measurements of the ROM and X-ray controls.

Results: 2 years after surgery patient is back to all daily and sporting activities, despite of the limitation of elbow flexion and visual differences of both upper arms. She has full extension and 120° flexion of the elbow. The DASH score is 20 points. An active bone formation is presented between all fragments.

Conclusion: Non-standard decisions and technical solutions could be successful in microvascular bone flap surgery in cases of large osteomyelitic bone defects of the upper arm.
Surgical Challenges and Functional Outcomes of Multiple Digit Replantations

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Objectives
Multiple digit amputations fall within the spectrum of complex mutilating hand injuries where there is transection or loss of multiple tissue components. Unless treated effectively, the patient risks spending the rest of his life with a severe disability, scarring, functional loss and pain. Hence effort to prevent poor outcomes is worthwhile. We conducted a study to review the clinical and functional outcomes obtained after multiple digit replantations

Methods
32 patients with a total of 88 amputated digits presented at our hospital between 2010 and 2018. A retrospective study was conducted. We included patients with multiple digit amputations who underwent replantation of at least two amputated digits. The post-operative assessment included the total active motion (TAM) range, grip strength, sensation, and patient reported functional scoring.

Results
Overall, we replanted 80 of 88 digits. The average age of the patients was 33 years old. 33% were complete amputations, and 66% were incomplete. The overall survival rate was 60 digits (75%). 5 digits required re-explorations (6.5%) and all survived. The average TAM was 142.6º at 6 months, and the grip strength 35.88% of the contralateral side. Preservation of the finger joints was significant for improved function.

Summary
There are no predictable scoring systems or algorithms for replantation surgery. Functional reconstruction is emphasized, and a comprehensive armamentarium including joint preservation, heterotropic replantation, free flaps and spare parts are used for a better outcome. Early rehabilitation should not be neglected to obtain a good functional outcome.
Dog bite hand injuries - a retrospective, multi-centre study of incidence, management and outcomes

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OBJECTIVES
The objective of this study was to characterize the nature of dog bite injuries to the hand treated over a 5-year period within the Nepean Blue Mountains Local health district (NBMLHD). The aim of his study was to correlate the length of stay and patient outcomes to the site and severity of injury, isolated microorganism, time to presentation and time to surgical management.

METHODS
Investigators will perform a retrospective review of emergency department presentations to the NBMLHD. Records of all patients who were evaluated for dog bite injuries to the hand between January of 2013 and December of 2018. These will be correlated with admission, length of stay and patient outcomes.

RESULTS
Preliminary analysis suggests delayed presentations (>48h post injury) and wound infection with Streptococcus spp. are associated with increased length of stay. In addition, once a dog bite injury has become infected (erythematous, pus discharge, increasing pain or impaired function of the hand) delays to surgical washout can also impact the length of stay and patient outcomes.

SUMMARY
We anticipate this study to show treatment recommendations to improve patient outcomes and reduce length of stay for the treatment and management of dog bite injuries to the hands.
The effectiveness of ultrasonographic elastography in the diagnosis of carpal tunnel syndrome

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1
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Objectives
To evaluate if there is a place for ultrasonography (US) and ultrasonographic elastography (UE) in the diagnosis and follow up of carpal tunnel syndrome treatment.

Materials
Measured US and UE criteria were median nerve area (MNA), proximal median nerve area (pMNA), difference between MNA and pMNA (dMNA) and strain values of carpal tunnel content (CTC) and median nerve (MN). Patients in the study group were also evaluated using the Boston questionnaire, Visual Analogue Scale (VAS) and nerve conduction studies. Fifty-three wrists in 43 patients received carpal tunnel release. Patients were re-evaluated 6 months after surgery. To establish a cut off value for MNA, ROC Curve analysis was used.

Results
Decrease in MNA and dMNA values after treatment was meaningful (p = 0.00). While there was no significant change in MN elasticity, mean CTC strain index of the study group (4.328± 1.564) decreased significantly after treatment (3.421 ± 1.154 p = 0.002). This decrease in the CTC index was more pronounced in patients who benefited from treatment (p = 0.001).

Summary
US and UE can be useful in the diagnosis of CTS and its response to treatment, if used together with physical examination.
ANTERIOR FRACTURE DISLOCATION OF THE ELBOW WITH ULNAR NERVE PALSY IN A 6-YEAR-OLD CHILD

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Objectives
Anterior elbow fracture dislocation is rare, especially in paediatric age group. We are presenting a case of elbow anterior fracture dislocation with ulnar nerve palsy in a 6-year-old child.

Methods
A 6-year-old girl presented to casualty with left elbow deformity and pain after she tripped and fell in the toilet. Ulnar clawing was present with reduced sensation over ulnar nerve distribution. Distal pulses and circulation were good.

The X-rays showed anterior dislocation of the left elbow with olecranon fracture. Closed manual reduction was attempted but failed. Open reduction and percutaneous K-wire insertion under general anaesthesia was performed. Medial approach of the elbow was done. Intra-operatively ulnar nerve was found impinged by the distal ulnar fragment but was in continuity. The transverse olecranon fracture was fixed with two K-wires and the radial head was reduced. Ulnar nerve was mobilised until tension-free. Ulnar collateral ligament was repaired. The elbow was immobilised with a splint.

Results
Ulnar claw was resolved at 2 weeks. The fracture heals and the K-wires were removed at 6 weeks. At 8 weeks, range of movement of the elbow was full. The elbow was stable in varus and valgus.

Summary
Anterior elbow dislocation is a high energy trauma and should be cautious of neurovascular injury. There was no clear recommendation in the literature regarding surgical approach. We chose medial approach of the elbow for ulnar nerve exploration and olecranon fixation.

Reference
Splint Versus Cast in Paediatric Phalangeal Neck Fractures

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Objectives: Paediatric phalangeal neck fractures are unique to the paediatric population. Options available for non-operative management of these fractures are either a plaster cast or a thermoplastic splint. This study compares the radiological outcome of type I and II phalangeal neck fractures treated with splint and cast immobilisation.

Methods: A retrospective review was conducted of patients with phalangeal neck fractures aged 12 and below who were treated non-surgically from 2008-2017. Radiographs were compared at 2 intervals post-injury (less than 1 week, and after 3 weeks). Translation and angulation in both coronal and sagittal planes were measured and compared using student T tests.

Results: There were 47 patients treated non-operatively in the series: 19 were assigned to the cast group while 28 were assigned to the splint group. There was no significant difference in the radiological outcome for paediatric phalangeal neck fractures treated with splint or cast immobilisation.

Summary: We recommend splint immobilization in a sensible and cooperative child to improve comfort and hygiene. However, we would still use cast immobilization when parents express concerns of their child’s compliance.
*Abstract not provided*