

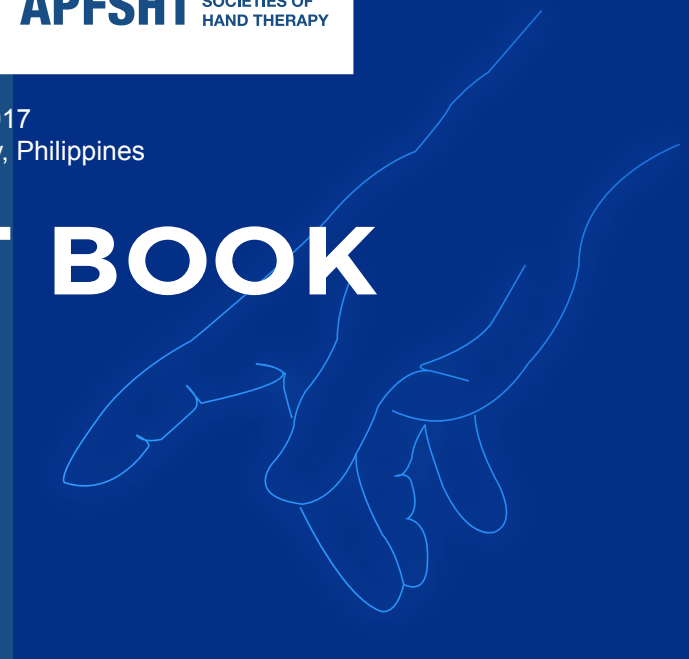


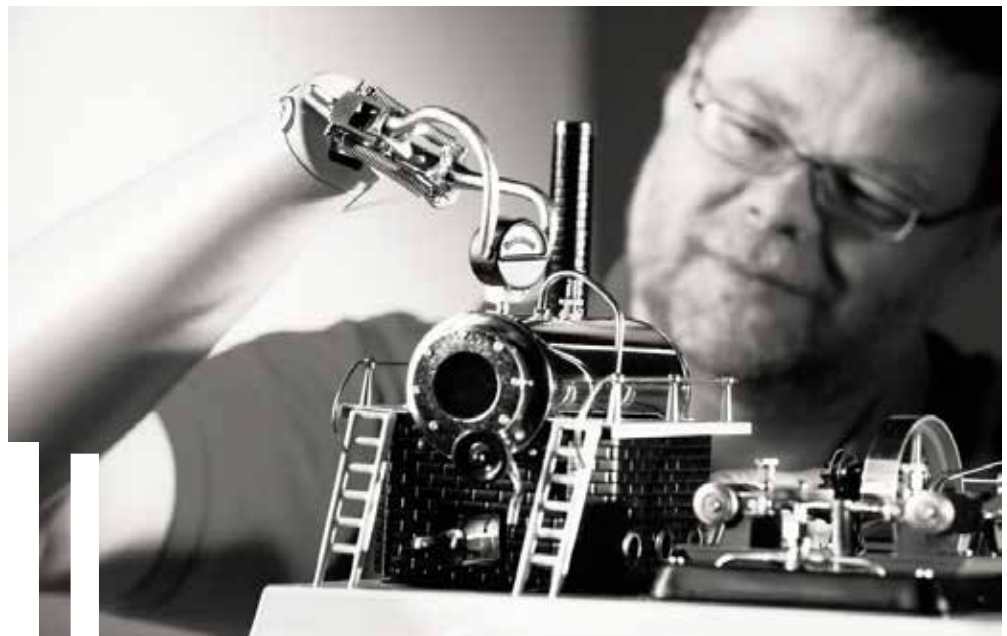
11th APFSSH2017
 ASIAN PACIFIC FEDERATION OF
 SOCIETIES FOR SURGERY OF THE HAND

**7th Congress of
 APFSHT** ASIAN PACIFIC
 FEDERATION OF
 SOCIETIES OF
 HAND THERAPY

November 7 - 10, 2017
 Radisson Blu Hotel, Cebu City, Philippines

ABSTRACT BOOK





Quality of life for everyday mobility

As Ottobock, we strive to accompany and support our patients in gaining more mobility and independence by providing high quality products.

We offer different types of aid for upper limb, here are the following:

- Definitive prosthesis
- Prosthetic hand
- Prosthetic socket
- Orthosis
- Wrist joint
- Myoelectric hand

We also provide a variety of customized orthotics and lower extremity prosthesis.

At the Ottobock Competence Center, you can rely on the professional support of an experienced rehabilitation team, product expertise and worldwide service.

Quality for life

Welcome Message from the Congress President



Maayong Pag-abot sa Cebu, Philippines!

Welcome to the 11th Congress of the APFSSH and 7th Congress of the APFSHT.

The Association of Hand Surgeons of the Philippines (AHSP) is proud and privileged to host this prestigious gathering of hand surgeons and therapists in the Asia Pacific region. The theme of the 11th Congress - CLASSIC. CURRENT. CUTTING EDGE.- will cover interesting and challenging topics to be lectured by eminent speakers from Asia Pacific, North America and Europe. The collaboration of the APFSHT through simultaneous sessions and workshops will add excitement for the young and senior hand surgeons.

To break the monotony of the scientific sessions on the first day, there will be lots of fun and surprise numbers during the Congress Banquet.

I would like to commend the tremendous work the organizing committee has done since the AHSP accepted the challenge three years ago in Kuala Lumpur. The Executive Council of the APFSSH deserve our sincere gratitude for their inspiration, support and trust in hosting this congress. Our gratitude also go to our sponsors and donors who believed in the purpose of the congress.

Mabuhay APFSSH and APFSHT! Thank you all!

Ida S. Tacata M.D.

Ida S. Tacata, MD
Congress President

Welcome Message from the President of APFSSH

As the president of the Asian Pacific Federation Societies for Surgery of the Hand (APFSSH), I sincerely welcome all of you to the 11th Congress of APFSSH in conjunction with the 7th Congress of the Asian Pacific Federation of Societies for Hand Therapy (APFSHT) in the beautiful Cebu City, Philippines on November 7th -10th, 2017.

The APFSSH member countries have been working very efficiently and in harmony in the fields of teaching, publications (Hand Surgery Asian volume), research, conferences organizing, and charity medical service as well in these 10 years. Some unique developments around the Asia-Pacific region have gained their credits and recognitions around the world; which includes brachial plexus injury treatment, microsurgery, wrist arthroscopy, sport injury, mangled upper extremity, and basic research as well.

This APFSSH / APFSHT combined meeting is one of the most important and the highest academic hand conferences in the Asian Pacific regions. The aims of this conference are to offer great opportunities for hand surgeons, hand therapists, as well as researchers and other physicians who are interested in the field of hand surgery; to present their ideas, clinical results, techniques, experiences and knowledge.

In the past 10 years, APFSSH meetings had been successfully hosted by respectful hand surgeons in Hong Kong (2008), Taiwan (Kaohsiung, 2009), Indonesia (Bali, 2012), and Malaysia (Kuala Lumpur, 2014). Based on our previous wonderful experiences, I am quite sure that we will have a successful APFSSH / APFSHT meeting in Cebu City this November. The highlights of the APFSSH conference this year includes many interesting topics of hand surgery, and famous international guest speakers and faculties who are in charge of special lectures and symposiums, as well as Professor Akio Minami's speech in the Tajima lecture. The organizing committee and the chairman have put a lot of efforts in the scientific program, the venue arrangement, the speakers' invitations, as well as the social activities. Cebu city is one of the best places for visitors in the Philippines, which is full of sunshine, hospitality, smiles and beautiful ocean.

I sincerely welcome all our friends from the Asian Pacific countries to this APFSSH / APFSHT Congress in Cebu City, Philippines. This will be a congress with lots of joy, friendships, and knowledge for our hand surgeons and hand therapists.

With kindest regards

Yuan-Kun Tu

Yuan-Kun Tu, MD, PhD, FICS

Professor in Orthopedics / E-DA Hospital, I-Shou University Superintendent, E-DA Hospital
CEO, E-DA Medical group / Kaohsiung, Taiwan
President, the Asian Pacific Federation Societies for Surgery of the Hand



Welcome Message from the AHSP President



On behalf of the Organizing Committee, I would like to welcome all participants to the 11th APFSSH and the 7th APFSHT Congress to the wonderful island of Cebu.

The Association of Hand Surgeons of the Philippines (AHSP), formerly Philippine Society for Surgery of the Hand, is one of the founding societies of the Asian Pacific Federation of Societies for the Surgery of the Hand (APFSSH). Since then, our society has grown and we are proud and honored to host the 11th Congress of the APFSSH. The AHSP and its members believe in what the APFSSH stands for: maintain communications between Asian Pacific member societies, disseminate knowledge in hand surgery through organized scientific meetings, enhance training through friendly exchange programs and promote camaraderie between hand surgeons throughout the Asian Pacific Region.

First, I would like to thank our distinguished speakers for selflessly giving their time and effort to share their knowledge and experience on hand surgery. Spending time away from home and family is truly a sacrifice and for this we thank you. You are truly an inspiration to all hand surgeons around the world. We also would like to thank the APWA for organizing an ICL with the APFSSH on DRUJ Instability. Secondly, I would like to thank the organizing committee, led by our beloved Congress President, Dr. Ida S. Tacata. I would also like to thank the affiliate societies of the APFSSH. This congress will not be possible without your continued support. Lastly, I would like to thank our sponsors and benefactors for helping our society in making this congress possible. To all the delegates in this meeting, I hope your stay will be a memorable one. Learn from the masters as well as from novices, enjoy the food, explore the island, meet friends and make new ones. See you all soon.

Maraming Salamat Po!

Emmanuel P. Estrella, MD, MSc, FPOA
AHSP President

Welcome Message from the APFSHT Congress Head



Greetings!

Welcome all delegates of the APFSSH and APFSHT Congress to Cebu, Philippines. I, in behalf of the local organising committee, would like to thank everyone who supported this event. We are glad that you all have shared your time for us to learn together to further enhance our knowledge and expertise on the management of the upper extremity. I would like to thank the APFSSH and APFSHT leaders for choosing our beautiful country as the venue of this wonderful event.

I would also like to thank all our local and international speakers who so generously shared their knowledge to all delegates of this event. We are thankful for your continuing support for the hand management practice in our country.

Learn, relax, have fun and enjoy!

Best Regards,

Jose Ma. Rafael D. Ramos, ORTP
Organizing Head

Welcome Message from the APFSHT President



It is my great pleasure as President of APFSHT to welcome all attendees to the joint 11th APFSSH and 7th APFSHT congresses here in Cebu City in November of 2017. Thanks to the effort of the local organizing committee, and many thanks to the APFSSH & APFSHT program committee for their willingness and cooperation in creating a joint scientific program. Take the opportunity to exchange experiences and ideas, acquire international scientific connections as well as make new friends. We look forward to interesting and thought provoking themes and discussions.

We hope that you will enjoy the congress program and also experience some of the many cultures in the Philippines. It is my hope that you get new ideas and contacts in both the hand surgery and therapy world.

I wish you a great and productive Congress, and some memorable days in Cebu City!

With sincerest regards

Seiji Nishimura
APFSHT President

Plenary Speakers

Tajima Memorial Lecturer



Prof. Akio Minami
JAPAN



Prof. Gregory I. Bain
AUSTRALIA



Dr. Jeff Ecker
AUSTRALIA



Dr. Don Lalonde
CANADA



Dr. Man Wah Joe Wong
HONG KONG



Dr. Pak-Cheong Ho
HONG KONG



Dr. S. Raja Sabapathy
INDIA



Prof. Theddeus OH Prasetyono
INDONESIA



Prof. Kazuteru Doi
JAPAN



Dr. Moroe Beppu
JAPAN



Prof. Juanito S. Javier
PHILIPPINES



Prof. Aymeric YT Lim
SINGAPORE



Dr. Sandeep Sebastian
SINGAPORE



Prof. Goo Hyun Baek
SOUTH KOREA



Dr. Marc Garcia-Elias
SPAIN



Prof. Diego L. Fernandez
SWITZERLAND



Prof. Yuan-Kun Tu
TAIWAN



Prof. Somsak Leechavengvongs
THAILAND



Dr. Chairaj Uerpaiojkit
THAILAND



Dr. John T. Capo
USA



Dr. Thomas R. Kieffhaber
USA



Dr. Scott H. Kozin
USA



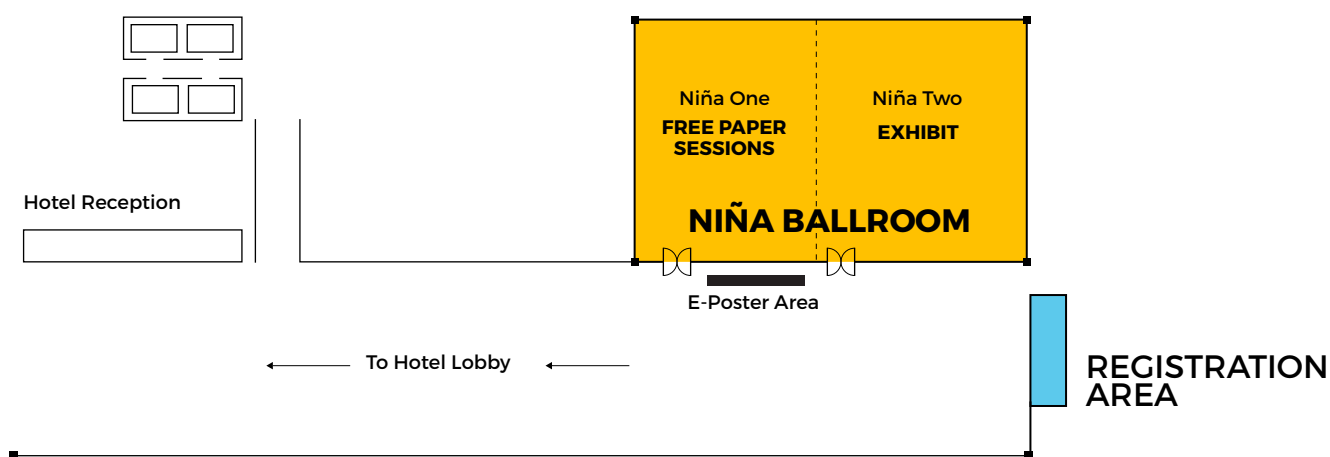
Dr. Peter J. Stern
USA

OTHER INVITED SPEAKERS

Vicky Allbrook	AUSTRALIA
Anthony Berger	AUSTRALIA
Ann Wajon	AUSTRALIA
Ahmad Suparno Bahar	BANGLADESH
Weng Dong--Xu	CHINA
Bo Liu	CHINA
Shan--lin Chen	CHINA
Esther Chow	HONG KONG
Josephine Ip	HONG KONG
Hin Keung Wong	HONG KONG
Chan Ping Tak	HONG KONG
Cecilia Li	HONG KONG
Henry Li	HONG KONG
Praveen Bhardwaj	INDIA
Heri Suroto	INDONESIA
Yukio Abe	JAPAN
Keichi Muramatsu	JAPAN
Toshiyasu Nakamura	JAPAN
Keiji Fujio	JAPAN
Yasunori Hattori	JAPAN
Koichiro Ihara	JAPAN
Keisuke Irie	JAPAN
Mikayo Omori	JAPAN
Hiroshi Yajima	JAPAN
Chimi Miyamoto	JAPAN
Mineo Oyama	JAPAN
Manohar Arumugam	MALAYSIA
Rashdeen Fazwi	MALAYSIA
Sharifa Roohi Ahmad	MALAYSIA
Charlie Tan	MALAYSIA
Ruban Sivanoli	MALAYSIA
Tunku Sara Ahmad	MALAYSIA
Shalimar Abdulla	MALAYSIA
Terence Tay	MALAYSIA
Jose Maria D. Bautista	PHILIPPINES
Tammy L. Dela Rosa	PHILIPPINES
Daniel V. Dungca	PHILIPPINES
Angel Gozum	PHILIPPINES
Ellen Y. Lee	PHILIPPINES
Nathaniel Orillaza, Jr.	PHILIPPINES
John Hubert Pua	PHILIPPINES
Mark Serra	PHILIPPINES
Consuelo Suarez	PHILIPPINES
Andrew Chin	SINGAPORE
Mark Puhaindran	SINGAPORE
David MK Tan	SINGAPORE
Anthony Foo	SINGAPORE
Alphonsus Chong	SINGAPORE
Ter Chyan Tan	SINGAPORE
Hyun Sik Gong	SOUTH KOREA
Min Jong Park	SOUTH KOREA
Soo Hong Han	SOUTH KOREA
Joong Wong Park	SOUTH KOREA
Myeon Jae Woo	SOUTH KOREA
Michael Chih--Hao Chang	TAIWAN
Kent Chang	TAIWAN
Kanchai Malungpaishorpe	THAILAND
Kanit Sananpanich	THAILAND
Jovito Angeles	USA

VENUE MAP

GROUND FLOOR (GF)



LEVEL TWO (2F)

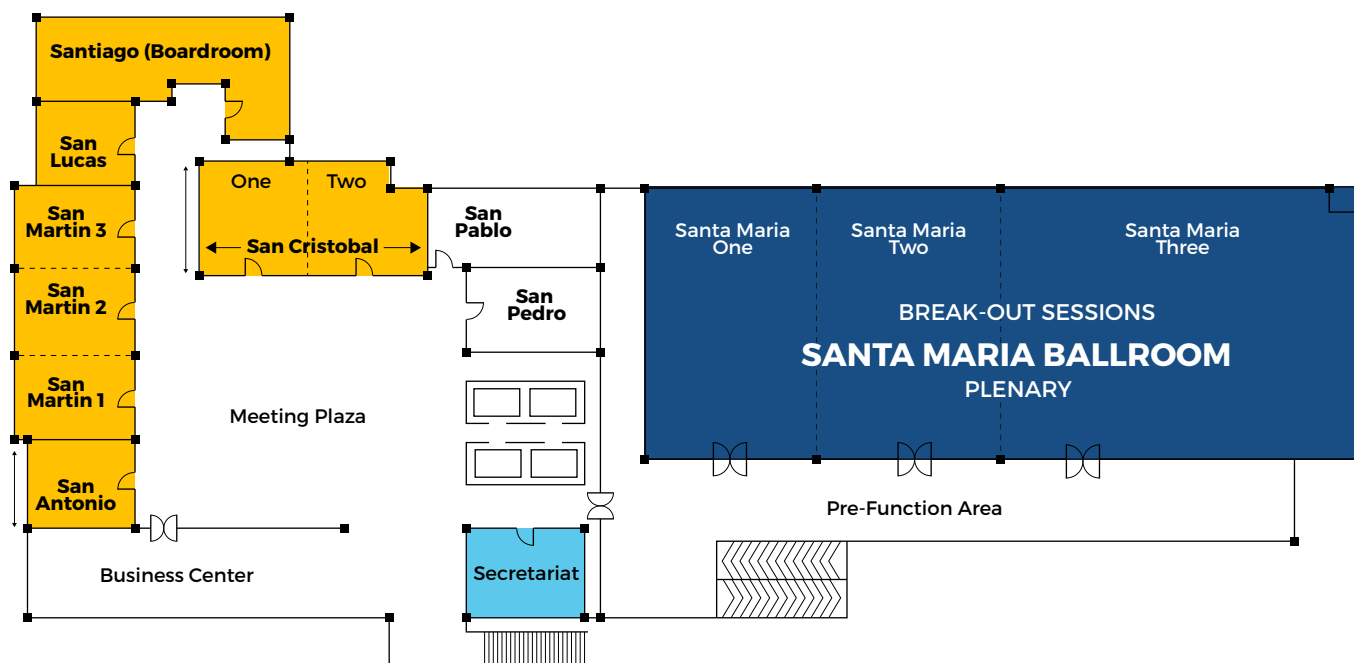
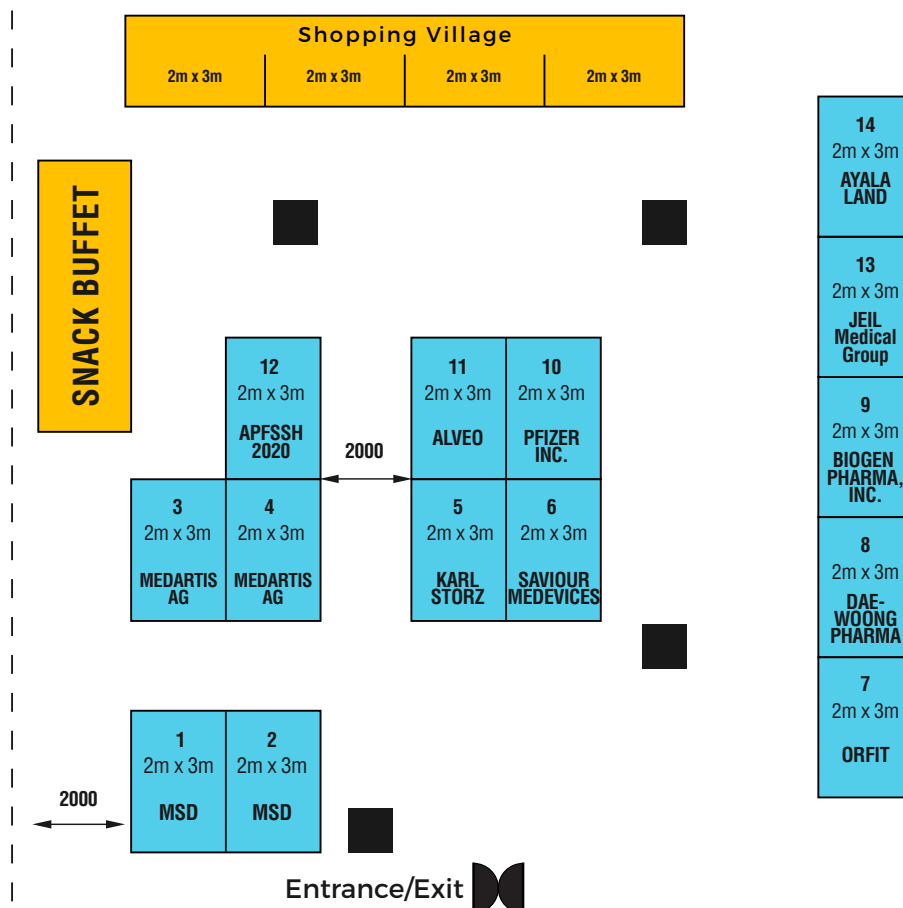


EXHIBIT LAYOUT

NIÑA BALLROOM 2
GROUND FLOOR (GF)



11th APFSSH and 7th APFSHT Scientific Programme

DAY 0 (November 7, 2017)

TIME	ACTIVITY	VENUE
0600-1200H	 IT'S TIME TO TEE OFF! APFSSH Fellowship Golf Tournament Cebu Country Club Assembly time: 5:45 AM Departure time: 6:00 AM Lunch - 12:00 PM - 1:00 PM Departure back to hotel: 1:00 PM	
1200-1700H	REGISTRATION	Nina Ballroom Foyer (GF)
1300-1700H	Council Meeting of the APFSSH	
1300-1500H	APFSSH Executive Council Meeting	Santiago (Boardroom, 2F)
1500-1700H	APFSSH Delegates' Meeting	Santiago (Boardroom, 2F)
1700-1900H	APWA Meeting	Santiago (Boardroom, 2F)
1900-2200H	Enjoy and relax the night away before the congress officially starts.  WELCOME COCKTAILS Events Plaza (Hotel Poolside)	

11th APFSSH and 7th APFSHT Scientific Programme

DAY 1 (November 8, 2017)

TIME	Sta. Maria 1	Sta. Maria 2	Nina 1	Sta. Maria 3	San Cristobal	San Martin 1 - 3
0800-0915H Simultaneous Sessions	SS1A: Brachial Plexus Session Mod: Kazuteru Doi & Aymeric Lim	SS1B: Nerve Compression Mod: Donald Lalonde & Tammy Dela Rosa	SS1C: Infections & Tumors Mod: Keichi Muramatsu & Daniel Dungca	APWA ICL Session 0700-0705H Welcome Remarks 0705-0715H Anatomy of the DRUJ including the Interosseous Membrane Toshi Nakamura (JPN) 0715-0725H Arthroscopic Examination of the TFCC & DRUJ Toshi Nakamura (JPN) 0725-0735H Clinical Examination of the DRUJ: 5-level Approach Pak Cheong Ho (HKG) 0735-0745H Imaging: x-rays, CT, MRI 0745-0755H Classification of Tears and Instability Esther Chow (HKG) 0755-0805H Arthroscopic Repair of Peripheral Tears – all inside and outside/inside aspects of Dorsal Ulnar and Volar. Weng Dong-Xu (CHN) 0805-0815H Arthroscopic Peripheral Tears Keiji Fujio (JPN)	SS1D: Free Paper Session Venue: San Cristobal 1 ARTHROSCOPY N. Lim / Ruban Sivanoli SS1E: Free Paper Session Venue: San Cristobal 2 TRAUMA Jessica Gandiongo/ Terence Tay	APFSHT Session 0830-0900H OPENING CEREMONIES 0900-0930H: Comparative study of STEF (Simple Test for Evaluation Hand Function) and 3 Other Hand Evaluation Tools Kent Chang (TWN) 0930-0945H: Validity and Responsiveness of the Simple Test for Evaluating Hand Function Keisuke Irie (JPN) 0945-1000H: The Criterion Validity of Simple Test Evaluating for Hand Function (STEF) in the Patients Following Hand injuries and diseases Mikayo Omori (JPN) 1000-1015H: Effectiveness of Biomechanical Taping in the Treatment of Upper Extremity Musculoskeletal Conditions Mark Serra (PHL)

11th APFSSH and 7th APFSHT Scientific Programme

DAY 1 (November 8, 2017)

TIME	Sta. Maria 1	Sta. Maria 2	Nina 1	Sta. Maria 3	San Cristobal	San Martin 1 - 3
0815-0830H	Hand Recon- struction in complete and lower type Obstetric BPI Scott Kozin (USA)	Advances in the Manage- ment of Cubital Tunnel Syndrome John Capo (USA)	Upper Extremity Infections in Patients with Diabetes Ahmad Suparno Bahar (BAN)	0815-0825H Arthroscopic Foveal Tears Bo Liu (CHN)		1015-1100H Musculoskeletal Ultrasound in the Upper Extremity Consuelo Suarez (PHL)
0830-0845H	Role of Nerve Transfers in Neonatal Brachial Plexus Palsy Kanchai Malung- paishorpe (THA)	Managing Nerve Compres- sion Syndromes Donald Lalonde (CAN)	Malignant Hand Tumors of the Upper Extremity Mark Puhaindran (SGP)	0825-0835H Open TFCC Tears Peter Stern (USA) 0835-0845H Tendon Grafts to reconstruct the TFCC (include IOM) – Open and Arthroscopic Ter Chyan Tan (SGP)		1100-1115H OPEN FORUM
0845-0900H	Management of Obstetric BPI in children >24 months Praveen Bhardwaj (IND)	Supraretini- nacular endoscopic CTR Jeff Ecker (AUS)	Surgical Excision of Slow-Flow Vascular Malformation without Tourniquet Theddeus Prasetyono (IDN)	0845-0900H What is the outcome of these repairs? Which do you use and when? Is there a difference between dynamic and static? Marc Garcia-Elias (ESP)		
0900-0915H	OPEN FORUM	OPEN FORUM	OPEN FORUM	0900-0910H TFCC in Children and Adolescents Pak Cheong Ho (HKG) 0910-0915H OPEN FORUM	OPEN FORUM	
0915-0930H	COFFEE BREAK (NIÑA 2)					

11th APFSSH and 7th APFSHT Scientific Programme

DAY 1 (November 8, 2017)

TIME	ACTIVITY	
0930-1200H	PLENARY SESSION 1A: Wrist Mod: Leo Daniel Caro & Michael Chih-Hao Chang VENUE: Santa Maria 2 - 3 (2F)	
0930-0950H	Unresolved and Recurrent Carpal Tunnel Syndrome – Peter Stern (USA)	
0950-1010H	The Complex Distal Radius: Approach to treatment - Diego Fernandez (CHE)	
1010-1030H	Salvage for the Post-traumatic Distal Radius Fracture – John Capo (USA)	
1030-1045H	The scapholunate dissociation: evaluation and management - Marc Garcia-Elias (ESP)	
1045-1100H	O P E N F O R U M	
1100-1110H	Introduction to the Tajima Memorial Lecture – Moroe Beppu (JPN)	
1110-1200H	The Tajima Memorial Lecture – Prof. Akio Minami (JPN) “Modified Sauve-Kapandji Procedure for the Distal Radioulnar Joint Disorders”	
1200-1300H	L U N C H	
1300-1500H	Plenary Session 1B: Wrist / Tendon Mod: Ida Tacata & Thomas Kiefhaber VENUE: Santa Maria 2 - 3 (2F)	APFSHT Session VENUE: San Martin 1, 2, 3 (2F)
1300-1320H	The Unstable Distal Radio-ulnar Joint Gregory Bain (AUS)	CMC Osteoarthritis Ann Wajon (AUS)
1320-1340H	Arthroscopic Bone Grafting for Scaphoid Non-unions: Indications, Technique and Outcomes - Pak Cheong Ho (HKG)	KEYNOTE SPEAKER Replantation and Thumb Reconstruction - Its Basic Technique and Rehabilitation Hiroshi Yajima (JPN)
1340-1400H	Novel Approach to Proximal Pole Fractures of the Scaphoid – Moroe Beppu (JPN)	
1400-1410H	O P E N F O R U M	
APFSSH & APFSHT COMBINED SESSION		
1410-1430H	Updates in Flexor Tendon Injuries I: Avoiding Problems in Zone 2 Flexor Tendon Repair – Peter Stern (USA)	
1340-1400H	Updates in Flexor Tendon Injuries II: Cutting Edge Rehabilitation of Zone 2 Flexor Tendon Repairs – Man Wah Joe Wong (HKG)	
1450-1500H	O P E N F O R U M	
1500-1515H	COFFEE BREAK (NIÑA 2)	


11th APFSSH and 7th APFSHT Scientific Programme

DAY 1 (November 8, 2017)

TIME	Sta. Maria 1	Sta. Maria 2	Nina 1	San Cristobal 1	San Cristobal 2	San Martin 1 - 3
1515-1715H Simultaneous Sessions	SS1F: Carpal Bone Pathologies Mod: Marc Garcia-Elias & Noel Carilo	SS1G: Wrist Arthroscopy Session Mod: Yukio Abe & John Hubert Pua	SS1H: Microsurgery Mod: Ellen Lee & Praveen Bhardwaj	SS1I: Free Paper CONGENITAL HAND Nathaniel Orillaza / Angel Gozum	SS1J: Free Papers Venue: ELBOW Henry Calleja / Soo Hong Han	APFSHT Sessions
1515-1530H	Scaphoid Non-union (Waist): Peter J. Stern (USA)	Arthroscopic TFCC repair: Algorithmic Approach to Management Pak Cheong Ho (HKG)	The Right Flap for the Right Injury Raja Sabapathy (IND)			1520-1540H Management of Pediatric Traumatized Hand Cecilia Li (HKG)
						1540-1555H Fascial Manipulation of the Upper Extremity Mark Serra (PHL)
1530-1545H	Wrist Instability: Approach to Diagnosis and Treatment Marc Garcia-Elias (ESP)	Results of Surgical Treatment of Combined TFCC and ECU Instability David MK Tan (SGP)	Perforator Flaps for the Hand & UE: Common Flaps for Common Hand Injuries Kanit Sananpanich (THA)			1555-1615H Electromyography Based Evaluation of Extensor Pollicis Longus Muscle Activities During Finger Movements Chimi Miyamoto (JPN)
1545-1600H	Kienbock's Disease: Diagnosis, Treatment and Prognosis Greg Bain (AUS)	Arthroscopically-assisted Reduction of Distal Radius Fractures: Indications and Outcomes Yukio Abe (JPN)	My Workhorse Flap for Large Defects: Why and How I Do It Ruban Sivanoli (MYS)			
1600-1615H	OPEN FORUM					

11th APFSSH and 7th APFSHT Scientific Programme

DAY 1 (November 8, 2017)

TIME	Sta. Maria 1	Sta. Maria 2	Nina 1	San Cristobal 1	San Cristobal 2	San Martin 1- 3
1615-1630H	Avascular Necrosis of the Scaphoid: Diagnosis, Treatment and Prognosis Thomas Kiefhaber (USA)	Endoscopic Management of Nonunion of the Proximal Pole of the Scaphoid Jeff Ecker (AUS)	Major Limb Replantation: Avoiding Complications and Optimizing outcomes Rashideen Fazwi (MYS)	SS1K: Free Paper Compression NEUROPATHY / Infection Romina Torres / Ahmad Suparno Bahar	SS1L: Free Paper TENDON Claire Durban-Mella / Hyun Sik Gong	Council Meeting of APFSHT
1630-1645H	Scaphoid Non-union: Correction of Deformity Diego Fernandez (CHE)	Repair of DRUJ using Dry arthroscopic technique Jeff Ecker (AUS)	Finger Replantation: Optimizing Results Praveen Bhardwaj (IND)			
1645-1700H	Dorsal Capsule Detachment from the Lunate: A Cause of the Dorsal Wrist Syndrome Toshiyasu Nakamura (JPN)	New Techniques in treatment of DRUJ instability Manohar Arumugam (MYS)	Toe Transfers In Traumatic Amputations Myung Jae Woo (KOR)			
1700-1715H	OPEN FORUM	Arthroscopic 1st CMCJ Fusion Esther Chow (HKG)	OPEN FORUM		OPEN FORUM	
1715-1730H		OPEN FORUM		OPEN FORUM		
1800-2100H	Experience sumptuous local dishes served the Filipino way.			<div></div> <div>PRESIDENTIAL DINNER Circa 1900 (Sanjercasville Ext. Rd., Lahug, Cebu City) Departure time: 6:00 PM <i>(By invitation only. Please be at the Radisson Lobby 15 minutes before departure time.)</i></div>		

11th APFSSH and 7th APFSHT Scientific Programme

DAY 2 (November 9, 2017)

TIME	San Cristobal 1 & 2			San Martin 1 - 3		
0730-0815H	Meet the Experts I: Distal Radius Fractures Diego Fernandez & Jeff Ecker Moderators: John Capo & Noel Carillo			Meet the Experts II: Complex Trauma of the Hand Peter Stern & Raja Sabapathy Moderators: Aymeric Lim & Tammy Dela Rosa		
TIME	Sta. Maria 1	Sta. Maria 2	Sta. Maria 3	Niña 1	San Cristobal 1	San Cristobal 2
0830-0945 Simultaneous sessions	SS2A: Upper extremity reconstruction in nerve and spinal cord injuries Mod: Scott Kozin & Sandeep Sebastin	SS2B: Hand Trauma Mod: Yasunori Hattori & Anthony Foo	SS2C: APFSSH & APFSHT Combined Session: Swan neck Boutonniere & PIP extensor lag: What works, what's new? Mod: Donald Lalonde & Jeff Ecker	SS2D: Brachial Plexus/Fingertip Mod: Moroe Beppu & Sharifah Roohi Ahmad	SS2E: Free Paper Session WRIST I: CARPAL BONE Esther Chow / Jovito Angeles	SS2F: Free Paper Session WRIST II: DISTAL RADIUS Joong Woong Park / Justiniano Bai
0830-0845H	Tendon Transfers for Tetraplegia Patients Hyun Sik Gong (KOR)	Fracture-dislocations of the PIP: external fixation Angel Gozum (PHL)	Anatomy of how relative motion splinting solves these problems Donald Lalonde (CAN)	Use of VATS (Video Assisted Thorascopic Surgery) in Brachial Plexus Reconstruction Tunku Sara Ahmad (MYS)		
0845-0900H	Upper Extremity Reconstruction in Spinal Cord Injury Scott Kozin (USA)	Fracture Fixation around the PIP Anthony Foo (SGP)	Swan Neck Deformity Donald Lalonde (CAN)	Shoulder reconstruction in Adult Brachial Plexus Injuries Somsak Leechavengvongs (THA)		
0900-0915H	Nerve Transfers in Tetraplegia Kanit Sananpanich (THA)	Fx-dislocations of the PIP: hemihamate arthroplasty Thomas R Kieffhaber (USA)	Boutonniere Deformity Jeff Ecker (AUS)	Flap coverage for fingertip injuries Sharifah Roohi Ahmad (MYS)		
0915-0930H	My Best Tendon Transfers for Different Nerve Injuries Praveen Bhardwaj (IND)	Pediatric Hand Injuries Alphonsus Chong (SGP)	Hand Therapy for Boutonniere and Swan Neck Deformities Vicky Allbrook (AUS)	Fingertip replantation and finger flaps Josephine Ip (HKG)		
0930-0945H	OPEN FORUM					
0945-1000H	COFFEE BREAK (NIÑA 2)					

11th APFSSH and 7th APFSHT Scientific Programme

DAY 2 (November 9, 2017)

TIME	Santa Maria 2 - 3	TIME	San Martin 1 - 3
1000-1240H	PLENARY SESSION 2A: Microsurgery/Brachial Plexus Mod: Yuan-Kun Tu (TWN) & Raja Sabapathy (IND)	1000-1230H	APFSHT Sessions
1000-1020H	Flaps for everyone Sandeep Sebastin (SGP)	1000-1015H	Long-term follow after Hand Allotransplantation: A Case Review Kent Chang (TWN)
1020-1040H	Flaps NOT for Everyone: Difficult Coverage for Upper Extremity Defects: Raja Sabapathy (IND)	1015-1030H	Management of the Traumatized Hand in the Acute Setting Henry Li (HKG)
1040-1100H	Anatomic Basis for Nerve Transfer Aymeric Lim (SGP)	1030-1045H	Pain Management of the Hand Akihito Yoshida (JPN)
1100-1120H	O P E N F O R U M	1045-1100H	Hand Therapy in the Philippines Jose Ramos (PHL)
1120-1140H	Long term Results for Upper and Extended Upper Type Brachial Plexus Injuries Somsak Leechavengvongs (THA)	1100-1115H	Application of Splint for Patients with TFCC Injury after Distal Radius Fracture Tomomi Yamada (JPN)
1140-1200H	Complete Brachial Plexus Injuries: Management and Assessment of Outcomes Yuan-Kun Tu (TWN)	1115-1130H	Updates on Repetitive Strain Injuries of The Hand Dr. John Hubert Pua (PHL)
1200-1220H	Evaluation of Motor Function After Peripheral Nerve Surgery: Pitfalls and Recent Trends Kazuteru Doi (JPN)	1130-1145H	Pronator Muscle Activity at grounding of the hand in falling down Mineo Oyama (JPN)
		1145-1205H	Clinical Taping for the Upper Extremities Charlie Tan (MYS)
1220-1240H	O P E N F O R U M	1205-1230H	O P E N F O R U M
1240-1330H	BENTO BOX LUNCH (To be distributed outside the Function Rooms)		


11th APFSSH and 7th APFSHT Scientific Programme

DAY 2 (November 9, 2017)

TIME	Santa Maria 2 - 3					
1330-1530H	Plenary Session 2B Elbow Mod: John Capo & Nathaniel Orillaza, Jr.					
1330-1350H	Treatment of Terrible Triad Injuries – John Capo (USA)					
1350-1410H	Pediatric Fracture-dislocations of the Elbow – Avoiding Complications – Scott Kozin (USA)					
1410-1430H	Hinged Fixators In Complex Elbow Conditions – Juanito Javier (PHL)					
1430-1450H	Elbow Instability: Basics to Bizarre – Gregory Bain (AUS)					
1450-1510H	Salvaging Complications of Elbow Surgery – Chairroj Uerpaiojkit (THA)					
1510-1530H	O P E N F O R U M					
1530-1545H	COFFEE BREAK (NIÑA 2)					
TIME	Sta. Maria 1	Sta. Maria 2	Niña 1	Sta. Maria 3	San Cristobal 1	San Cristobal 2
1545-1745H Simultaneous Sessions	SS2G: Distal Radius Mod: Diego Fernandez & Jose Bautista	SS2H: Basic Science/Burns Mod: Josephine Ip & Shalimar Abdullah	SS2I: Tendon Problems Mod: Teddy Prasetyono & Aymeric Lim	APWA ICL Session	SS2J: Free Paper MICRO I: Kanit Sananpanich / Tristram Montales	SS2K: Free Paper MICRO II: Hin Keung Wong / Jose M Pagsaligan
1545-1600H	Radiologic Anatomy of Distal Radius Fractures Gregory Bain (AUS)	Synthetic tendon grafts Shalimar Abdulla (MYS)	Repair of Z3 extensor tendon Jeff Ecker (AUS)	DRUJ Arthritis excision arthroplasty, matched resection arthroplasty, SK procedure John Capo (USA)		

11th APFSSH and 7th APFSHT Scientific Programme

DAY 2 (November 9, 2017)

TIME	Sta. Maria 1	Sta. Maria 2	Niña 1	Sta. Maria 3	San Cristobal 1	San Cristobal 2
1600-1615H	Distal Radius Fractures in the Elderly Diego Fernandez (CHE)	Artificial Nerve Conduits Josephine W Ip (HKG)	Repair Of Tendon Injuries Using Walant Donald Lalonde (CAN)	DRUJ Arthritis distal ulna and hemi-ulnar replacement Shanlin Chen (CHN)		
1615-1630H	Intraarticular osteotomies for Distal Radius Fractures Diego L. Fernandez (CHE)	Role of Nerve Stimulation in Peripheral Nerve Repair/ Reconstruction Jovito Angeles (USA)	The safety and Efficacy of One-per-Mil Tumescence Technique for Pediatric Hand Surgery Theddeus OH Prasetyono (IDN)	Arthritis-total joint replacement Andrew Chin (SGP)		
1630-1645H	OPEN FORUM			Malunion and DRUJ Greg Bain (AUS)		
1645-1700H	Complications after operative treatment of distal radius fracture Anthony Foo (SGP)	Principles and Management for Hand Burn Injuries. Raja Sabapathy (IND)	Getting the right tension in selected tendon transfers: Wide awake Donald Lalonde (CAN)	Salvage procedures of the DRUJ – failed replacement distal ulna, hemireplacement, failed excision and hemiresection Diego Fernandez (CHE)	SS2L: Free Paper Wrist IV: Distal Radius David MK Tan / Eugene Brito	SS2M: Free Paper DEGENERATIVE CONDITIONS Sandeep Sebastin / Giselle Gabriel
1700-1715H	Extra-articular osteotomies: Indications and Outcomes Jose Ma. D. Bautista (PHL)	Non-Tourniquet Technique for Hand Burn Contracture Theddeus OH Prasetyono (IDN)	Tenolysis after primary & secondary tendon repairs Donald Lalonde (CAN)	INTERACTIVE DISCUSSION		
1715-1730	Long-term results of ulnar head replacement Ping-Tak Chan (HKG)	OPEN FORUM	Tips and Tricks in Flexor Tendon Tenolysis Hin Keung Wong (HKG)			
1730-1745H	OPEN FORUM					
1800-2200H	Spend the last night of the congress appreciating Filipino culture.					
						
CONGRESS BANQUET Sta Maria Ballroom, Raddison Blu Hotel						

11th APFSSH and 7th APFSHT Scientific Programme

DAY 3 (November 10, 2017)

TIME	San Cristobal 1 & 2			San Martin 1 - 3	
0730-0815H	Meet the Experts III: Carpal Instabilities Marc Garcia-Elias & Gregory Bain Moderators: Jeff Ecker & Pak Cheong Ho			Meet the Experts IV: Salvage Procedures for Failed Brachial Plexus Surgeries Scott Kozin & Kanchai Malungpaishrope Moderators: Yuan Kun Tu and Praveen Bhardwaj	
	TIME	Sta. Maria 1	Sta. Maria 2	Sta. Maria 3	San Cristobal 1
0830-0945 Simultaneous sessions	SS3A: The Pediatric Hand Mod: Goo Hyun Baek & Nathaniel Orillaza	SS3B: SLD (Scapho-lunate Dissociation) Mod: Gregory Bain & David Alagar	SS3C: Degenerative and Inflammatory Conditions Mod: Ping Tak Chan & Andrew Chin	SS3D: Free Paper Session BPI and PNI Heri Suroto / Peachy Handog	SS3E: Free Paper Session WRIST III / TUMORS Koichiro Ihara / Raymar Sibonga
0830-0845H	Complex Syndactyly Josephine Ip (HKG)	Pathomechanics of SLD Marc Garcia-Elias (ESP)	Degenerative Osteoarthritis of the elbow John Capo (USA)		
0845-0900H	Thumb reconstruction for congenital deformities Scott Kozin (USA)	Reconstruction in SLD Marc Garcia Elias (ESP)	Degenerative osteoarthritis of the wrist: Arthroplasty vs. arthrodesis Andrew Chin (SGP)		
0900-0915H	Congenital Synostosis Terence Tay (MYS)	Arthroscopically-assisted SL reconstruction for chronic SLD Pak Cheong Ho (HKG)	Basal thumb arthritis principles of management Jeff Ecker (AUS)		
0915-0930H	Reconstruction for pediatric cerebral palsy Praveen Bhardwaj (IND)	Management of SNAC/SLAC wrists Diego Fernandez (CHE)	Arthroscopic Management of the Rheumatoid Wrist Min Jong Park (KOR)		
0930-0940H	OPEN FORUM				
0940-1000H	COFFEE BREAK (NIÑA 2)				

11th APFSSH and 7th APFSHT Scientific Programme

DAY 3 (November 10, 2017)

TIME	Santa Maria 2 - 3
1000-1200H	PLENARY SESSION 3: General Mod: Anthony Berger & Goo Hyun Baek
1000-1020H	Small Joint Arthroplasties: Improving Outcomes in Small joint surgery – Thomas Kiefhaber (USA)
1020-1040H	Approach to Ulnar-sided Wrist Pain – Marc Garcia-Elias (ESP)
1040-1100H	Current Concepts in Ulnar Impaction Syndrome – Goo Hyun Baek (KOR)
1100-1110H	O P E N F O R U M
1110-1130H	Wide Awake Surgery: Clinical Experience and Complications – Donald Lalonde (CAN)
1130-1150H	Art & Challenges of Burn Hand Surgery – Theddeus OH Prasetyono (IDN)
1150-1210H	Volunteerism & Helping Hands Project – Scott Kozin (USA)
1210-1220H	O P E N F O R U M
1230-1330H	CLOSING CEREMONY & LUNCH (Lunch to be served in Bento boxes)

The 11th APFSSH Organizing Committee

Congress President:	Dr. Ida S. Tacata	Abstract Book/Souvenir Program/ “Theme”/Documentation	
Secretary General:	Dr. Emmanuel Estrella	Chair:	Dr. Nathaniel Orillaza
		Co-Chair:	Dr. Jose Maria Bautista
Ways and Means:		Registration/Program/Invitations/Publicity	
Chair:	Dr. David Alagar	Chair:	Dr. Eugene Brito
Co-Chair:	Dr. Noel Carilo	Co-Chair:	Dr. Tristram Montales
Free Paper (Oral/Poster)		Tajima Memorial Lecture Coordinator	
Chair:	Dr. Lucille Detoyato	Chair:	Dr. Leo Daniel Caro
Co-Chair:	Dr. Tammy Dela Rosa	Co-Chair:	Dr. Peachy Handog
Scientific Committee		Socials/Hospitality/Accompanying Persons Program/Workshop – Hand Therapist Coordinator	
Chair:	Dr. Emmanuel Estrella	Chair:	Dr. Henry Calleja
Co-Chair:	Dr. Tammy Dela Rosa	Co-Chair:	Dr. Mina Torres/Ameena
Physical Arrangement		11th APFSSH Golf Cup	
Chair:	Dr. Nelson Lim	Chair:	Dr. Angelito Gozum
Co-Chair:	Dr. John Hubert Pua	Co-Chair:	Dr. Henry Calleja

ARTHROSCOPY | 8:00 AM - 9:15 AM | NOV 8, 2017

STABILITY OF DIFFERENT APPROACHES FOR TRIANGULAR FIBROCAR-
TILAGE COMPLEX FOVEAL REPAIR: A CADAVERIC BIOMECHANICAL STUDY

Hsueh-Pu Chou, MD¹, Chin-Hsien Wu, MD^{1,2}, Chin-Hou Ma, MD^{1,2}, Cheng-Yo Yen, MD, PhD^{1,2}, I-Ming Jou, MD, PhD^{1,2}, Yuan-Kun Tu, MD, PhD^{1,2}

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Objective In this cadaveric study, we hypothesized that the arthroscopic transosseous suture is able to achieve comparable biomechanical results to the open triangular fibrocartilage complex (TFCC) foveal repair technique. Another purpose of this study was to evaluate the feasibility of the new aiming device for arthroscopic transosseous suture.

Methodology Six matched pairs of "fresh-frozen" forearm cadaver specimens were prepared to test. The specimens were mounted vertically in a custom-designed stabilization tower using the AO external fixator. Group I specimens were treated by open repair technique with suture anchor. Group II specimens were treated by arthroscopic transosseous suture with new aiming device, which could make two bone tunnels simultaneously and let the procedure easier. Before and after the disruption of TFCC fovea, dorsal and palmar translations of ulna were measured in response to the load (3kg) in a palmar and then a dorsal direction. These measurements were also recorded after repair of TFCC foveal tear in both groups. Three consecutive loads in each direction were applied to measure the translation of ulna. The total translation of the ulna was calculated as the sum of the mean dorsal and palmar translations.

Results One cadaveric specimen has preexisting TFCC pathology. The remaining 11 specimens presented significant increase in the total translation of the ulna following disruption of TFCC ($p=0.003$). The median percent total translation eliminated following TFCC repair of group I (open repair) and II (arthroscopic repair) specimens were 64% and 172% ($p=0.004$).

Conclusion In this study, we found that disruption of the TFCC resulted in a significant decrease in distal radioulnar joint stability. Furthermore, we showed the feasibility of new aiming device for arthroscopic transosseous suture. In summary, arthroscopic transosseous suture technique shows a superior repair efficacy to open repair technique in the biomechanical strength.

PHYSEAL BAR RESECTION WITH THE AID OF PATIENT MATCHED
INSTRUMENT (PMI) AND ARTHROSCOPICALLY ASSISTED TECHNIQUE FOR
THE PARTIAL PHYSEAL ARREST OF THE DISTAL RADIUS

Satoshi Miyamura¹, Kunihiro Oka^{1,2}, Hiroyuki Tanaka¹, Shingo Abe¹, Atsuo Shigi¹, Tsuyoshi Murase¹

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²Osaka University Healthcare Center, 17-1, Machikaneyama-cho, Toyonaka, Osaka 560-0043, Japan.

Objective We report a case of partial physeal arrest of the distal radius, which was successfully treated by Langenskiöld procedure with use of patient matched instrument (PMI) and intramedullary endoscopic assisted technique.

Methodology An 11-year-old girl sustained a growth plate fracture of the right distal radius and was initially treated with cast immobilization at the previous institution. The fracture was united for several weeks, however, the ulnar-sided wrist pain and unsightly appearance of her wrist was developed during half a year and she was referred to our institution. Radiographs showed shortening deformity of the distal radius and computed tomography (CT) revealed that the physeal bar existed at the center of the growth plate. To remove the bar precisely through the medullary cavity of distal radius, PMI was created as a surgical guide based on the three-dimensional (3-D) computer simulation. After the gradual lengthening of distal radius to correct the deformity, we performed a physeal bar resection (Langenskiöld procedure). PMI was fitted onto the volar surface of distal radius and multiple pinning around the

physeal bar with 1.0mm K-wires through PMI was performed. The physeal bar enclosed accurately with K-wires was resected. Furthermore, completion of the resection was observed by intramedullary endoscopy for direct physeal visualization.

Results Twenty months after the surgery, the deformity had been corrected completely without any pain and she had returned to full activity and athletics.

Conclusions Langenskiöld procedure, which is relatively common management for the partial physeal arrest, enable to reestablish physeal growth in the extremity, nevertheless, this procedure is technically demanding to excise the physeal bar precisely. In the present case, we achieved complete removal of the bar using PMI, in combination of a direct observation by intramedullary endoscopy. We hereby present the great efficacy of simultaneous use of PMI and arthroscopy in Langenskiöld procedure.

ARTHROSCOPIC FOUR-CORNER AND CAPITULUNATE FUSIONS FOR
SCAPHOLUNATE ADVANCED COLLAPSE (SLAC) OR SCAPHOID NONUNION
ADVANCED COLLAPSE (SNAC)

Mak Michael Chu-Kay

Introduction Open four-corner fusion is a conventional motion preserving salvage procedure for post-traumatic wrist arthritis. A totally arthroscopic approach for partial wrist fusion has not been reported previously. A 15-year-review (2000 to 2014) of arthroscopic four-corner and capitulunate fusion in our center was conducted.

Methods There were 12 wrists which underwent this procedure in the period reviewed. Five had four-corner fusion and seven had capitulunate fusion. Subjective and objective parameters including range of motion (ROM), functional assessment based on 10 common standardized tasks of daily living, pain assessment based on a 3-point pain scale, and grip power were recorded on follow-up by occupational therapists. Follow up period was from 4 months to 12 years and 6 months.

Results Fusion was achieved in 92%. There was a case of painless fibrous non-union but no revision surgery was required. Same 92% of improvement in both wrist function scores ($p=0.005$) and pain score ($p=0.01$) were observed. Mean residual flexion/extension arc was 88% of the pre-operative range. There was no significant difference between the four-corner fusion and capitulunate fusion groups in terms of ROM, function or pain scores. 92% patient could return to their prior occupations within a mean duration of 9 months.

Summary With all-arthroscopic technique and use of headless compression screws, a high fusion rate could be achieved, with or without the need for bone grafting. A functional ROM, adequate pain relief and restoration of functional performance could be obtained with this minimally invasive approach.

ARTHROSCOPIC OSTEOSYNTHESIS FOR SCAPHOID NONUNION

JuiTien Shih M.D.

Department of Orthopaedic Surgery

Armed Forces Taoyuan General Hospital, Taiwan

Objective Scaphoid fracture nonunions are usually treated by conventional bone grafting with supplementary internal fixation. Because of the significant complication of conventional bone-grafting techniques, some surgeons have advocated the use of arthroscopically assisted with bone grafts or substitute for nonunion of scaphoid fracture. High success rates have been reported for the technique.

Materials and Methods From 2006 Jun to 2014 Jun, arthroscopic osteosynthesis with bone grafts or substitute were used to treat 36 early type (I, II) scaphoid nonunions without necrosis. Thirty four patients were male patients and two were female. Their mean age was 24.8 (range 19 to 38) years. Follow-up was for a minimum of 15 (range 15-28) months and fracture union was assessed on serial X-rays or with CT scans if the X-ray appearances were inconclusive.

Results In our series, 32 (88.9%) of the 36 fracture nonunions had united. Postoperatively, union could be assessed satisfactorily by series X-rays in 30 patients, but CT scans were required in six patients where it was uncertain whether union had occurred.

Conclusion Arthroscopic osteosynthesis should be considered for early type (I, II) of nonunion of scaphoid without necrosis.

ARTHROSCOPY | 8:00 AM - 9:15 AM | NOV 8, 2017

ASSESSMENT OF ARTICULAR DISPLACEMENT OF DISTAL RADIUS FRACTURES TREATED ARTHROSCOPICALLY

Akira Kawabata¹, Hidetoshi Teraura², Kosuke Sasaki³, Kiyohito Takamatsu¹

Department of Orthopaedic Surgery, Yodogawa Christian Hospital

Department of Orthopaedic Surgery, Higashi-Sumiyoshi Morimoto Hospital

Department of Orthopaedic Surgery, Osaka Ekisaikai Hospital

Objective Arthroscopy is an alternative therapy for intra-articular fractures of the distal radius, and the efficacy of this procedure has been demonstrated. Articular displacement of fractures can be accurately evaluated via intraoperative arthroscopy; however, displacement has typically been evaluated radiographically during follow-up. In this study, we evaluated the validity of arthroscopic reduction via postoperative CT.

Methodology This study included intra-articular distal radius fractures arthroscopically treated with a volar locking plate and evaluated using postoperative CT. We selected 15 patients (4 men and 11 women; mean age 59.1 years) with a minimum follow-up duration of 6 months (mean, 14.5 months). Postoperative CT was performed immediately post-surgery in 13 cases and post-bone union in 9 cases. Gap and step-off were examined as indices of articular displacement via arthroscopy and radiography and CT, respectively, during the follow-up period. Mayo wrist scores were evaluated at final follow-up.

Results Intraoperative arthroscopic evaluation demonstrated mean gap and step-off after fracture reduction to be 0.8mm and 0.1mm, respectively. Radiographic findings for gap and step-off were 1.5mm and 1.1mm preoperatively, 0.2mm and 0.1mm immediately post-surgery, and 0.1mm and 0.1mm at final follow-up, respectively. CT findings for gap and step-off were 3.2mm and 1.9mm preoperatively, 1.2mm and 0.3mm immediately post-surgery, and 0.5mm and 0.1mm post-bone union, respectively. There were no significant differences between intraoperative arthroscopic findings and CT findings immediately post-surgery or post-bone union. Therefore, articular fragment reduction was maintained during the postoperative periods. Radiographic and CT findings for preoperative and immediate postoperative indices significantly differed. Radiographic findings underestimated articular displacement and CT evaluation was more precise. Mean Mayo wrist score was 87.0 points at final follow-up.

Conclusions Our CT findings indicated that we achieved and maintained good articular displacement reduction in intra-articular distal radius fractures treated arthroscopically with a volar locking plate.

ARTHROSCOPIC EXCISION OF WRIST GANGLIONS: DIFFERENCES BETWEEN THE TRANS-CYSTIC PORTAL AND THE CYST-SPARING PORTAL TECHNIQUES

Chin-Hsien Wu, MD^{1,2}, Jih-Hsi Yeh, MD^{1,2}, Cheng-Yo Yen, MD, PhD^{1,2}, I-Ming Jou, MD, PhD^{1,2}, Yuan-Kun Tu, MD, PhD^{1,2}¹Department of Orthopedics, E-Da Hospital/I-Shou University, Kaohsiung, Taiwan²Department of Medicine, I-Shou University, Kaohsiung, Taiwan

Objective Arthroscopic excision of wrist ganglions has recently become popular for the treatment of wrist ganglions. However, the preliminary results were contradictory. Maybe the approach to arthroscopic excision of wrist ganglions plays an important role. We analyzed 2 surgical approaches to arthroscopic excision of wrist ganglions.

Methodology Between April 2009 and October 2015, 47 consecutive patients with wrist ganglions who underwent arthroscopic excision in our institute were classified to 2 treatment groups retrospectively: the trans-cystic portal technique and the cyst-sparing technique according to surgeon's preference. The VAS, Mayo wrist scores and Disabilities of arm, shoulder and hand (DASH) scores were recorded for clinical assessment. Recurrence, residual pain and complications were evaluated at the final follow-up.

Results There were no significant differences between the groups with regard to demographic data, preoperative clinical assessment and duration of follow-up. There were also no significant differences between the groups with regard to operative time ($p = 0.627$), postoperative VAS ($p = 0.666$), Mayo wrist score ($p = 0.677$), DASH score ($p = 0.919$), recurrence ($p = 0.491$), residual pain ($p = 0.696$), complications ($p = 0.611$). Recurrence was found in 3 of 47 patients, one in the trans-cystic portal technique group and two in the cyst-sparing technique group, respectively. Transient extensor tendonitis was the most common complication. One was noted in the trans-cystic portal technique group and two in the cyst-sparing technique group, respectively. The residual pain was noted in three patients with intraarticular pathology.

Conclusion We found no statistically significant difference in the clinical outcomes, recurrence, residual pain and complications between the trans-cystic portal technique and the cyst-sparing technique while arthroscopic excision of wrist ganglions. Surgeons can perform the arthroscopic excision of wrist ganglions with their familiar techniques. However, extensor tendon should be seen perfectly at the end of the operation with care and the intraarticular pathology should be treated simultaneously.

ARTHROSCOPY ASSISTED TREATMENT OF CHRONIC WRIST PAIN AFTER DISTAL RADIUS FRACTURES

Young-Keun Lee, Tae Gyun Kim, Jun-Mo Lee

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Key words: Arthroscopy, Distal Radius Fractures, Chronic Pain.

Objective To report the arthroscopic findings and clinical results of patients with chronic wrist pain after distal radius fracture who underwent diagnostic arthroscopy and arthroscopic-assisted tailored treatment.

Methodology We retrospectively analyzed the records of 11 chronic wrist pain patients after distal radius fracture, who underwent diagnostic arthroscopy and arthroscopic-assisted tailored treatment from 2010 to 2015. Average patient age was 49 years, the average time from injury to treatment was 13.8 months and the average follow up period was 17.5 months. The functional outcome was evaluated by comparing the range of motion, grip strength, pinch strength, visual analogue scale for pain and quick Disabilities of the Arm, Shoulder and Hand questionnaire, which were measured preoperatively and at final follow up.

Results We could find synovitis in all cases and classify the pathologic intra-articular lesions into 4 patterns. TFCC rupture was seen in 11 cases, intercarpal ligament rupture was in 6 cases, ulnar impaction syndrome was observed in 4 cases, and cartilage defect was noted in 8 cases. In terms of surgical treatment, 11 patients underwent arthroscopic synovectomy, 5 underwent foveal or capsular repair of TFCC, 5 underwent intercarpal K-wires fixation or thermal shrinkage, 1 underwent intercarpal ligament reconstruction, 2 underwent Sauve-Kapandji procedure and 1 underwent ulnar shortening osteotomy. Postoperatively, the average range of motion, grip and pinch strength increased significantly. The average VAS score increased from 6.4 preoperatively to 1.3 at the final follow up ($P=0.003$), while the average quick DASH score decreased from 54.9 preoperatively to 14.7 at the final follow up ($P=0.003$).

Conclusions Arthroscopy assisted treatment of chronic wrist pain after distal radius fracture can provide an accurate diagnosis, significant pain relief and functional improvement.

ARTHROSCOPY | 8:00 AM - 9:15 AM | NOV 8, 2017**FUNCTIONAL RESULTS POST ARTHROSCOPIC TRIANGULAR FIBROCAR-
TILAGE COMPLEX RECONSTRUCTION IN CHRONIC DISTAL RADIOULNAR
JOINT INSTABILITY**JuiTien Shih M.D.*Department of Orthopaedic Surgery
Armed Forces Taoyuan General Hospital, Taiwan*

Objective Tears in the triangular fibrocartilage complex (TFCC) are often observed with ulnar wrist pain and limit wrist function in work or sport. In chronic cases, tears with degeneration of the TFCC combined with DRUJ instability, are difficult to treat. Consequently, this paper presents the results of Arthroscopic reconstructing the TFCC with the free PL tendon.

Materials and Methods From September 1999 to September 2011, 21 adult patients, 20 male and one female, with chronic TFCC tears were studied. Their ages ranged from 19 to 24 years, and the mean age was 22.4 years. We adopted a protocol of arthroscopic TFCC reconstruction with PL tendon for all chronic TFCC injuries with DRUJ instability in our clinic. Thereafter, a rehabilitation program, including wrist motion and the occupational therapy was begun. The period from the accident to the operation ranged from 14 to 28 months, with a mean of 22.6 months.

Results All patients with negative, zero or mild positive (<2mm) ulnar variance found. The results were graded using Mayo Modified Wrist Score. Eleven of the 21 patients rated their wrists as "excellent", nine as "good", and one as "fair". No patients experienced wound infections or complication.

Conclusions Arthroscopic TFCC reconstruction using PL tendon is an effective method for treating chronic TFCC tears with DRUJ instability, as suggested in this study.

TRAUMA HAND**8:00 AM - 9:15 AM | NOV 8, 2017****VOLAR APPROACH TO METACARPAL FIXATION: INDICATIONS AND
SURGICAL OUTCOMES**Chan May Fong*NUHS Hand & Reconstructive Microsurgery, National University Health System Singapore
119228*

Objective Volar approach to treatment of acute fracture, non-union, or malunion of metacarpal fractures is infrequently performed due to uncommon indications. In selected clinical scenarios, however, this approach is required to provide the optimal access to perform tumor excision, osteotomy, and placement of implant along biomechanically favorable corridors.

Methodology In a series of eight patients with acute fractures, revision fixation, malunion, and pathological fracture, the volar approach was employed for plate fixation and bone grafting. Patients charts were analyzed for indications, anatomical and biomechanical considerations, and surgical outcomes.

Results The primary pathology in each of these patients were successfully treated with no significant complications such as vascular or arterial injury. There were no long-term sequelae such as flexor tendon attrition nor adhesions.

Conclusion Although volar approach to metacarpus is technically demanding, it provides unique access for difficult clinical scenarios where conventional dorsal approach may not be favorable.

**RETROGRADE FIXATION OF METACARPAL FRACTURES WITH INTRAMED-
ULLARY CANNULATED HEADLESS COMPRESSION SCREWS**D. Jann, M. Calcagni, T. Giesen*Plastic and Hand Surgery Department, University Hospital Zurich, Zurich, Switzerland
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Zurich, Rämistrasse 100, 8091 Zürich, Switzerland. Email: david.jann@icloud.com*

Purpose Evaluation of clinical and radiological outcomes in patients with displaced metacarpal head, neck and shaft fractures treated with retrograde intramedullary cannulated compression screws (CCS). **Methods:** We retrospectively analyzed all digital charts of patients with metacarpal fractures, which have been treated with a retrograde SpeedTip CCS 2.2, or 3.0 mm between September 2014 and June 2017 in our institution. We performed closed reduction under fluoroscopic control and routinely used a small incision above the metacarpal head to insert the screw retrogradely in the intramedullary canal. Patients used twin tapes for the affected and one adjacent finger for 4-5 weeks and began active motion immediately. We recorded patient data, range of motion, grip strength and evaluated bone union on x-rays. A total of 45 metacarpal fractures were identified in 39 patients. In one patient, surgery was performed due to secondary dislocation of an initially conservatively treated subcapital fifth metacarpal fracture. One patient fractured the same fifth metacarpal shaft 14 months earlier; plate removal was performed 3 months earlier after complete healing. All patients reached minimum 1 month follow-up. **Results:** In 44 fractures a single screw and in one multifragmentary metacarpal head fracture two screws were used. Three patients required screw removal because of screw dislocation without being symptomatic. One patient with multiple fractures and a flexion deficit required arthrolysis of two metacarpophalangeal joints. One patient with a head fracture of the second metacarpal that showed a 25° extension lag. Tenolysis was recommended for this case but the patient refused. We found no other complications. All fractures were healed. **Conclusion:** This easy and fast technique shows good outcomes for different patterns of unstable metacarpal fractures. The advantage is early active motion without immobilization as well as stable fixation. Operative removal of the screw is rarely needed.

**A NOVEL TECHNIQUE FOR DYNAMIC EXTERNAL FIXATION OF PROXIMAL
INTERPHALANGEAL JOINT FRACTURE-DISLOCATIONS: THE SRIRACHA
DYNAMIC EXTERNAL FIXATOR**N. Sastravaha, W. Taweewuthisub, K. Limudomporn*From the Department of Orthopedic Surgery, Queen Savang Vadhana Memorial Hospital,
Chonburi, Thailand*

Objective Dynamic external fixation is a commonly used method to treat unstable proximal interphalangeal (PIP) joint fracture-dislocations. The pins and rubbers traction system, being one of the most popular techniques due to its compact design, isn't without flaws. The rubber band's traction force is difficult to adjust or maintain. We present an alternative technique using a plastic syringe which, we believe, is stronger and friendlier to the patient's hand activities than the pins and rubbers traction system. The purpose of this case series was to investigate the results of our new technique.

Methodology A 20mL syringe was designed and cut to suit each patient's finger in the fashion that PIP and DIP joint motions were not limited. The first Kirschner wire was inserted at the head of the middle phalanx through the syringe. Reduction was maintained and the second and third Kirschner wires were inserted through the syringe at the head of the proximal phalanx and the base of the middle phalanx respectively. Fluoroscopy was used to check for joint congruency throughout the arc of motion. Range of motion (ROM) exercise began immediately after the operation.

Results Five patients with unstable PIP joint fracture-dislocations were included. Follow-up time ranged from 3 to 9 months. The mean final ROM of the injured PIP joint was 90°. The mean numeric rating pain score was 1. Quick-DASH score was 0 in all patients except in one patient with a score of 40. One patient who had a surgical site infection requiring debridement and device removal at 33 days postoperatively had a ROM of the injured PIP joint of 0° to 86°. There were no cases of loss of reduction or syringe breakage.

Conclusions Our results were comparable to other dynamic external fixation techniques used for unstable PIP joint fracture-dislocations. The main advantages of our technique are strength of the system, simplicity of the procedure, the compact design, relatively low cost, and availability of the materials. In addition, our technique can also be used in pilon fractures and comminuted shaft fractures of the middle phalanx.

TRAUMA HAND | 8:00 AM - 9:15 AM | NOV 8, 2017

PEDIATRIC PROXIMAL PHALANX FRACTURES: OUTCOME OF TREATMENT OF SALTER HARRIS TYPE 2 INJURIES

Xu JY, Chong Alphonsus KS, Foo Anthony TL

NUHS Hand & Reconstructive Microsurgery, National University Health System Singapore 119228

Introduction Salter-Harris type 2 (SH2) fracture of the proximal phalanx is the most common phalangeal fracture in the growing hand, and treatment ranges from immobilization and splinting of milder injuries to surgery for irreducible fractures. This study evaluates the outcome of SH2 fractures treated by early mobilization, splint immobilization, and cast immobilization.

Methodology Retrospective chart review from 2013-2016, identified 88 patients (90 digits) with proximal phalangeal base SH2 fractures treated at our institution with a minimum of one month follow up. Two patients who underwent surgery were excluded from our analysis. Clinical data and radiological outcomes were charted and analyzed.

Results Five patients were treated with buddy taping, 30 by splinting, and 52 by casting. The average time to radiological union is 4.5 weeks. The average follow up is 6.6 weeks. A total of 22 patients received manipulation and reduction of the fracture. Only one finger showed secondary displacement on follow up XR done at four weeks post injury. Splint immobilization was as good as cast in maintenance of fracture reduction, and there was no statistically significant difference in outcomes between the groups.

Conclusion Splint immobilization seemed to provide comparable clinical and radiological outcome, without cast related discomfort or complications.

TREATMENT OF INTRAARTICULAR PHALANGEAL FRACTURE BY THE REDUCTION THROUGH THE CORTICAL WINDOW AND BUTTRESS PLATING

Ji Hun Park, Jong Woong Park

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Introduction The surgical aims in managing comminuted intraarticular fractures of the base of the middle phalanx include adequate stability, maintaining articular congruence and early joint mobilization. Achieving these goals can be a challenge in the treatment of intraarticular phalangeal fracture. The primary aim of this study was to assess the clinical and radiological results after a reduction through the cortical window and modulated locking plate fixation in patients with comminuted articular depression type fractures of the base of the middle phalanx and to describe technical features that can facilitate the surgical procedure.

Methods Six fingers (5 patients, mean age 42 years) with comminuted articular depression type fractures of the base of the middle phalanx were surgically treated. We reduced articular fragments of all fingers with a use of K-wire or small elevator inserted through a cortical window, which was made just proximal to the depressed fragments. Residual bone defect was filled with allograft. The constructs were stabilized with a modulated locking plate, where articular fragments and grafted bone tamps were buttressed by one or two locking screws. The minimum follow up was over 12 months. Initial postoperative and final stability and range of motion of the PIP joint were assessed using physical examination, radiographs, and goniometer by the treating surgeon. Patients completed the Quick Disabilities of the Arm, Shoulder and Hand (DASH) score at latest follow up and complications were assessed.

Results All reduced articular surface were maintained during whole follow up period and healed with stable PIP joints. All patients reported having no pain or vague pain of their injuries to the hand. At follow-up, the median finger PIP arc of motion were 94.7° (range, 80°-100°) and the median finger DIP arc of motion were 61.7° (range, 30°-70°). One patient who had previous finger joint osteoarthritis and Parkinson disease showed mild flexion limitation in PIPJ with flexion contracture of DIPJ, but he did not complain restriction in daily lives. The median grip and pinch strength were

94% (range, 80 - 100) and 88.3% (range, 66.7 - 100) of the contralateral side, respectively. The median Quick DASH score was 2.28 (range, 0 - 9.1). All patients returned to their work.

Conclusion Presented technique provides satisfactory restoration of articular congruence, and enables reliable joint stability and early joint mobilization of comminuted articular depression type fractures of the base of the middle phalanx.

MODIFIED EATON-LITTLER'S RECONSTRUCTION FOR TRAUMATIC THUMB CARPOMETACARPAL JOINT INSTABILITY: OPERATIVE TECHNIQUE AND CLINICAL OUTCOMES

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ABSTRACT

Injuries to thumb carpometacarpal joint ligaments lead to instability. Eaton-Littler ligament reconstruction traditionally uses a strip of flexor carpi radialis to stabilise the CMC joint. We have modified this technique to reproduce the direction of active action of the anterior oblique ligament by reconstructing both the volar and dorsoradial ligaments. In this prospective study we evaluated patients with confirmed traumatic thumb CMC joint instability who underwent modified Eaton-Littler reconstruction. Strength analysis, Michigan Hand Outcome Questionnaire, QuickDASH and subjective outcome measures were collected pre- and postoperatively with minimum 3-years followup. Eleven patients were included in the final analysis, mean age 29 years (range 16-52), average follow up of 6.2 years (range 3-11). There was a statistically significant improvement in all outcome measures. Our modified technique helps to simultaneously address both volar and dorsal ligaments and yielded satisfactory clinical outcomes at medium term follow up. Level of evidence: therapeutic, prospective clinical study; level-III.

INTERDIGITAL DYNAMIC FIXATOR - A NOVEL TECHNIQUE FOR COMMUNUTED PERIARTICULAR BASE FRACTURE OF PROXIMAL PHALANX: A CASE SERIES AND REVIEW OF THE LITERATURE.

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Abstract Background Fractures of the phalanx account for more than 20% of all upper extremities fracture, mostly, proximal phalanx (P1) fracture. Managing comminuted fracture of P1 remained challenging problem for hand surgeon especially periarticular fracture base of P1. Several operative techniques were performed to gain anatomic reduction, stable fixation and early range of motion. We proposed a novel technique: Interdigital dynamic fixator. Objective: The aims of this study were determined the outcome of comminuted periarticular base of P1 fractures which were performed by the operations: Interdigital dynamic fixator technique.

Material and Methods A comminuted periarticular base of P1 fracture was reduced by distal traction. The joint motions were not interfered because both metacarpophalangeal (MCP) and proximal interphalangeal (PIP) remained free of motion. The first pin was inserted at neck of P1 through the adjacent phalanx after reduced by distal traction. The second pin was inserted at base of P1 through the adjacent phalanx to maintain reduction. The third pin may be inserted at the mid-P1 to correct angulation and improved fracture stability. Fluoroscopy was used to check alignment and reduction. Range of motion (ROM) exercise began immediately after the operation. Results: Three patients with comminuted P1 fractures were recruited. The average follow-up period was 6 months. The mean ROM of the injured MCP of those 3 patients was 83°. The mean ROM of PIP was 80°. The patients reported visual analogue pain score of 0-1. The grip strength was acceptable compared to uninjured side. All cases were union in good alignment without serious complication.

Conclusion Despite to pilot study, the Interdigital dynamic fixator should be alternative way to manage comminuted periarticular P1 fracture.

TRAUMA HAND | 8:00 AM - 9:15 AM | NOV 8, 2017**TRANS-METACARPAL SCREW FIXATION FOR EXTRA-ARTICULAR FRACTURES AT THE BASE OF THE PROXIMAL PHALANX; POSTOPERATIVE RESULTS**Eichi Itadera*Department of Orthopedics, Japanese Red Cross Narita Hospital*

Instruction Extra-articular fractures at the base of the proximal phalanx are difficult to treat to obtain normal alignment. We have developed a fixation method using a headless bone screw, and introduced the surgical technique and its clinical utility at the 10th APFSSH. The purpose of this presentation is to show the postoperative results.

Materials and Methods Patients with extra-articular fractures at the base of the proximal phalanx of the fingers, operated on with trans-metacarpal screw fixation at our institution between January 2014 and July 2016 were included in this study. There were 6 fractures of 4 patients.

Surgical technique After manipulative reduction with traction and flexion of the MCP joint, a guide-pin is inserted from a small dorsal skin incision into the proximal phalanx through the metacarpal head and MCP joint. Then, a headless cannulated screw is placed into the proximal phalanx over the guide-pin. Clinical and radiographical results were assessed at the final follow-up.

Results Range of motion of the MP joint was satisfactory except 1 patient, which had extensor tendon adhesion seemed to be caused by the fifth CM joint fracture-dislocation or soft tissue damage. All 6 fractures obtained satisfactory union of the fractures. There were no correction loss, no angular deformity, and no postoperative osteoarthritis. Critical complications relevant to this operative technique could not be found.

Conclusion This procedure may offer a useful alternative in the treatment of extra-articular fractures at the base of the proximal phalanx.

CONGENITAL HAND**8:00 AM - 9:15 AM | NOV 8, 2017****TOE TO HAND TRANSFER WITH METATARSOPHALANGEAL JOINT ARTHRODESIS FOR FULL-LENGTH THUMB RECONSTRUCTION IN CONGENITAL THUMB HYPOPLASIA'S**Dzintars Ozols^{1,2}, Anete Rozentalberga³, Vadims Nefjodovs², Aigars Petersons²*¹Department of Hand and Plastic Surgery, Microsurgery Centre of Latvia, Riga East University Hospital, Riga, Latvia, ²Riga Stradin's University, ³University of Latvia*

Introduction The congenital thumb hypoplasia represents as patients disability with lack of functions, poor cosmetics and significantly influenced quality of life in the future. The surgical technique for the toe to hand transfer has been modified. Second metatarsophalangeal joint arthrodesis (chondrodesis) is done to improve length, stability and functionality of a new thumb for type IIIb; IV and type V.

Materials and Methods A total of 3 cases were done using new toe to hand transplantation method in the Microsurgical Centre of Latvia. Follow up study was done to evaluate outcome of hands functions. Results were compared to pollicization. The parents and the patients were asked to answer for two questions: Transplanted toe looks like thumb? Transplanted toe works like thumb? Evaluation of the VAS score from 1-10 (less is best). DASH and PEDI scores were used to evaluate functional outcome.

Results Long-term average 4 years follow-up evaluation was done. Average DASH score for toe to hand transplantation thumbs were 9.35 (8-10.7) and PEDI score 64.

DASH score for pollicization was 19.8 (6-26.7) and PEDI score 58.66 (54-66). VAS score for toe to hand transplantation 4.5 (2-7) and for pollicization 8.33 (5-20). Grasp and pinch force were measured.

Conclusion The point for new technic for thumb reconstruction with second toe transplantation and MTP arthrodesis (chondrodesis) was salvage of 5-digit hand and restoration functionality of the thumb. This method can be an alternative for the pollicization to reconstruct thumb hypoplasia's grade IIIb-V. We think that MTP arthrodesis is an answer for stability and length of thumb. There is no any doubts for CMC (carpometacarpal) stability without ligament reconstruction; it looks like pediatric patients can make stable pseudo joints. Stable thumb can be achieved even without trapezium bone.

IS METACARPAL OSTEOTOMY NECESSARY FOR THE PATIENTS WITH WASSEL TYPE IV THUMB DUPLICATION?Seok Woo Hong, Jihyeung Kim, Hyun Sik Gong, Kee Jeong Bae, Hyo Seok Jang, Se Hun Kim, Goo Hyun Baek*Department of Orthopedic surgery, College of Medicine, Seoul National University
Objectives*

The aims of this study were to evaluate the efficiency of surgical procedure which include both soft tissue correction and metacarpal osteotomy in patients with Wassel type IV thumb duplication compared to that of soft tissue correction only and to suggest indications for the metacarpal osteotomy in patients with Wassel type IV thumb duplication.

Methodology We retrospectively reviewed 32 patients with Wassel type IV thumb duplication who underwent surgical treatments and were followed up for more than 2 years. Of them, 18 patients underwent only soft tissue procedures and 14 patients underwent both soft tissue procedures and metacarpal osteotomy for the reconstruction of the thumb MCP joint. We measured the angle between the anatomical axis of the 1st metacarpal bone and that of the proximal phalanx of the thumb on thumb posteroanterior(PA) radiographs at initial visit. We repeated the measurement on thumb PA radiographs two years after surgery.

Results In 18 patients who had only soft tissue procedures for the reconstruction of the thumb MCP joint, the angulation deformities of the thumb MCP joint was changed from 17.7° to 11.4°. On the other hand, the angulation deformities significantly improved from 24.7° to 7.9° in 14 patients who had both soft tissue procedures and metacarpal osteotomy ($P < 0.001$).

Conclusions Considering that the acceptable remnant angulation deformity is less than 5°, metacarpal osteotomy could be recommended to patient with Wassel type IV thumb duplication who have more than 10° of angulation deformity of the thumb MCP joint. Metacarpal osteotomy is a very useful procedure to correct the angulation deformity of the thumb MCP joint effectively in patients with Wassel type IV thumb duplication especially who have severe angulation deformities.

FUNCTIONAL STATUS AND SURGICAL INDICATIONS OF CONGENITAL ANOMALIES OF THE HAND PERSISTING TO ADULTHOODNathaniel S. Orillaza Jr.*University of the Philippines Manila
Topic: congenital hand anomaly*

Introduction Congenital upper limb anomalies present in a wide variety of clinical pictures. Function largely depends on the mental capacity with combinations of presence or absence, stability and mobility of structures around the extremity. Correction, if indicated, is recommended during early childhood to optimize function before formal education starts. There have been limited reports on these conditions persisting beyond the recommended age for reconstruction. Indications for surgery on a later time have also not been explored adequately.

CONGENITAL HAND | 3:15 PM - 5:15 PM | NOV 8, 2017

Objective We report our series of patients with congenital anomalies consulting for surgery during adulthood on the indications and functional status prior to surgery. Methodology: Retrospective review of post-operative patients was done to extract reasons for consulting and delay in consultation. Functional status data were also collected including educational attainment, employment and preoperative Disability of Arm Shoulder and Hand for Filipinos (Fil DASH) for patients seen in recent years.

Results We report 13 cases of congenital anomalies of the hand managed surgically in adulthood. The most common diagnoses were amniotic band syndrome and pre-axial polydactyl. Most of the patients did not complain of significant problems in doing activities of daily living. This was manifested by their educational attainment and employment status. For those with preoperative DASH, the average disability was low. The common indications for surgery include work-application concerns, recent realization of possibly increasing efficiency after reconstruction. There were also reports of social pressure and hygiene as reasons to consider surgery.

Conclusion Cultural beliefs and practices play a major role in the delay for seeking surgical management of common congenital anomalies of the hand. Most patients were able to adapt well but opted to have surgery to possibly improve economic opportunities and social status.

A NEW CLASSIFICATION OF A CONGENITAL RADIO-ULNAR SYNOSTOSIS BASED OF THE SURGICAL OUTCOMES OF MOBILIZATION WITH A FREE VASCULARIZED FASCIO-FAT GRAFT AND A RADIUS OSTEOTOMY

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Objectives Mobilization of a congenital radio-ulnar synostosis is still a challenging problem because of the high tendency of re-ankylosis. We devised a mobilization procedure consisted of separation, radius osteotomy and a free vascularized fascio-fat interposition. We reported surgical outcomes and proposed the new classification based on surgical outcomes.

Patients and Methods We performed this procedure on 26 arms of 25 patients (21 boys and 4 girls). The age at the surgery ranged from 5.3 to 13.4 years. Preoperative forearm ankylosis was between neutral and 100° of pronation (mean 32.0°). Radius head dislocation was seen in 23 arms (posterior in 14, anterior in 9). The mean follow-up duration ranged from 24 to 111 months (mean 51 months).

Results There were no re-ankylosis after separation. The mean range of active forearm rotation after surgery was 81.6 +15.8°. All patients reported improvements in performing some activities, such as accepting objects, holding a bowl of soup and performing gymnastics. These patients were divided into 3 groups according to the direction of the dislocated radius head. The mean post-operative forearm rotation was 98° in the group with anterior dislocation, 96° without dislocation and 78° with posterior dislocation. Postoperative rotation of the anterior dislocation group was better in the group with posterior dislocation ($p < 0.05$). The group with posterior dislocation was further divided according to the preoperative pronation position. Those with 50° or less pronation gained better ROM (mean 85°, $n = 5$) than those with over 50° pronation (mean 73°, $n = 9$) ($p < 0.05$).

Discussion and Conclusions This mobilization procedure prevented re-ankylosis after separation of the synostosis and provided the ability to rotate the forearm that improved a child's daily activities. Classification according to the preoperative direction of the dislocated radius head and pronation position reflected the surgical outcome.

MIDDLE TERM POST-OPERATIVE OUTCOMES OF TREATMENT FOR CONSTRICTION BAND SYNDROME

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Department of Orthopaedic Surgery, Sapporo Medical University School of Medicine

Purpose Constriction band syndrome is characterized by findings of constriction band, lymph edema, acrosyndactyly, amputation and syndactyly at the finger base. We evaluated post-operative outcomes and complications associated with constriction band syndrome for patients undergoing surgery in our hospital.

Methods We reviewed 27 hands from 17 patients (12 male and 5 female, 10 cases were bilateral) with congenital constriction band syndrome who underwent surgery in our hospital and were followed more than 4 years. The affected digit was the thumb in 1, index in 20, middle in 21, ring in 28, and little in 15 fingers. The pre-operative findings for the affected digits were included the presence of constriction band in 20, lymph edema in 14, acrosyndactyly in 34, amputation in 76, and syndactyly at the finger base in 44 digits. Average age of the patients was 10 months (range, 2-25 months) at surgery. Average duration of the post-operative follow-up was 7.1 years (range, 4-11 years). We evaluated surgical procedures, number of surgeons, pre- and post-operative pinch and grasp functions, post-operative complications, and pre- and post-operative radiograph findings (metacarpal hypoplasia).

Results With regard to surgical procedures, constriction band release was performed in 11, separation of acrosyndactyly in 34, web reconstruction in 72, bone lengthening in 3, defatting in 1 and amputation in 1 finger. Finger tip pain as a post-operative complication was observed in 7 of 85 fingers. In 19 of 22 hands, grasp and pinch function was improved by web plasty or acrosyndactyly separation. In 3 cases, bone lengthening was underwent to improve grasp and pinch function. We found metacarpal hypoplasia in 17 fingers when there was amputation at the level of the proximal phalanx and it progressed during growth in 16 fingers.

Conclusion It is necessary to recognize the incidence of metacarpal hypoplasia associated with constriction band syndrome.

LONG-TERM RESULTS AFTER SIMPLE ROTATIONAL OSTEOTOMY OF THE RADIUS SHAFT FOR CONGENITAL RADIOULNAR SYNOSTOSIS

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Department of Orthopaedic Surgery, Yamagata University Faculty of Medicine

Purpose To clarify the long-term results of simple rotational osteotomy for congenital radioulnar synostosis (CRUS).

Method Eight forearms in 5 patients with CRUS who underwent simple rotational osteotomy of the radius shaft were followed up for an average of 14 years (10-19 years) postoperatively. The true position of the forearm in ankylosis was measured by a line through the styloid processes of the radius and the ulna. Palm pronation and supination angles were also measured. The osteotomy was performed at the insertion of the pronator teres to the shaft of the radius. The pronation position was then corrected manually to allow 90 degrees of palm supination with compensatory rotation around the wrist, and a cast was applied.

Results Prior to surgery, the forearm fixation averaged 44 degrees of pronation (range, 30-70). Post operatively, the forearm was fixed at an average of 4 degrees of supination (range, -20-30). The average pronation/supination angle of the palm was 26/53 degrees at the final follow-up. There were no neurological or circulatory complications after surgery. Ability to perform daily activities was markedly improved, and all patients were satisfied with the results of surgery.

Conclusion Our present technique for rotating the forearm of patients with CRUS is simple, easy and safe.

ELBOW | 3:15 PM - 5:15 PM | NOV 8, 2017**POSTOPERATIVE EVALUATION OF COMPUTER SIMULATION IN ARTHROSCOPIC ARTHROPLASTY FOR ELBOW OSTEOARTHRITIS****Ko Temporin**, Keiichi Oura, Kozo Shimada*Affiliation; Department of Orthopaedic Surgery, Japan Community Healthcare Organization Osaka Hospital*

We have performed the arthroscopic surgery for elbow osteoarthritis according to the preoperative planning using computer simulation. Now we investigated the feasibility of the preoperative planning, comparing the postoperative CT data. We enrolled 12 patients, 12 elbows of osteoarthritis in this study. They had the surgery after July, 2014. They were average of 47.7 years old, all were male, and the affected side was 11 of right and one of left. For the preoperative simulation, CT was performed in three positions: maximum flexion, 90 degrees, and maximum extension. Using these data, 3-dimensional bone models of three positions were reconstructed on a computer software, and the rotating axes of flexion and extension ranges were calculated. The forearm bones were rotated around the axes over the maximum degrees, and overlapping part of the bones was estimated as the impinging osteophyte. In the operation, impinging osteophyte and free body were removed arthroscopically according to the preoperative planning. Postoperative CT was performed within 6 months after the surgery, and bone models using postoperative CT data were made. We compared the preoperative and the postoperative bone models, and calculated the removed osteophyte. Moreover, flexion / extension simulation using the postoperative bone models was performed as the same manner of the preoperative planning, and investigated the presence of remaining osteophyte. Relationship between the remaining osteophyte and the postoperative range of motion was investigated. Osteophyte tended to be over-removed. Remaining osteophyte was remained mainly in the medial side of the coronoid process and the lateral side of the olecranon. The medial side of the coronoid process and the medial side of the olecranon was related with the postoperative range restriction. Osteophyte tended to be remained in some locations, and these affected the range of motion. Care should be taken in the surgery.

ELBOW DENERVATION: ANATOMICAL STUDY OF THE FEASIBILITY AND SURGICAL PERSPECTIVES.**Bourcheix L.M.**, **Houvet P.**, Institut Français de Chirurgie de la Main et du Membre Supérieur. Paris. France

Introduction Articular denervation of the elbow was proposed in case of severe osteoarthritis accompanied by joint stiffness and pain. We present an anatomical study, in order to evaluate this elbow denervation and the surgical perspectives.

Materials and Methods 40 specimens (20 fresh/frozen cadavers), all had vascular injections with RTV colored silicone. The study was conducted by two protocols:

- 1) Extensive dissections for 10 specimens in order to identify : nerve landmark and all articular branches from the median, ulnar, radial, musculocutaneous and medial cutaneous nerves.
- 2) For the following 30 specimens : 2 surgical approaches of the elbow, anteromedial and lateral for identification of presumptive articular nerves, mark by surgical clips or loops and pursued by extensive dissection.

Results The nervous branches originating from the mixed nerves and destined to be capsular have either a direct origin from the nerve-trunk, or derived from the motor branches of the muscles surrounding the elbow joint. Median nerve: 2 to 5 articular branches can be identified by the medial pathway. Ulnar nerve: 2 to 4 articular branches are identified. All easily approached by the medial route. Radial nerve: 4 to 8 capsular branches are identified by the antero-lateral approach. Musculocutaneous nerve: 3 to 6 branches are easily dissected by the medial route. Medial cutaneous nerve of the forearm, 1 to 2 nerve branches, originating from a posterior branch of the nerve are for articular and easily dissected by the medial route.

Conclusion The great majority of the nerve branches to the articular capsule of the elbow joint are accessible by two surgical approaches. There is no pattern that can be offer for denervation of a painful post traumatic elbow. Each case must be discussed to provide a surgical program "a la carte"!

THE INFLUENCES OF AGE AND MORPHOLOGICAL CHANGES OF THE ELBOW ON SURGICAL RESULTS OF CHRONIC MONTEGGIA LESION.**Kunihiro Oka**^{1,2}, Atsuo Shigi², Shingo Abe², Satoshi Miyamura², Hiroyuki Tanaka², Tsuyoshi Murase²*Osaka University Healthcare Center**Department of Orthopaedic Surgery, Osaka University Graduate School of Medicine*

Objective The surgical treatment for chronic Monteggia lesions (CML) remains a challenging procedure. The purpose of this study is to investigate the influences of age and morphological changes of the elbow on surgical results of CML.

Methodology Twelve CML cases were investigated. The mean age at the operation and the periods from the injury were 12.7 years and 44 months, respectively. The shape of radial head (SRH) was classified into three types, concave, flat, and convex. To evaluate morphological change of proximal radioulnar joint (PRUJ), radial notch angle (RNA) which indicates the tilt relative to the sagittal plane, and radial notch depth (RND) which indicates the depression of the articular surface were analyzed. The relations of the deformities of the elbow and the surgical results were analyzed.

Results The average RNA of the affected side (30°) was greater than that of the normal side (25°) ($p < 0.05$). The average RND on the affected side (0.6mm) was smaller than that of the normal side (1.9mm) ($p < 0.05$). The radial notch was remodeled according to the dislocated radial head, resulting in hypoplasia. 7 cases achieved reduction of the radial head without osteoarthritis and pain. The SRH were concave in 3 and flat in 4. However, the other 5 cases remained the subluxation of the radial head with osteoarthritis. The SRH were flat in 4 and convex in 1. The age of those in the subluxation cases (15.3 years) was significantly greater than in the reduction cases (10.9 years). Of the 3 cases with RNA over 40°, 2 cases remained the subluxation of the radial head.

Conclusions In the case of CML being over early adolescence, having flat/convex SRH or morphological changes on PRUJ, it is required to consider the indication of the surgery carefully.

EVALUATION OF OSTEOPOROTIC FEATURES IN PATIENTS WITH AN OLECRANON FRACTURE**Seong Cheol Park, Hyun Sik Gong, Kahyun Kim, Seung Hoo Lee, Sehun Kim, Goo Hyun Baek***Department of Orthopedic Surgery, Seoul National University College of Medicine, Seoul, South Korea*

Objective To determine whether olecranon fractures have osteoporotic features such as age-dependent low bone attenuation and low-energy trauma as a cause of injury.

Methodology In a total of 114 patients (53 males and 61 females) with acute olecranon fracture, we retrospectively reviewed elbow CT scans and medical records for the causes of injury (high or low-energy trauma). Their mean age was 57 years. Bone attenuations were measured on the central part of the olecranon on sagittal CT images avoiding the fracture and on the distal humerus (distal metaphysis and medial and lateral condyles) on coronal CT images. We compared bone attenuations and causes of injury in each gender between younger (< 50 years) and older (≥ 50 years) patients. Multiple regression analysis was performed to determine the effect of age and gender on bone attenuation.

Results Mean bone attenuations in older male or female patients were significantly lower than those in younger patients except in the medial condyle in men. The proportion of low-energy trauma in older male patients was significantly higher than that in younger male patients. In female patients, low-energy trauma was predominant in both younger and older patients. Age and female gender were found to have significantly negative effects on bone attenuation.

ELBOW | 3:15 PM - 5:15 PM | NOV 8, 2017

Conclusions This study demonstrates that olecranon fractures have osteoporotic features, including age-dependent low bone attenuation and low-energy trauma as a predominant cause of injury. Our results suggest that osteoporosis evaluation should be considered for patients aged 50 years or more with an olecranon fracture.

LONG-TERM CLINICAL AND RADIOGRAPHIC OUTCOMES AFTER OPEN REDUCTION WITH ULNAR OSTEOTOMY COMBINED WITH ANNULAR LIGAMENT RECONSTRUCTION FOR MISSED MONTEGGIA FRACTURE-DISLOCATION IN CHILDREN

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Background Operative indication and procedures for surgery for missed Monteggia fracture-dislocation in children are controversial. The purpose of this study is to examine the long-term clinical and radiographic outcomes after open reduction with ulnar osteotomy combined with annular ligament reconstruction.

Methods 27 consecutive patients were treated surgically by similar procedures. The patients' ages at open reduction were from four to 15 years (mean, 10 years); 18 were boys, and 9 were girls. Postoperatively, we investigated the clinical and radiological outcomes over a mean duration of follow-up of 6 years.

Results The postoperative Mayo Elbow Performance Index at the time of follow-up ranged from 65 to 100, with 24 excellent, 2 good, 2 fair, and no poor results. The radial head remained in a completely reduced position in 22 cases and was subluxated in 5 cases at final follow-up. In 4 cases, osteoarthritic (OA) changes were observed at the humeroradial joint. The radiographic results were divided into two: Good, a complete reduction of the radial head without OA changes; and Fair, radial head subluxation or OA changes. Good was rated in 20 cases and Fair in 7. Good results were obtained in all cases that had undergone open reduction within 3 years from trauma or until 12 years old, while 88% of the other cases resulted in Fair.

Conclusions If open reduction with ulnar osteotomy combined with annular ligament reconstruction is performed when the patient is less than 12 years of age or within 3 years after the injury, good long-term clinical and radiographic outcomes can be expected.

TARGETED MUSCLE REINNERVATION FOR TRANSHUMERAL AMPUTEES: MODIFIED SURGICAL TECHNIQUE FOR OPERATING MULTIPLE JOINTS IN A PROSTHETIC ARM

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Introduction Kuiken et al. found that an amputated nerve transferred into a nearby muscle produced a transcutaneously detectable electromyographic signal corresponding to the transferred nerve, the targeted muscle reinnervation (TMR) technique, for controlling the prosthesis. However, it is ideal to select and transfer each motor fascicle to achieve highly developed myoelectric arms with multiple degree-of-freedom motions.

Methodology We treated 4 men with post-injury transhumeral amputation. We first identified the amputated median and radial nerves. The sensory fascicles were identified using somatosensory evoked potential. The motor fascicles were divided into an innervating digit flexion and an innervating forearm pronation/wrist flexion in the median nerve; and into an innervating digit extension and an innervating forearm supination/wrist extension in the radial nerve. Each median nerve fascicle was transferred to the biceps short head or the brachialis branch while the biceps long head branch was retained for elbow flexion. Each radial nerve fascicle was transferred to the triceps medial or lateral head branch while the triceps long head branch was retained for elbow extension. EMGs and physical test results were evaluated.

Results In needle EMG, myogenic potentials were detected at all six motions such as digit flexion/extension, forearm pronation/supination, and elbow flexion/extension within 6 months postoperatively in all cases. In surface EMG, the identification rate was 97.7%, i.e. one-to-one correspondence was almost achieved 12 months postoperatively. Holding functions, VAS, and DASH significantly improved after acquiring six motions with the surgery compared with only two motions of digit flexion/extension before surgery ($p < .05$).

Conclusions We noted functional improvement with marked identification rate for each motion after the selective nerve transfers as well as pain relief after neuroma excision and detection of favorable myogenic potentials after subcutaneous fat tissue removal. Thus, more selective nerve transfers are required for highly developed prostheses with multiple degrees of freedom.

COMPRESSION NEUROPATHY

3:15 PM - 5:15 PM | NOV 8, 2017

COMPARISON OF SINGLE-DOSE RADIAL EXTRACORPOREAL SHOCK WAVE AND LOCAL CORTICOSTEROID INJECTION FOR TREATMENT OF CARPAL TUNNEL SYNDROME INCLUDING MID-TERM EFFICACY: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL

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Objective To compared efficacy in relieving pain and improving clinical function between single-dose rESWT and local corticosteroid injection (LCIS) over the mid-term (24 weeks). **Methodology:** Twenty-five patients with mild to moderately severe CTS were randomized to receive either single-dose rESWT ($n=13$) or LCIS ($n=12$). Primary outcomes were evaluated using the Boston self-assessment questionnaire, while secondary outcomes used the Visual analogue scale (VAS) and electrodiagnostic parameters.

Results Evaluations at baseline and at 1, 4, 12 and 24 weeks after treatment found significantly greater improvement in symptom severity scores, functional scores and Boston questionnaire scores at weeks 12 to 24 in the rESWT group compared to the LCIS group. When compared to the baseline, there was significant reduction of VAS and functional score in the rESWT group at weeks 12 and 24. The LCIS group had no statistically significant differences in VAS reduction and functional score of the same period.

Conclusions Treatment of CTS using single-dose rESWT has a carry-over effect lasting up to 24 weeks suggesting that single-dose rESWT is appropriate for treatment of mild to moderate CTS and provides longer-lasting benefits than LCIS.

COMPRESSION NEUROPATHY | 3:15 PM - 5:15 PM | NOV 8, 2017**OUTCOME OF TREATMENT OF CARPAL TUNNEL SYNDROME: ORTHOSIS ALONE VERSUS COMBINATION OF ORTHOSIS, ULTRASOUND THERAPY AND NERVE/TENDON GLIDING EXERCISES****Sze-En Sim, Jayaletchumi G, Tunku Sara Ahmad**

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Introduction Carpal tunnel syndrome (CTS) is a common compressive neuropathy. In early stages, conservative management is our first choice. Many modalities exist for example orthosis, ultrasound therapy, wax therapy and nerve or tendon gliding exercises. Efficacy of each modality had been described in literatures. However, the effectiveness of combination of these modalities is not well-established. The purpose of this study is to assess the outcome of conservative treatment for carpal tunnel syndrome comparing orthosis alone with combination of orthosis, ultrasound therapy and nerve/tendon gliding exercises.

Methods Forty-one patients who presented to Upper Limb Reconstructive and Microsurgery Clinic, University Malaya with CTS and positive electrodiagnostic study were recruited. About 15 patients had bilateral CTS. 56 wrists were equally randomized to orthosis alone and a combination therapy of orthosis, nerve/tendon gliding exercises and ultrasound therapy. All patients were required to complete the Boston Carpal Tunnel Questionnaire during first visit and 2 months after treatment.

Results In both groups, the symptoms and hand functions were comparable before intervention. After the intervention, both groups showed significant improvement in mean scores of symptoms, mean difference in orthosis group 0.53; 95% CI whereas in combined group 0.59; 95% CI and functions, mean difference in orthosis group 0.48; 95% CI whereas in combined group 0.69; 95% CI. However, there was no significant difference between group comparisons.

Conclusion Patients who underwent conservative management for carpal tunnel syndrome showed improvement in symptoms and functions. However, the combination of orthosis, nerve/tendon gliding exercises and ultrasound therapy was not superior compared to orthosis alone. Thus, orthosis is sufficient in early treatment of CTS considering cost and time-constraints.

ASSESSMENT OF TENDON SUBLUXATION AFTER SIMPLE RELEASE OF THE FIRST COMPARTMENT IN DE QUERVAIN DISEASE: A PROSPECTIVE RANDOMIZED CONTROLLED STUDY COMPARING SIMPLE MIDLINE INCISION AND DORSOLUNAR INCISION ELEVATING RADIAL FLAP**Jong-Pil Kim, MD, Jae Sung Yoo, MD, Seokwon Yang, MD**

Department of Orthopedic Surgery, Dankook University Hospital

Purpose To evaluate tendon subluxations using ultrasonography after release of the 1st compartment in patients with De Quervain disease and to compare the clinical and functional outcomes between the midline incision and dorsolunlar incision elevating the radial flap.

Methods In this randomized prospective study, 66 patients with De Quervain disease who required surgical release of the first compartment were divided into two groups: Group I with midline incision and Group II with dorsolunlar incision. To evaluate tendon subluxation, the sliding distance of the extensor pollicis brevis (EPB) in 5 wrist positions were measured at 12 and 24 weeks using ultrasonography: neutral deviation, radial deviation, ulnar deviation, dorsiflexion, and volar flexion of the wrist. Clinical outcomes of the patients were evaluated using the Disabilities of the Arm, Shoulder and Hand (DASH) score, Visual Analogue Scale (VAS), and grip strength at 4, 12, and 24 weeks after surgery.

Results In wrist flexion, volar displacement of EPB was 1.37 ± 0.63 mm in group I and 0.31 ± 0.85 mm in group II at 12 weeks after surgery ($p < 0.001$), 1.25 ± 0.61 mm in group I and 0.36 ± 0.69 mm in group II at 24 weeks ($p < 0.001$). In wrist extension, dorsal displacement of the tendon was 0.56 ± 1.36 mm in group I and 1.92 ± 1.75 mm in group II at 12 weeks after surgery ($p = 0.024$). Otherwise, no significant difference

between two groups was found in the other position of the wrist.

Clinical outcome measures showed no difference between the groups. There were no significant correlations between tendon subluxation and clinical outcome measures ($p = 0.618$).

Conclusion Tendon subluxation after 1st compartment release for De Quervain disease is more increased during wrist flexion in the simple midline incision and during wrist extension in the dorsolunlar incision elevating the radial flap. However, tendon subluxation after 1st compartment release does not affect clinical outcomes. Keywords: De Quervain Disease, First Compartment Release, Subluxation

THE EFFECT OF REHABILITATION INTERVENTIONS, ON SENSATION, FUNCTION AND PAIN OF PATIENTS WITH CARPAL TUNNEL SYNDROME AFTER SURGERY: A RANDOMIZED CONTROLLED TRIAL STUDY**Maryam Farzad¹, Fereydoun Layeghi², Roya Mahmoodi³**

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Introduction Carpal tunnel syndrome is the best known and most common median nerve entrapment, and 90% of all neuropathic disorders are included. Proceedings after surgery in these patients is especially sensitive and in this regard there is disagreements. The present study was to evaluate the effect of rehabilitation treatment after surgery for carpal tunnel on motor function, sensory and pain between the two groups without interfering with routine rehabilitation (dressing) and rehabilitation (early motion) was performed.

Method This clinical trial was performed in Iran Hand Rehabilitation Center at Tehran, on patients with carpal tunnel syndrome who underwent surgical operation. 30 patients randomly using random cards were divided into two groups control and intervention. The Intervention group received rehabilitation exercises depending on the patient's condition, within a day after surgery and the control group received no intervention. Patients were assessed in three period for pain, sensation, function and pinch and grip by researcher before surgery, 6 weeks after surgery and 8 weeks after surgery by VAS, Semmes Weinstein Test of Monofilaments, the BQ test and the Vigorimeter. SPSS software, version 20, independent t-test and repeated measure were used to analyze the results.

Results There was no significant difference in increase of function between the groups ($p = 0.28$). In both groups we had decrease in average score of pain and improve sense but There was no significant difference in sensation between the groups ($p = 0.19$). There was significant difference in pain and grip and pinch between the groups.

Conclusion According to the results of this study, rehabilitation interventions, although in the short term, can affect the pain and strength of these patients and can also facilitate return to work, but does not affect at the long-term, it means that improvement achieves over time. However, in this regard, it seems larger interventional studies are needed.

Key words Carpal tunnel syndrome, Rehabilitation, pain, sensation, function, grip

ENDOSCOPIC TREATMENT FOR CARPAL TUNNEL SYNDROME: VIETNAMESE EXPERIENCE**Tran Trung Dung, Ma Ngoc Thanh, Tran Quyet, Nguyen Trung Tuyen, Nguyen Huy Phuong, Hoang Van Ban, Pham Trung Hieu, Vu Tu Nam**

Hanoi Medical University

Objective Evaluate the result of 100 patients suffer from carpal tunnel syndrome treated with single portal endoscopic transversal ligament release
Patients and methods: 100 consecutive patients suffer from carpal tunnel syndrome were treated with single portal endoscopic transversal ligament release in Hanoi

COMPRESSION NEUROPATHY | 3:15 PM - 5:15 PM | NOV 8, 2017

Medical University Hospital. We use the Boston questionnaire to evaluate after surgery 2 weeks, 1 month, 3 and 6 months.

Result All the patients have the improvement of motion and sensory. The Boston questionnaire point reduced from 3.52 to 1.70 after surgery. The EMG index increased after surgery. We could not found any complication postoperatively.

Conclusion endoscopic transversal ligament release is safe, cosmetic and effective method for treatment carpal tunnel syndrome

Keywords carpal tunnel syndrome; endoscopy

UPPER LIMB PARTIAL JOINT DENERVATION: LITERATURE STUDY AND NEW CONCEPTS PROPOSITIONS.

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Introduction First approach to the treatment of joint pain is medical. That includes non-steroid medicaments, rest or splinting, steroid injections, physical therapy etc... When all these methods are outdated, surgical interventions begin, proceeding from arthroscopy with a simple wash to total joint arthroplasty. This algorithm is classical and reliable. Sometimes the situation is not so simple : Patient is young, joint cartilage is no so bad and joint is globally good but pain is awful. Partial joint denervation is the concept of preservation of joint function and pain relief by disconnecting the neural pathways from the pathologic joint to the brain.

Material and Methods Nerve pathways include final terminations for the ligaments, periosteum, capsule and cartilage of the diseased joint.

For each joint (20 wrist, 40 elbow, 20 shoulder), study required :

- anatomical dissection to identify innervation of the joint after silicone injection.
- description of a surgical approach (classical or endoscopic) to allow nerve branches disconnection.

Results Literature review reported only few schematic drawings at elbow and shoulder joints. Hilton's law (1863) has not yet been totally appreciated : « the same trunks of nerves whose branches supply the groups of muscles moving a joint furnish also a distribution of nerves to the skin over the insertions of the same muscles and the interior of the joint receives its nerves from the same source ». Results obtained for partial wrist denervation can probably be transposed successfully to the elbow and shoulder.

Conclusions Partial joint denervation offers a day surgery and often rehabilitation free. It is probably an element in the global surgical treatment algorithm that must offered as a reliable conservative method. We need to demonstrate that pain relief is possible and document the success of this new approach with an appropriate population study.

THE NECROTIC DIABETIC HAND MIGHT BE ONE OF THE TERMINAL COMPLICATIONS OF DIABETES MELLITUS.

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Objective The manifestations of diabetes were already well reported, such as limited joint mobility, Dupuytren's contracture, and trigger finger. However, the necrosis of hand in the patients with diabetes mellitus (DM) was not known yet. We wanted to know that the necrosis of hand in diabetes might be the one of terminal complications of DM.

Methods From 2014 Jan to 2015 August, we recruited patients with DM which showed necrosis of their hands. Patients with history of using vasopressors were excluded. Finally, five patients were enrolled. Four patients were male, and mean age was 64 years old. Mean duration of DM was 21 years, and mean HbA1C was

8.4. The blood glucose level of all patients was not successfully controlled by medications. Therefore, all patients were treated with insulin injection.

Results Clinical manifestations and extent of necrosis of hand were diverse, such as necrosis of dorsal skin of hand, necrosis of single digit, and necrosis of whole hand. Only two patients had history of trauma, such as prick by needle or wood branch. The other three patients showed very poor glucose control [HbA1C > 9.0] and they had other complications, such as DM nephropathy, DM retinopathy, and DM foot. They were already got hemodialysis and amputations of both legs. Only one patient with skin defect of dorsal hand was successfully treated with flap surgery and skin graft. Other four patients were treated by amputations. All three patients with poor glucose control were died within a year from hand amputation.

Conclusion DM foot was already well known as the vascular and neuropathic complications of DM, and the prevention and treatment protocols were already reported. We found that clinical manifestations of necrotic DM hand were a little bit similar to those of DM foot. This condition might be one of the terminal vascular and neuropathic complications of DM. In accordance with the longer survival of DM patients by the development of DM medications and management of other complications, hand surgeons should know about this condition, and should make the prevention and treatment protocols.

FUNCTIONAL OUTCOME FOR ARTHROSCOPIC TREATMENT OF SEPTIC ARTHRITIS OF THE WRIST

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Introduction Septic arthritis of wrist, potentially joint destructing condition, accounts for an estimated 5% on septic arthritis of all joints. Arthroscopic lavage for septic arthritis of the knee, hip or shoulder is well-documented in the literature while previous research studies with wrist focusing solely in open treatment, and functional outcome were limited. Immunosuppression is a common risk factor including diabetes mellitus and IV drug use.

Our study aims to evaluate effectiveness of arthroscopic treatment and investigate functional outcome.

Materials and Methods 14 patients, including 10 males and 4 females of an average age of 59.7 (range 30-93) with history of septic arthritis of the wrist who underwent arthroscopic treatment, was included in retrospective cohort study. History of prior injury, arthroscopic and radiological findings, and other factors including joint aspirate and intra-op tissue culture were recorded. QuickDASH score was used for subjective functional outcome assessment. Calculated overall score, item score and total score was recorded and calculated for each item.

Results All except 2 patients (83.3%) responded well to single arthroscopic treatment. 2 required subsequent operations with no complication. Average QuickDASH score was 19.7 out of 100 (range 0-56.8) with average follow up of 10 months. Jar opening, cutting food, and recreational activity scored the highest with an average of 2.2 among all items; while tingling sensation had a lowest score of 1, followed by social activities with a score of 1.3. Duration of symptoms of 7 days or more prior to presentation gave a higher QuickDASH score. Only 1 case (8.3%) had signs of severe joint erosion on X-Ray on subsequent follow-up.

Discussion and Conclusion Septic arthritis of the wrist can be managed with arthroscopic treatment for a reasonably favorable outcome. Early arthroscopic treatment should be considered for all patients admitted for septic arthritis of wrist if not contra-indicated.

COMPRESSION NEUROPATHY | 3:15 PM - 5:15 PM | NOV 8, 2017**INNOVATIVE LINE FOR DISTAL TO PROXIMAL APPROACH IN OPEN CARPAL TUNNEL RELEASE AND ITS RELATION TO IMPORTANT ANATOMIC STRUCTURES: CLINICAL USE AND CADAVERIC STUDY**

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Review of literature shows numerous distal to proximal techniques for open carpal tunnel release, though none of them indicate a constant starting point nor an anatomic landmark. A prospective study was designed to describe an innovative line for the starting point of a distal to proximal technique. Twenty-five patients underwent open carpal tunnel release by the senior author using the proposed distal to proximal incision from October 2013 to August 2014. Intraoperative measurement of the distal edge of the TCL relation to the proposed distal to proximal incision was done. The proposed proximal to distal incision was also tested in 6 cadaveric specimens and dissection was done to visualize the TCL and nearby structures. Intraoperative measurements showed a mean of 9.08mm from the edge of the distal aponeurotic portion of the TCL (range 8-10mm, SD 0.8621) in relation to the proposed distal to proximal incision. Measurements from the 6 cadaveric specimens showed a mean of 9mm from the edge of the distal aponeurotic portion of the TCL (range 8-10mm, SD 0.8165) and 8mm to the superficial palmar arch (range 7-9mm, SD 0.8165) in relation to the proposed distal to proximal incision. The proposed distal to proximal incision provides a consistent and safe topographical landmark that correlates well with the anatomic structures surrounding the carpal tunnel.

WIDE AWAKE LOCAL ANESTHESIA NO TOURNIQUET: A PILOT STUDY IN POC FOR CARPAL TUNNEL RELEASE

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Philippine Orthopedic Center

Abstract Objective Wide Awake Local Anesthesia No Tourniquet (WALANT) uses a mixture of lidocaine and epinephrine for anesthesia and has found great success in hand surgery. At the Philippine Orthopedic Center (POC), we still use local anesthesia along with a tourniquet which gives the patient pain and discomfort at the tourniquet site. This study aims to see perioperative and post-operative pain, intraoperative bleeding and immediate clinical outcomes of patients using WALANT for surgical anesthesia for carpal tunnel release.

Methodology A prospective case series of all patients who underwent carpal tunnel release under WALANT from April 2016 to September 2016 is presented. Those with concomitant trigger finger and de quervain disease which required release on the affected hand were also included. A tourniquet was on standby in case of uncontrollable bleeding. Intraoperative bleeding, VAS scores, grip strength and return to daily activity were noted.

Results 13 patients were included in the study; 3 were male, 10 were female. Mean age was 58 years, Mean surgical time was 15.38 minutes (7-20 mins). 12 were reported to have minor bleeding, 1 was reported to have bleeding but was still manageable. None of the surgeries were bloodless or had too much bleeding that necessitated a tourniquet. VAS scores during injection of local anesthesia ranged from 1-5 (mean 2.38). None of the patients felt pain during and immediately after the surgery. Mean grip strength at 4 weeks was 16.54kg, average time return to daily activity was 5.62 days. No complications were noted.

Conclusion WALANT is a relatively simple technique that is safe which effectively eliminates tourniquet pain for carpal tunnel release.

TENDON | 3:15 PM - 5:15 PM | NOV 8, 2017**MULTIPLE FLEXOR TENDON RECONSTRUCTION 30 YEARS AFTER ZONE 4 INJURY: A CASE REPORT WITH ONE YEAR FOLLOW-UP**

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The treatment of chronic flexor tendon injuries continues to challenge hand surgeons. Various reconstructive procedures are available, each having its advantages and disadvantages. Several factors affect the final outcome, regardless of the technique used. Aspects to be considered when selecting a technique are muscle atrophy, joint contracture, nerve injury, location of tendon ends, and patient compliance and determination. We present a case of a 39 year old, right-handed who came in with inability to flex all fingers of the right hand. A laceration on the flexor zone 4 was sustained 33 years prior. Preoperative preparation consisted of evaluation of muscle strength, location of tendon ends, joint mobility, and patient counseling regarding the contemplated procedure and post-operative course, including the possibility of a secondary surgery. The patient was indicated for a single, possible two-stage flexor tendon reconstruction; A double set up was planned. Wide-awake local anesthesia no tourniquet (WALANT) with anesthesia monitored care was used to assess adequate muscle excursion of the donor muscles. Intra-operatively FDS and FDP tendons, as well as FPL proximal and distal stumps were successfully identified and had adequate length. Tendon grafts were taken from the FDS tendons. The proximal FDP tendon to the index finger was repaired distally to the index and middle finger using FDS tendon grafts. Likewise, the proximal FDP tendon to the small finger was repaired to the ring and small finger using tendon grafts. The distal stump of the FPL was repaired to the proximal FDS of the index finger. All repairs required tendon grafts, and were tested actively to assure adequate tension and muscle excursion was enough to close fingers. Post-operatively, the patient underwent religious physical and occupational therapy sessions. After 14 months, the patient now has adequate PIPJ flexion to hold small to medium-sized cylindrical objects with his right hand.

FACTORS AFFECTING THE CLINICAL OUTCOMES OF MULTISTRAND REPAIR AND EARLY ACTIVE MOBILIZATION THERAPY FOR ACUTE ZONE II FLEXOR TENDON INJURY

Kaneshiro Yasunori

Objective Factors affecting the clinical outcomes of multistrand repair and early active mobilization (EAM) therapy for acute Zone II flexor digitorum tendon rupture were investigated.

Methods The subjects were 35 fingers of 30 consecutive patients treated with 6-strand flexor tendon repair and EAM therapy for zone II flexor tendon injury. 22 were men and 8 were women with the mean follow-up period of 7 months. Clinical outcomes at the final follow-up period were evaluated according to Strickland's criteria, and correlations with aging, waiting period for operation from injury, presence of nerve injury, concomitant injury of flexor digitorum superficialis tendon, and postoperative range of motion of the proximal interphalangeal (PIP) joints were investigated.

Results The final outcomes were excellent for 25 fingers, good for 9, and fair for 1. No tendon rupture was observed. A univariate analysis showed that the severity of postoperative flexion contracture of the PIP joints at 4 weeks was correlated with the final outcome ($r=0.41$, $p=0.01$), and it was also weakly correlated with the severity of flexion contracture of the PIP joints at the final follow-up ($r=0.30$, $p=0.07$). The other factors were not correlated with final outcomes. A multivariate regression analysis showed flexion contracture of the PIP joints at 4 weeks and the final follow-up was positively correlated with final outcome ($r=0.33$, $p=0.03$, $r=0.31$, $p<0.01$, respectively), and aging was negatively correlated with final outcome ($r=-0.28$, $p<0.01$).

TENDON | 3:15 PM - 5:15 PM | NOV 8, 2017

Conclusions The current study indicated that, if flexion contracture of the PIP joint developed early stage of EAM therapy for Zone II flexor tendon rupture, it tended to persist until final follow-up, and its severity had an effect on the final outcome. Preventing flexion contracture of the PIP joint is thus important to improve clinical outcomes.

EARLY OUTCOMES OF TENDON REPAIR AND RECONSTRUCTION IN THE HAND USING BARBED SUTURES

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Introduction Advancements in suture material and techniques have seen a vast improvement in the tensile strengths and outcomes of tendon repair and reconstruction. The challenges of standard sutures has been the added volume of suture material from knot tying for the various techniques used, and its problem with glide. Barbed sutures can therefore be a potential solution to these problems.

Methods and Materials This is a retrospective study conducted in a single tertiary hospital over a period of 1-year. Between July 2015 and July 2016, 15 patients underwent barbed suture repair or reconstruction of 17 tendons in the hand. All patients were included in the study. The average follow up period was 6 months. Patient's case notes were reviewed to ascertain the type of tendon repair performed, repair technique and the type of suture used. Records from the Hand Occupational Therapist as well as the Hand specialist outpatient clinic were reviewed to determine if there were any post-op complications.

Results 4 patients underwent tendon repair of traumatic lacerations of 6 flexor tendons, as 2 patients had concomitant injuries to 2 tendons on the same finger. The remaining 11 patients underwent tendon transfers. All 17 tendons were repaired with V-LOC 3-0 barbed sutures using the Modified Kessler's 4-strand double core technique. During follow-up, there were no complications of tendon rupture or repair failure requiring revision surgery. Range of motion was satisfactory, with no evidence of excessive tendon adhesions.

Conclusion The early outcomes of using barbed sutures in tendon repair and reconstruction are favourable. With knotless repair, surgical time is also decreased. Further studies are needed to ascertain the long term results of the use of such sutures.

USE OF SILICONE TUBES AS ANTI-ADHESION DEVICES: A MODIFIED SECONDARY FLEXOR TENDON RECONSTRUCTION

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Objective Although the results with primary flexor tendon repair have been improved the secondary reconstruction is still needed for complicated injuries such as Boyes grades 2-5 injuries or those that have failed primary repair. Besides its many advantages, the main disadvantages of the staged flexor tendon reconstruction are the lengthy treatment time. We used silicone tubes as anti-adhesion devices, performing tendon grafting simultaneously and try to shorten the lengthy treatment time. This retrospective study was designed to assess the outcome of this modified flexor tendon reconstruction

Patients and Methods From March 2008 to March 2016, sixteen patients who sustained failed flexor tendon repair were treated by a modified flexor tendon reconstruction protocol with at least a 12-month follow-up. First stage treatment consisted of flexor tendon reconstruction with tendon graft, followed by silicone tubes interposition to minimize the fibrosis and adhesion around tendon graft; second stage treatment consisted of silicone tube removal under local anesthesia. Results: The median patient age of the 4 women and 12 men at the time of surgery was 34 years (range, 26–50 years). Of these flexor tendon injuries, 9 were Boyes

grade 2, 1 was Boyes grade 3 and 2 was Boyes grade 4 and 4 was Boyes grade 5. The preoperative and final follow-up total active motion (TAM) were 10° (range, 5°–60°) and 120° (range, 90°–160°), respectively. At follow-up 4 patients had excellent, 7 had good results, 4 had fair results, and 1 had poor results according to stickland and Glogovac criteria. Complications included two superficial infections and one deep infection in one patient whose silicone tube was removed at postoperatively 3 weeks. The most common complication was flexion deformity of the PIP and/or DIP joint that was related to the surgical procedure. This could easily be corrected with night splints.

Conclusions Modified two-stage flexor tendon reconstruction technique is an effective and safe procedure for complicated flexor tendon injury. Patients only need shorter periods of rehabilitation than that in the conventional two-stage reconstruction. Surgeons could perform reconstruction easily with lower complications.

BIOMECHANICAL TESTING OF A NOVEL FLEXOR TENDON REPAIR

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Objective This study compared the biomechanical performance of a novel 6-strand Asymmetric flexor tendon repair with the modified Lim-Tsai technique using cyclic testing.

Methodology Two separate groups consisting of 10 porcine tendons each was repaired using the Asymmetric and the modified Lim- Tsai technique respectively. The repaired tendons were tested as: 2-20N for 500 cycles (stage I); 3-33N for 500 cycles (stage II). Gap formation at every 100 cycles at the point of lowest force during the cycle was measured. A high resolution video recorder was used to monitor the development of a gap. A repair with the maximum gap formation below 2mm was considered to "survive" cyclic loading.

Results All the repairs survived after stage I. The mean gap formation for Asymmetric repairs was 0.28mm (SD 0.63) versus modified Lim-Tsai repair at 0.43mm (SD 0.69). When the cyclic load was increased at stage II, the mean gap formation of modified Lim-Tsai repairs exceeded the 2mm gap limit at 600th cycles (2.51mm (SD 1.86)) and then reached 4.15mm (SD 1.93) at the end of stage II, resulting in 0% survival rate. The mean gap formation of Asymmetric repairs reached 2.02mm (SD 1.43) at 800th cycles and 2.38mm (SD 1.52) at the end of stage II, accounting for 60% survival rate.

Conclusions The Asymmetric repair has better biomechanical performance during cyclic testing as compared to the modified Lim-Tsai repair.

FEASIBILITY OF USING WIDE-AWAKE LOCAL ANESTHESIA AND NO TOURNIQUET (WALANT) IN TENDON TRANSFER SURGERY

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Objectives WALANT allows us performing hand surgery without sedation or general anaesthesia and avoid tourniquet discomfort. The aim of the study is to assess the efficacy and safety in applying WALANT in tendon transfer surgery.

Methodology From January 2014 to July 2017, 23 consecutive patients had tendon transfer surgeries (12 FDS opponenplasty, 5 EIP to EPL transfer, 1 EIP to EDC middle finger transfer, 4 FCR to EDCs transfer, 2 PT to ECRB transfer, 1 BR to EPL transfer, 1 EDM to EDC index finger transfer and 1 EDC middle finger to EDC ring finger transfer) performed under WALANT. Two cases received more than one tendon transfer in single operation. Retrospective study was performed and subjective effectiveness of WALANT was assessed via phone interview and questionnaires.

TENDON | 3:15 PM - 5:15 PM | NOV 8, 2017

Results Eight male and twelve female patients were recruited into the study. Average age was 57.4 (range 28 to 74). All procedures were completed without switching the anaesthetic mode or using tourniquet. Average operation time was 85.2 minutes (range 51-233 minutes) and 40.1ml of 0.5% lignocaine with 1:100,000 adrenaline (range: 24-83 ml) was given during the procedure. Overall VAS pain score was 2.25 (multiple transfer VAS 1, range 0-10) and tendon manipulation is perceived as the most painful part of the procedure. 35% (multiple transfer 50%) of patients experienced no pain during the whole procedure at all and 40% did not take the analgesics after the operation. Only one case had mild wound ischaemia which healed uneventfully. 85% of patients prefer to use WALANT as the method of anaesthesia for their next hand surgery.

Conclusion WALANT technique is feasible and desirable in tendon transfer surgery. It allows accurate tensioning of the transfer, permits patient feedback to evaluate tendon transfer result during operation, and enables a safe procedure with adequate anaesthesia for the patient.

WRIST I: Carpal Bone**8:00 AM - 9:15 AM | NOV 8, 2017****FOUR-CORNER FUSION METHOD USING BIOABSORBABLE PLATE FOR SLAC & SNAC WRIST**

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Objective Although four-corner fusion for scapholunate advanced collapse (SLAC) or scaphoid nonunion advanced collapse (SNAC) wrist has traditionally been reported to produce favorable treatment outcomes, no consensus has been reached regarding the standard fixation technique. We have performed four-corner fusion with bioabsorbable plate made from a composite of poly-L-lactic acid and hydroxyapatite at our department. Here, we report the four-corner fusion surgical procedure and clinical outcomes.

Methods This study included 9 patients with SLAC/SNAC wrist who underwent four-corner fusion with a bioabsorbable plate (BAP) at our department between April 2009 and June 2016. The primary diseases were scapholunate ligament injury in 2 patients, Preiser's disease in 3 patients, and scaphoid pseudoarthrosis in 4 patients. The mean age was 61.3 (range, 48-71) years. The plate is mesh-like and can be cut with scissors. After it is soaked in water heated to 68°C, the plate can be bent in multiple directions. In the surgical procedure, the collapsed scaphoid was removed, and the carpal bones (i.e., the capitate, lunate, hamate, and triquetrum) were temporarily fixed with Kirschner wires. After cancellous bone was grafted into the gap in the joint, the four carpal bones were fixed with a BAP and absorbable screws. External fixation was applied for 2 weeks after surgery. The mean postoperative follow-up period was 31.3 (range, 6-86) months.

Results In all patients, bone union was achieved without dislocation, and pain was relieved. The wrist extension and flexion range of motion changed from 84.4° before surgery to 82.9° after surgery, whereas the grip strength (percentage of the unaffected side) changed from 53.2% before surgery to 68.2% after surgery. The Quick Disabilities of the Arm, Shoulder, and Hand score improved from 50.3 to 11.7. In addition, no complications, such as infection, avascular swelling or tendon adhesion, were observed.

Discussion The BAP has the advantages that it can be freely changed to a desired shape, can be fixed with screws through holes easy for insertion, does not require surgical removal, and can be confirmed on X-ray.

Conclusion Four-corner fusion was performed with a BAP. This procedure requires no removal of internal fixation devices and screws, and produces stable, clinical outcomes. Thus, four-corner fusion appears to be a useful fusion technique.

PEDICLE VASCULARIZED BONE GRAFT OF THE DISTAL RADIUS FOR THE SCAPHOID NONUNION FRACTURE

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Abstract Scaphoid fracture is the most common of carpus bone fracture (60-70%) and second to the distal radius fracture in the wrist. Etiology majority is low-energy injuries due to sporting event (59%), fall onto an outstretched wrist (35%), and high-energy trauma caused by fall from a height also motor vehicle injury. 82% of the scaphoid fractures in males.

One of complication of scaphoid fracture is non union. Incidence of scaphoid fractures developing non union is 10% -15%, and higher if the fracture at the proximal pole fractures (>30%), avascular necrosis (proximal pole fractures) → 14% to 39% scaphoid fracture nonunion are seen that have developed AVN. Clinical examination of non union fracture scaphoid are decreased wrist motion and grip strength, general or radialioedema and focal snuffbox tenderness (sodoes scaphoid fracture), tender of distal pole of scaphoid of palpation and axial compression of the thumb may reproduce pain. Dorsal distal radius vascularized pedicle bone grafting is alternative to conventional measures for the treatment of displaced proximal pole fractures, established nonunions, and avascular necrosis of the proximal fragment. Graft based on the 1,2-intercompartmental suparetinacular artery (1,2 ICSRA) has reliable anatomy and predictable course between the 1st and 2nd extensor compartments and can be harvested and insert in to the prepared fracture site using a single-incision approach. The procedure were : cutting the graft, elevate graft and pedicle, scaphoid preparation, inseting the graft and closure.

Post operative carefit with a short arm thumb spica cast first two weeks continue for another 4 weeks and then removable thumb spica splint wearing all the time until healing (confirm by radiograph CT)

.Keywords pedicle vascularized bone graft distal radius - scaphoid nonunion fracture

CROSS-SHAPED BONE GRAFTING AND LOCKING PLATE FIXATION FOR ARTHRODESIS OF THE TRAPEZIOMETACARPAL JOINT: SURGICAL TECHNIQUE AND EARLY MOBILIZATION

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The trapeziometacarpal joint is the second most common site of osteoarthritis in the hand and the most frequent to require surgery. Arthrodesis of the trapeziometacarpal joint is recognized as a standard 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. Ten 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). Physical therapy was started the day after surgery and free use of the hand was permitted. Patients showed radiographic evidence of trapeziometacarpal joint union after an average postoperative period of 8.3 weeks (range 6-12 weeks). The VAS 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. These data suggested that our technique is a highly valuable and 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.

WRIST I: Carpal Bone | 3:15 PM - 5:15 PM | NOV 8, 2017**THE EFFECTS OF TRACTION ON MOTION OF RADIO-LUNATE AND CAPITO-LUNATE JOINTS**

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Objective We investigated whether passive range of motion exercise with traction would be effective for recovering range of motion of the wrist joint. Employing an experimental device that enabled quantification of traction force and directionality, changes of the radio-lunate (RL) and capito-lunate (CL) joints during flexion-extension movements were assessed with radiography and MRI.

Methodology Radiography: Dynamic radiography was conducted in the wrist joint of 20 hands from 20 healthy adults. Angles of the RL and CL joints with and without traction were measured in several positions: the neutral position, 40° of flexion, and 40° of extension.

MRI: In 10 hands from 10 healthy adults, MRI scans were taken of the wrist joint fixed in several positions with and without traction: the neutral position, 40° of flexion, and 40° of extension. Angles and joint spaces of the RL and CL joints were measured.

Results Radiography: Traction produced significant increases in the RL angle in all positions. MRI: Traction produced significant increases in the RL angle in the extended position. In the flexed position, it produced increases in the flexed direction, but this change was not statistically significant. In the RL joint, joint spaces increased significantly in the neutral position and the extended position. Significant increases were also noted in the CL joint in the neutral position and the extended position.

Conclusions Traction applied to the wrist joint caused increased range of motion of the RL angle. The RL joint and CL joint spaces increased significantly with traction in the neutral position and the extended position. Changes of the RL and CL angle correlate with dilation of the joints. Traction may be effective when used in rehabilitation to expand the range of motion of the RL joint.

THE SURGICAL OUTCOMES OF COMBINED RADIAL WEDGE AND SHORTENING OSTEOTOMY FOR THE TREATMENT OF KIENBÖCK'S DISEASE

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Objective The treatment of Kienböck's disease is controversial and various surgical procedures have been applied. Authors performed combined radial wedge and shortening osteotomy for Kienböck's disease with non-negative ulnar variance. The purpose of this study is to report the results of this procedure by analysis of clinical and radiological data.

Methodology Eighteen Patients of Kienböck's disease without ulnar negative variance were included in this study. There were 8 male and 10 female patients (average age, 37 years) and the mean follow up period was 25 months. Radiological analysis included Lichtman stage, ulnar variance, radial inclination and carpal height ratio. Clinical analysis included range of motion, Visual Analogue Scale (VAS), grip power, modified Mayor wrist score and Disabilities of the Arm, Shoulder and Hand (DASH) score.

Results On preoperative radiographs, Lichtman stage IIIA was 16 cases and IIIB stage was 2 cases. Pre-operative radiographic analysis showed average ulnar variance +0.50mm, radial inclination 27.7°, carpal height ratio 0.49, radioscapoid angle 52.7° and stahl's index 0.41. Final follow up radiographs showed solid union of osteotomy and average ulnar variance +2.4mm, radial inclination 16.5°, carpal height ratio 0.48, radioscapoid angle 58.1° and Stahl's index 0.36. Clinical analysis showed average increase of dorsiflexion 8.2°, palmar flexion 30.0° and grip strength

was 18.5lb. At the final follow up, the mean VAS was 1.0, the mean DASH score was 4.5 and the mean Modified Mayo wrist score was 78.1.

Conclusions Author's procedure for Kienböck's disease provided acceptable clinical and radiological results in this study, and it could be a recommendable option for the patients with non-negative ulnar variance.

Key words Kienböck's disease, Radial shortening osteotomy, Wrist joint range of motion, Grip power, DASH

ILIAC CREST WEDGE BONE GRAFTING FOR SCAPHOID NON-UNION WITH DEFORMITY

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Introduction Displaced scaphoid fractures run the risk of nonunion, avascularity or malunion. Degenerative osteoarthritic changes may develop in the course of 10 years following nonunion of the scaphoid. Scaphoid nonunions with deformity are unstable and are usually treated with a structural bone grafts to increase the chances of union. We present six cases scaphoid nonunion with a DISI deformity treated with iliac crest wedge bone grafting and internal fixation.

Methods A retrospective review of all patients with established nonunion of the scaphoid bone were included. Inclusion criteria included: established nonunion with humpback deformity, unilateral injury, those reconstructed using iliac crest wedge grafting, minimum follow-up of at least 6 months. Exclusion criteria include: unable to answer DASH score and incomplete post op xrays.

Results We had a total of six patients who fulfilled the criteria for the study. All were males with an average age of 31 years old (range: 18-44 years). The dominant hand was involved in two of the six patients. All patients had a diagnosis of scaphoid nonunion with humpback deformity by x-ray and CT scan. All had scaphoid waist fractures except for one, which is located at the proximal pole. The average delay to surgery was 8 months (range: 2-15 months). All patients had open reduction with anterior wedge bone grafting from the iliac crest to correct the deformity and were fixed with a headless screw except for one (multiple pins). The average pre-operative scapho-lunate angle was 73 degrees (range: 65-87 degrees). This improved to 51.8 degrees (range: 45-52 degrees) at an average follow-up of 12.7 months (range: 6-19 months). The average FIL-DASH score improved from 36 (SD, 18) preoperatively to 9.1 (SD, 5.1). Presently, grip as a percentage of normal averaged 89% (SD, 9.7), pinch at 96% (SD, 7.5), wrist flexion at 67% (SD, 17), wrist extension at 74.6% (SD, 13.9), and VAS for pain at 2.7 (SD, 1.6). The union time of the scaphoid had an average time of 11 weeks (SD, 1.7) this was measured by CT scan on all patients.

CONCLUSION The use of the anterior iliac crest bone grafting is still a good alternative for scaphoid non-unions with deformity and without avascular necrosis.

MODIFIED LRTI PROCEDURE FOR TREATMENT OF ADVANCED THUMB BASAL JOINT ARTHRITIS

Chang Chih-Hao

Introduction Thumb carpometacarpal (basal joint) osteoarthritis is a common degenerative joint disease affecting 33% of postmenopausal women. The peak age is between 50 and 60 years old. If the patient suffered from painful thumb basal joint, she will seek for the help of conservative treatment first. Once the conservative treatment did not work and x-ray showed advanced arthritis (Eaton stage 3 and 4), the surgery will be suggested. We must mention that the severity of x-ray finding is not always proportional to the degree of pain. There are several surgical options including CMC arthrodesis, implant arthroplasty, arthroscopy-associated arthroplasty, limited bone excision with suspensory procedure, and LRTI procedure. There are many debates between these procedures and not yet concluded. Although suspensory arthroplasty distracted many surgeons and won the good result in short days,

WRIST I: Carpal Bone | 3:15 PM - 5:15 PM | NOV 8, 2017

LRTI is still most popular and widely used. In this study, we modify some techniques of LRTI procedures and got good result during the follow-up 3 years post-operatively.

Materials and Methods From 2010~2013, we collected 15 cases who received the LRTI procedure to treat advanced thumb basal joint arthritis. The average age is 62 years old (55~78). The female/male ratio is 11/4. The x-ray findings all belonged to stage 3 and 4 Eaton classification. They all received the conservative treatment before surgery at least 3 months. The LRTI procedure is performed by single surgeon who had the experience of over 15 years hand surgeries. The harvested tendon is universal FCR and average 9.8 cm length. Trapeziectomy was performed in all cases. First, the CMC joint was explored and trapeziectomy was done. Then the FCR was identified and harvested. We passed the FCR tendon from the trapeziectomy hole to the dorsal wrist. Second, the FCR was passed through the basal portion of first metacarpal base and surrounded. APL tenodesis was performed and sutured to the FCR tendon. Third, the tendon ball was made using the left FCR and was sutured to the trapezoid bone by the suture anchor (2.9 mm). Finally, the suture line was fixed to the joint capsule. One or two c-wires were applied from distal third of first metacarpal bone to the second metacarpal base. Short arm splint with thumb spica was applied for 4 weeks postoperatively.

Results and Discussion In this study, all patients got a great improvement of pain. During the follow up of 3 years, there is about 75% pinch power left and 2 mm sinking of first metacarpal base. The CMC joint can rotate very smoothly. This modified method is acceptable and the result is satisfactory.

IS SCAPHOLUNATE INSTABILITY A POSTTRAUMATIC OR CONGENITAL DISORDER?

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It is generally assumed that an injury of the scapholunate ligament and the secondary restraints may lead to different degrees of scapholunate instability. However, when both wrists are affected, a nontraumatic cause may be more likely. The aim of the study was to determine the incidence of unilateral and bilateral widening of the scapholunate gap and the association with other radiological signs of scapholunate instability.

Methods X-rays of both wrist of 954 patients who attended the hospital for wrist pain or trauma were examined. Patients with widening of the scapholunate gap (≥ 4 mm) were identified, it was noted if both wrists were involved, if the lunate was in extension on lateral X-rays and if there were signs of scapholunate advanced collapse with cartilage degeneration.

Results Mean age of patients was 46 years (range: 13 -94) and 61% were women. Unilateral widening of the scapholunate joint was present in 14 (1.5%) and bilateral widening in 65 (6.8%). Of the 79 patients with a wide scapholunate gap, 38 (48%) had extension of the lunate and 22 (28%) had signs of cartilage loss. Mean age of patients without extension of the lunate was significantly less than those with dorsal tilting, 43 and 53 years, respectively. This was also the case for patients with and without cartilage degeneration (44 versus 58 years).

Conclusion Widening of the scapholunate gap and other radiological signs of scapholunate instability were more frequently observed in both wrists. Younger persons tend to have only a wide scapholunate gap and with increasing age dorsal tilting of the lunate and osteoarthritis can appear. These findings may indicate that a congenital predisposition may be more important to cause scapholunate instability than a posttraumatic.

WRIST II: Distal Radius

8:30 PM - 9:45 PM | NOV 8, 2017

CORRECTIVE OSTEOTOMY OF THE INTRA-ARTICULAR MALUNION OF DISTAL RADIUS FRACTURE; UTILITY OF THE COMPUTER SURGICAL SIMULATION AND PATIENT MATCHED INSTRUMENTS: A SERIES OF FOUR CASES

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Objective We report four cases of the challenging intra-articular corrective osteotomy for the malunited intra-articular distal radius fractures (IDRFs) with outside-in osteotomy technique using patient matched instruments (PMIs) manufactured based on computer simulation.

Methodology We retrospectively evaluated four cases who were treated with the intra-articular corrective osteotomy for symptomatic malunion of IDRFs. We performed three dimensional (3D) computer surgical simulation using 3D bone models based on CT data to assess the original fracture line and the displacement of fragment. Based on computer simulation, we designed PMIs as osteotomy guide with guide sleeve to insert guide K-wires for outside-in osteotomy and molded PMIs with 3D printer. In operation, we made the PMI fit onto bone surface of the distal radius and inserted 1.2mm multiple K-wires through the guide sleeves along the original fracture line. The PMI was removed and osteotomy was completed with a chisel without release of the joint capsule and ligaments. Fragments were corrected with arthroscopic or fluoroscopic guidance or with PMI, and fixed rigidly with locking plates or screws. All patients were evaluated clinically and radiologically before operation and at the final follow up.

Result The original IDRFs were three volar shearing fracture and one die punch fracture of the scaphoid facet. All patients were successfully performed corrective osteotomy using PMI and showed no sign of necrosis of the fragment. Pain was relieved in all cases. The mean gain in flexion/extension arc was $62.5 \pm 35.9^\circ$ and in pronation/supination arc was $27.5 \pm 32.0^\circ$. Maximum articular step-off was reduced from 5.0 ± 2.0 mm to 1.0 ± 0.2 mm.

Conclusion 3D computer surgical simulation and PMIs allow surgeons to perform safety and precise intra-articular osteotomy for the symptomatic malunion of IDRFs and may help to avoid salvage procedures such as arthrodesis of the wrist.

VOLAR SHIFT AS AN INDEPENDENT RADIOLOGICAL PREDICTOR OF INSTABILITY IN DISTAL RADIUS FRACTURES

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Aims Surgical indications in distal radius fractures are unacceptable displacement with fracture instability. Lafontaine et al and MacKenney et al proposed predictors of instability based on patient age and radiological parameters. Philips et al further suggested that alignment of volar cortex post-reduction predicted need for surgery. We propose that volar shift at pre-reduction may be an independent predictor of instability.

Methods Radiographic films from 2013 to 2014 were analysed at presentation, post-M&R, 1 week and 4 weeks postinjury. Parameters studied included volar shift, volar tilt (VT), radial inclination (RI) and radial height (RH). Inclusion criteria are extra-articular and intra-articular fractures. Exclusion criteria are partial articular fractures and fractures with associated carpal injuries. Instability was classified into Early (Post-M&R), Early (1 week) and Late (4 weeks). An instability occurs when VT is not within -5 to 10° , RI is not more than 11° or RH is not more than 6mm; or more than 50% loss in reduction compared to the post-M&R imaging

WRIST II: Distal Radius | 8:30 PM - 9:45 PM | NOV 8, 2017

Results The first 200 fractures of our institution's distal radius fracture registry were reviewed and 80 were included in our study. Of the 66 cases that had volar shift, 60 (90.9%) were noted to have Early Instability (1 week) ($p=0.009$) and 63 (95.5%) had Late Instability ($p=0.004$).

Conclusion Volar shift is a significant independent risk factor to predict fracture instability. Though it may not predict early instability at post-M&R, it is significantly associated with instability at 1 week and 4 weeks post-injury. We further extend our study with a larger sample size and present the results.

INTRAMEDULLARY FIXATION FOR DISTAL RADIUS FRACTURES. COMPLICATION AND TECHNICAL PITFALLS FOR ITS AVOIDANCE.

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Background Intramedullary fixation for distal radius fractures is less invasive and is free from hardware irritation. But some specific complications such as radial nerve sensory neuritis were documented. Furthermore, there were no studies analyzing whether this less invasive technique could reduce the common complications associated with distal radius fractures.

Patients and Methods We retrospectively investigated the medical records of 73 patients with distal radius fractures treated with an intramedullary implant (Micronail). There were 49 AO A type fractures and 24 AO C type fractures. The average age was 70.6 years old. The average follow-up period was 341 days. We investigated complications according to the complication checklist proposed by McKay.

Results As for neurological complications, 2 patients (2.7%) had radial nerve sensory neuritis which resolved after several months, and 5 (6.9%) had minor sensory hypoesthesia of the radial nerve which resolved after a few weeks. Two patients (2.7%) had carpal tunnel syndrome which resolved spontaneously. As for tendinous complications, 3 patients (4.1%) had trigger finger at the A1 pulley, which needed injection of triamcinolone. There was no synovitis or tendon rupture around the fracture site. One patient (1.4%) treated with a relatively small sized implant had malunion after volar inclination of the intramedullary nail and distal fragment. The overall complication rate was 17.8%. There were no major complications which needed secondary surgical intervention such as hardware removal.

Conclusions Intramedullary fixation for distal radius fractures was free from tendinous complications around the fracture site. Radial nerve sensory disorder could be reduced by atraumatic nerve handling.

IS SKYLINE VIEW VALUABLE FOR DETECTING PROTRUDED SCREW IN VOLAR PLATE FIXATION OF DISTAL RADIUS FRACTURE? : COMPARED WITH INTRAOPERATIVE MOBILE-MINI CT

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Objective Our purpose is to compare and analyze intraoperative fluoroscopy (skyline view) and intraoperative mobile mini CT for detecting protruded screw in volar locked plating of distal radius fracture.

Methodology We did a retrospective analysis on 20 patients (6 males and 14 females) who had both intraoperative fluoroscopy (skyline view) and intraoperative mobile mini CT taken, among the patients who had volar locking plate fixation for distal radial fracture at our institution from January 2017 to March. After fixating with volar locking plate, we took skyline view to see if there is protruded screw, then took intraoperative mobile mini CT to compare the distance between screw tips and the dorsal radial cortex (STCD: Screw tip cortex distance).

Results In skyline view, STCD was 1.68mm, 2.08mm, 2.16mm, 2.84mm, 4.51mm from radial side, respectively. In CT, it was 1.79mm, 1.22mm, 1.20mm, 1.62mm, 5.79mm, respectively. Regarding the 2nd and 3rd screws, STCD of CT was significantly short compared to that of skyline view ($p < 0.05$). 2 patients showed protruded 3rd screw in CT, while they did not seem so in skyline view. These screws were replaced with shorter ones.

Conclusions The skyline view was not accurate in measuring screw length. During operation, we were able to replace the protruding screws found in intraoperative mobile mini CT, which were not found in skyline view. Intraoperative mobile mini CT for checking protruded screw when fixating distal radius fracture with a volar locking plate, it is expected to decrease complication like extensor tendon rupture.

Keyword : distal radius fracture, skyline view, mobile mini CT

ARTHROSCOPICALLY ASSISTED VS. TRADITIONAL SURGICAL TREATMENT OF DISPLACED ARTICULAR DISTAL RADIUS FRACTURES. EVALUATION OF OUTCOMES.

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Objective to analyze long term results of articular distal radius fracture surgeries performed by one surgeon within 7 years either in traditional and arthroscopically assisted technique.

Methodology 110 patients had articular distal radius fractures of one hand (both hands fractured were excluded from evaluation). 50 fractures were treated under arthroscopic control and 60 patients were treated in traditional style without arthroscopic assistance. The follow up period is 72 to 12 months postoperatively. More than 80% of operated patients had AO C-type fractures. Patients in both groups were operated with K-wires and external fixation device or volar compression plates. Results of treatment were evaluated with PRWE (Patient-Rated Wrist Evaluation), Gartland & Werley and MASS07 scores, Grip/Pinch strength and ROM was measured.

Results All fractures were healed, but 13 patients had undergone the second stage procedure due to complications (infection, contracture or loss of primary fixation). 17 of patients, from both groups together, were lost for follow-up, 3 of them died due to other circumstances not related with distal radius fracture. Early postoperative results within 6 months after surgery are better for the arthroscopically assisted group. The worst results are for AO C3 type fractures. Better results have patients after early and intensive rehabilitation. More detailed results should be presented in congress venue.

Conclusions In hands of experienced hand surgeon both methods work well, but arthroscopical examination helps to find articular step-ups or fragment malpositions which are unrecognizable under the fluoroscope control. Volar plating gives a chance for early rehabilitation.

THE TRANSVERSE SINGLE-INCISION APPROACH TO THE DISTAL RADIUS

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Purpose Minimally-invasive distal radius fracture fixation has been shown to have similar functional outcomes and potential aesthetic benefits as compared to the traditional Henry approach. We describe an alternative approach to the distal radius that leaves a transverse scar which is well hidden in the wrist crease.

Methods The surgical approach to the distal radius is described. A transverse incision is used which leaves a scar hidden in the proximal wrist crease. Post-operatively, patients underwent a standard rehabilitation programme. Patient demograph-

WRIST II: Distal Radius | 8:30 PM - 9:45 PM | NOV 8, 2017

demographics and fracture classification and outcome are also collected.

Results A technical description of the approach to the distal radius using a transverse skin crease incision is presented. A total of 16 patients underwent the procedure. Radiological parameters of the pre- and post-operative x-rays were analysed. The patients had distal radius fractures classified by Arbeitsgemeinschaft für Osteosynthesefragen (AO) from A2 to C3. A 1-year follow-up is presented. All patients had union of the fracture and had no complaints about the scar outcome. Some patients experienced temporary wrist stiffness post-operatively, however one patient required implant removal because of tendon irritation. All the patients were able to return to their pre-injury work.

Conclusions The transverse approach to the distal radius using a single incision is a viable alternative to the traditional longitudinal approach to the distal radius. The approach has the advantage of having the surgical scar hidden within the proximal wrist crease and easier visualization of the ulnar corner of the distal radius fracture, to guide reduction. Although there is a learning curve for this new approach, the transverse approach is a viable alternative with potential aesthetic advantages.

OUTCOMES OF CORRECTIVE OSTEOTOMY FOR MALUNITED DISTAL RADIUS FRACTURES

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Objective Malunion of distal radius fractures results in residual pain, stiffness and loss of function. Increased angulation of the distal radius leads to incongruence of the distal radioulnar joint. This in turn affects the pronosupination of the forearm. The aim of the study is to investigate whether correction of the tilt of the malunited distal radius fracture will improve pronosupination and also which type of tilt (dorsal or volar) will have a poorer outcome in terms of pronosupination.

Methodology Retrospective review of 17 patients with 18 wrists that underwent corrective osteotomy by a single senior surgeon for malunited distal radius fractures between 2001 and 2008. Case notes and radiographs were reviewed. Pre and post operative radiographic parameters were measured and pronosupination values were obtained from the case notes.

Results Increased tilt of the malunited distal radius caused decreased pronosupination. Pronosupination improved significantly post corrective osteotomy with the dorsally tilted distal radius fractures doing better than the volarly tilted distal radius fractures.

Conclusion Corrective osteotomy of malunited distal radius fractures improves pronosupination of the forearm. Dorsally tilted distal radius fractures have more improvement in pronosupination compared to volarly tilted distal radius fractures.

POST-OPERATIVE DASH SCORES OF SURGICALLY TREATED DISTAL RADIUS FRACTURES IN RELATION TO LA FONTAINE'S CRITERIA OF INSTABILITY

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Objective This is a retrospective and prospective cohort study that aims to determine the functional outcome of adult patients who have distal radius fractures across all the available treatment options and correlate the instability criteria of La Fontaine with DASH scores and pain scores of the patients after treatment. Another objective is to correlate which of the criteria of La Fontaine are related with good or poor functional outcomes.

Methods Twenty (20) patients who were treated via ORIF, Closed reduction with or without pinning or external fixation for distal radius fractures from were evaluated from year 2011 to 2016. Functional outcome measures were the Quick FIL DASH scores and VAS scores post-operatively. Follow-up was from 3 months to 79 months post-op.

Results The average DASH score was noted at 27.63. Pain scores at the time of interview were all 0 in terms of the visual analog scale. The presence of dorsal angulation more than 20 degrees, dorsal comminution, intra-articular fracture, and ulnar fracture resulted in a higher DASH score which is significantly different from those who did not possess the said criteria on injury films. Among all these criteria, the presence of dorsal comminution showed the highest mean DASH score and patient's age >60 showed the lowest mean DASH score. The mean DASH scores between those who had more than 3 La Fontaine's criteria were also noted to be significantly higher than those who had 3 or less La Fontaine's criteria. It is notable that all follow-up post-operative radiographs were of acceptable radial inclination and intra-articular gap or step-off. No significant difference in DASH scores were noted in the radial height and dorsal angulation, while a significant difference in mean DASH scores were noted for those with acceptable and not acceptable ulnar variance. Mean DASH scores were noted to be highest for those with type C fractures at 29.25, followed by those who had type B fractures at 25.51, and lastly by type A fractures at 23.41. No test for significance was also done for this part due to the small and unequal sample size.

Conclusion: Each criterion in La Fontaine's criteria of instability are independent of each other in terms of outcome as shown by the significantly higher DASH scores for those who have a dorsal comminution, followed by dorsal angulation > 20 degrees, presence of an ulnar fracture and lastly an intra-articular fracture. Although not significantly different, we found that elderly patients reported lower DASH scores probably owing to their low-demand for the use of injured extremity. As expected, those who had more severe injuries (AO type C fracture), appeared to have higher mean DASH scores.

MICROSURGERY I

3:45 PM - 4:45 PM | NOV 8, 2017

REPLANTATION MANAGEMENT OF RING AVULSION AMPUTATIONS

[Agus Roy R H Hamid, Hendra Sanjaya](#)

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Abstract Ring avulsion of the finger caused by avulsion of the soft tissues when the ring is pulled forcefully can cause a wide range of damage. Replantation management of ring avulsion is little bit difficult and can be challenge for hand surgeon because of in ring avulsion amputation got a long segment damage to the vessels and intrinsic damage caused to soft tissues at the proximal edge of the amputation. Four patients with total ring avulsion amputations underwent microsurgical replantation in the period 2011 to 2016. Arterial repair was done by direct vessel suture in three patients with cross anastomosis, vein anastomosis from dorsal region. We used simple K wire for fixation the bone and using needle for prevents the soft tissue inside the degloved. All patient was survive. Patients showed good optimally function. All successful patients were happy with the outcome.

Key Words Ring avulsion amputation, Replantation, K-wire insertion.

DORSAL METACARPAL ARTERY PERFORATOR FLAP

[Ho-Jun Cheon, Sang-Hyun Woo](#)

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Purpose Reverse dorsal metacarpal artery island flap is a common procedure performed in the reconstruction of the soft tissue of the hand, except for the tip of the finger. Rather than elevating the flap and the artery through reverse dorsal metacar-

MICROSURGERY I | 3:45 PM - 4:45 PM | NOV 8, 2017

pal artery island flap procedure, elevating only the island flap via the use of a perforator in the dorsal metacarpal artery perforator flap is a simpler and more useful procedure. The purpose of this study is to evaluate the result of the dorsal metacarpal artery perforator flap procedure.

Methods Dorsal metacarpal artery perforator flap was performed in 37 patients, composed of 29 males and 8 females, from November 2012 through October 2016. The mean age of the patients was 47, and the average follow up period was 5.3 months. In 16 of the cases, the subcutaneous tunnel was created for the pedicle to pass through, and in 22 of the cases, the pedicle was left exposed with wet dressing and 2 weeks later, pedicle division was performed.

Results The mean flap size was 4.3x2.5cm. Primary closure (mean flap size 4.1 x 2cm) was performed at the donor site in 17 cases, and full thickness skin graft (mean flap size 4.2 x 2.8cm) was performed at the donor site in 21 cases. 5 cases of partial necrosis, and 1 case of total necrosis were observed, and 15 cases included additional procedure of flap defatting.

Conclusions Scars remained, but donor site morbidity was minimal. It is also a useful procedure in producing adequate length of the pedicle for reconstructing not just the dorsal side of the hand, but also the thumb or the 1st web space of the hand.

AXON COUNT OF UPPER LIMB MOTOR POINTS AND CLINICAL IMPLICATIONS FOR NERVE TRANSFER

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Background Nerve axon counts are critical for planning nerve transfers. A disparity leads to a size mismatch and a poor functional result. There is no study that measures axonal counts for all the nerves in the upper limb using manual counting, the gold standard. The figures that surgeons use arise from different sources and different methods.

Objective Our goal is to complete a blueprint of upper limb neuromuscular anatomy for reconstructive surgery by including the axon counts of the motor points of upper limb muscles.

Methodology Terminal motor nerve endings of twenty-three upper limb muscles were harvested from ten fresh frozen cadaveric upper limbs. These nerve endings were processed and manual quantitative histomorphometry was performed. Axons on each specimen were counted independently by two investigators and the average count for each motor point was reported.

Results Motor points for arm muscles deltoid, triceps, biceps, and brachialis had higher axon counts compared to that of forearm muscles. Among the forearm muscles, median and ulnar nerve innervated wrist flexors have motor points with equivalent counts as radial nerve innervated wrist extensors. Motor points of these wrist flexor and extensor muscles had slightly higher axons counts than the motor points of supinator and pronator teres. Among the extrinsic muscles of the fingers, motor points for flexor digitorum superficialis and flexor digitorum profundus had more axons, their counts were comparable to wrist flexors and extensors.

Conclusions Axon counts, when combined with the knowledge of nerve clusters and muscle morphology, can help surgeons decide the most suitable nerve transfer in any given clinical situation.

AN OUTCOME STUDY OF TOE-TO-THUMB TRANSFER SURGERY

[Nguyen Viet Tan](#)

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Objective to evaluate the results of toe-to-thumb transfer surgery.

Methodology Prospective study. A series of 36 toe flaps (19 trimmed great toe flaps and 17 second toe flaps) were transferred to reconstruct thumb stumps in 36 patients with the average age of 30.2 (range, 8-61). Among them, 29 cases (7 without thenar muscles and 22 preserving thenar muscles) had long-term outcomes with the following-up time of at least 12 months.

Results Out of 36 toe flaps, 34 flaps (94.4%) were harvested based on arterial supply of first dorsal metatarsal artery. 2 flaps (5.6%) were harvested based on arterial supply of first plantar metatarsal artery due to the first dorsal metatarsal artery did not exist. Short-term outcomes: out of 36 toe flaps, 35 (97.2 %) survived; 1 (2.8%) had distal phalange necrosis complication. Long-term outcomes: union rate was 29 out of 29 cases (100%) after 3 months, the average of static 2-point discrimination was 14 mm, 4 out of 29 cases (13.7%) had tendon adhesion complication and 2 out of 29 cases (6.9%) had angular malalignment complication. In 7 thumb stumps without thenar muscles, the average of Kapandji thumb opposition score was 5.6; the average of grip strength was 35.0 % of the uninjured side. In this group, the pinch strength was weak but all of the patients could hold small and large objects. In 22 thumb stumps preserving thenar muscles, the average of Kapandji thumb opposition score was 8.3; the average of grip strength and key pinch strength was 66.4 % and 54.7 % of uninjured side respectively; the average of total active motion was 540.

Conclusions Toe-to-thumb transfer surgery had the high survival rate (97.2 %) and good functional outcome.

Key words: Toe to thumb transfer, thumb reconstruction, thumb stump.

COMPARISON BETWEEN MUSCLE STUFFED VEIN VERSUS COMMERCIAL NEUROTUBE® IN TREATMENT OF NERVE DEFECTS IN AN ATHYMIC RAT MODEL

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Objective The gold standard in peripheral nerve injury is utilizing autologous nerve grafts to bridge the defect but has donor site morbidities and unpredictable outcome. We hypothesize that tissue engineered biological nerve tube construct made of a vein filled with skeletal muscle is better than commercially available absorbable polyglycolic acid woven mesh tube as a nerve conduit.

Methodology This is a single centre prospective study conducted in Universiti Kebangsaan Malaysia with 4 groups of rats each consisting of 3 adult athymic rats: nerve defect (ND), reverse autograft (RA), absorbable polyglycolic acid mesh tube (NT), and muscle stuffed vein (MSV). A 15mm defect was surgically created in the right sciatic nerve. At 2 weekly intervals, gait analysis, pinch test and nerve conduction study (NCS) were performed until 12 weeks.

Results The MSV group suffered from autotomy of the toes of the operated limb at 5 weeks. All rats had obvious calf muscle wasting and clawing of toes. Sensory recovery was noted by a positive pinch test by postoperative 10 weeks. By 12 weeks, the RA group had regained normal values but the MSV group achieved 75% and NT group 70% of the baseline reading. Overall there was no significant difference between all the groups in SFI, pinch and NCS values. At 12 weeks the rats were euthanized and their sciatic nerve harvested. The MSV graft was well incorporated and of similar diameter as the sciatic nerve. The NT was in continuity and was of similar appearance to muscle. MSV and NT are comparable to the gold standard autologous nerve graft.

Conclusion The sensory and neurophysiological recovery between the MSV and NT groups was comparable without significant difference. Both these groups had comparable results with the gold standard nerve autograft. NT and MSV are good alternatives to the autologous nerve grafts. MSV is a cheaper alternative to NT.

MICROSURGERY I | 3:45 PM - 4:45 PM | NOV 8, 2017**COMPARISON OF VENOUS DECONGESTION STRATEGIES IN ARTERY ONLY DISTAL REPLANTATIONS**Joel Lim, Jr

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Objective Venous outflow may not be possible following distal replantations, and various methods of venous outflow have been described with seemingly good results. In this study, we compare two methods, external bleeding, and subdermal pocketing, in a population of patients treated at a single institution.

Methodology Between 2011 to 2016, 43 artery-only digital replantations were performed. 15 patients underwent external bleeding while 28 underwent subdermal pocketing as the primary venous decongestion strategy. The survival rate, mechanism of injury, and level of amputation were analyzed.

Results Survival rate of the external bleed group was 80% (12 of 15) while that of the subdermal pocket group was 67.9% (19 of 28). There was no statistically significant difference between method of decongestion, level of amputation, or mechanism of injury. One case was complicated by infection in the pocketing group. No bleeding complication was noted in the external bleed group

Conclusions Both methods of venous decongestion provided comparable outcomes

MICROSURGERY II**3:45 PM - 4:45 PM | NOV 9, 2017****SUPERMICROSURGICAL FINGERTIP RECONSTRUCTION USING TOE TIP TRANSFER AND OTHER FLAPS**Hidehiko Yoshimatsu, Arito Kurazono

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Introduction With the advent of supermicrosurgery, fingertip replantation is now widely performed. However, success rate of the replantation is not as high as in amputations at more proximal levels, especially in crush injuries. We would like to propose an algorithm for fingertip reconstruction using supermicrosurgical techniques.

Materials and Methods When amputation entailed loss of the distal phalanx, 2nd toe tip transfer was performed in 10 patients. When there were no loss of the distal phalanx, but the nail matrix damaged, nail matrix transfer was chosen in 1 patient. When both the distal phalanx and the nail matrix were intact, soft tissue transfer was performed in 10 cases, including 7 cases of partial toe transfer and 3 cases of lateral digital free flap transfer. Non-enhanced angiography, Duplex ultrasonography, and indocyanine green (ICG) angiography were used preoperatively and/or intraoperatively to facilitate flap elevation.

Results Postoperative courses were uneventful, and all flaps survived completely, with satisfying functional and aesthetic results. No complications accompanied the donor sites. In two cases where the donor site was covered with artificial dermis, secondary intention healing was completed within a month.

Conclusions With the help of new devices, supermicrosurgical free flap transfers with minimal donor-site morbidity can be performed. In many cases, postoperative results can be superior to those of conventional methods.

EMERGENCY LIMB REPLANTATION AND MICROSURGERY SERVICE FROM INCEPTION TO PRESENT: 15 YEARS' EXPERIENCE IN THE HONG KONGMak MCK¹, Cabello AP¹, Liu WH¹, Tse WL¹, Yiu HW², Ho PC¹

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²Department of Orthopaedics and Traumatology, North District Hospital

Introduction Traumatic limb amputation and severe limb injury with devascularization are devastating to patients in hand function and their activities of daily living. Cluster-wide emergency limb replantation service was set up to enhance quality and outcome. This is a review of 15 years' experience of this service.

Materials and methods: A retrospective review of 233 patients who received either replantation or revascularization surgery from June 2002 to December 2016 was done. All patients were managed according to a cluster coordinated protocol. Demographics including mechanism of injury, level of injury and occupational relationship were recorded. The time required from presentation at the accident and emergency department (AED) to arrival at the operating theater (OT) was recorded. Outcome measures include survival of the replanted or revascularized digit or limb, additional procedures, arc of motion, recovery of sensation, grip strength, return to previous vocation, and complications.

Result Success rate correlated with the time elapsed from presentation at AED to arrival at OT ($p=0.032$), and mechanism of injury ($p=0.013$). From 2006 to 2016 there were a total of 129 patients, of whom 75 suffered from amputation and 54 from incomplete injury with devascularization. The limb or digit survival rate was 74%. Among all patients, most regained a functional arc of motion. Sensation recovery was present in almost all cases. Grip strength and rate of return to vocation were obtained. Factors related to outcome were time elapsed from presentation to accident and emergency department to start of operation, and injury mechanism.

Conclusion Replantation surgery in this cluster-based service has a success rate comparable to those reported in literature. Factors related to outcome were identified. Coordination between various departments in cluster hospitals was critical in providing an efficient and effective service.

IS THE SURVIVAL OF ARTERIALIZED VENOUS FLAPS STILL UNPREDICTABLE? OUR EXPERIENCE AND NEW PERSPECTIVEHede Yan MD, Ph.D, Zhijie Li MD, Weiyang Gao MD.

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Objective to redress the traditional concepts that the survival of the arterialized venous flap is unpredictable and its application should be very cautious.

Methodology: We summarized the outcomes of hand reconstruction with arterialized venous flaps (AVFs) and compared with the conventional flaps during the past five years. The reconstruction was carried out for the coverage of dorsal and palmar aspects of fingers, especially for finger pulps. The type of AVFs included simple skin flaps, and composite flaps with palmaris longus tendon or subcutaneous nerves. Flap sizes ranged from 1.5cm x 2.0cm to 10 cm x 4.5cm. Donor sites located at forearms and feet.

Results of all the 83 AVFs, there was one flap loss and all others survived uneventfully with a survival rate of 98.8%. The flaps were pliable and unbulky, most importantly, flaps achieved satisfactory sensation within 3 to 6 months.

Conclusions: The arterialized venous flaps are easily designed and harvested with good quality without the need to sacrifice a major artery at the donor site, and no limitation of the donor site. They can be transferred not only as pure skin flaps, but also as composite flaps including tendons and nerves as well as vein grafts. They are good candidates and comparable with conventional flaps in reconstructive surgery, especially for the reconstruction of relatively small defects of hand and digits and have been useful tools in the plastic surgeons' armamentarium, which may be the optimal choice in hand reconstruction in certain cases.

MICROSURGERY II | 3:45 PM - 4:45 PM | NOV 9, 2017

DORSAL METACARPAL ARTERY PERFORATOR FLAP

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Purpose Reverse dorsal metacarpal artery island flap is a common procedure performed in the reconstruction of the soft tissue of the hand, except for the tip of the finger. Rather than elevating the flap and the artery through reverse dorsal metacarpal artery island flap procedure, elevating only the island flap via the use of a perforator in the dorsal metacarpal artery perforator flap is a simpler and more useful procedure. The purpose of this study is to evaluate the result of the dorsal metacarpal artery perforator flap procedure.

Methods Dorsal metacarpal artery perforator flap was performed in 37 patients, composed of 29 males and 8 females, from November 2012 through October 2016. The mean age of the patients was 47, and the average follow up period was 5.3 months. In 16 of the cases, the subcutaneous tunnel was created for the pedicle to pass through, and in 22 of the cases, the pedicle was left exposed with wet dressing and 2 weeks later, pedicle division was performed.

Results The mean flap size was 4.3x2.5cm. Primary closure (mean flap size 4.1 x 2cm) was performed at the donor site in 17 cases, and full thickness skin graft (mean flap size 4.2 x 2.8cm) was performed at the donor site in 21 cases. 5 cases of partial necrosis, and 1 case of total necrosis were observed, and 15 cases included additional procedure of flap defatting.

Conclusions Scars remained, but donor site morbidity was minimal. It is also a useful procedure in producing adequate length of the pedicle for reconstructing not just the dorsal side of the hand, but also the thumb or the 1st web space of the hand.

FREE VASCULARIZED FIBULAR GRAFT FOR RECONSTRUCTION TREATMENT BONY DEFECT, SERIAL CASES

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Background The use of free fibular grafts has been well reported for the treatment of various conditions, include reconstruction of bony defects and nonunion, and osteomyelitis as well. The fibula is the most commonly used vascularized bone graft due to its structure and shape are appropriate for diaphyseal locations.

Serial Cases Cases of patient who underwent vascularized free fibular graft harvest for bony defect. First case was a girl 18 years old with soft tissue & bone defect in the right lower leg due to vehicle accident 1 year ago. Scar and soft tissue minor 10 cm at right lower leg, pain but range of motion still normal. Already done osteocutaneous free vascularized fibular graft from the contralateral side. Second case was female 38 years old with the history of infected total hip arthroplasty after debridement and removal of the arthroplasty, also put external fixation. There is leg length discrepancy 9 cm, sinus and pus was coming out. After the infection subsided she was underwent microsurgery free vascularized fibular graft.

Both these cases were good in result after several months surgery by successful bony healing, resulting in limb preservation, pain relief, extremity stability, satisfactory functional outcome.

Conclusion Free vascularized fibular graft has good result for reconstructive surgery of the bony defect. The use of fixation, careful soft tissue and bony reconstruction, meticulous microvascular surgical technique are essential in achieving best outcome.

Keywords Free Vascularized Fibular Graft, Reconstruction Treatment, Bony Defect

FREE AND PEDICLED FLAPS IN LATE RECONSTRUCTION OF BURNED HAND.

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Riga East University Hospital. Centre of Microsurgery of Latvia

Objective: severe hand contracture due to burn scarring can leave severe functional deficit leaving only reconstructive options of free or pedicled flaps. Purpose of our study is to report the outcome of the use of flaps in severely burned upper extremity.

Methodology: retrospective review of 38 consecutive patients between 2003 and 2015. 33 were men, 5 women, aged between 11 and 71 years (average 41.5 years). 6 patients had both hands involved. All of patients had MRSA infection. Types of defects and details of the level of lesion were reviewed. The range of motion of joints, grip and pinch strengths, complications and patient outcome were determined.

Results: all flaps survived but one ALT flap had thrombosis of arterial anastomosis and after vein grafting experienced distal epidermal necrosis. One reverse RFF experienced venous congestion and had partial necrosis. No flap complications occurred after 2010. Follow up period averaged 24 months. Transferred flaps provided good coverage allowing grip and pinch in all but three cases. Range of motion dramatically improved and all patients can use hands in their everyday activities.

Conclusions: the use of microsurgical flaps can significantly improve function of late sequelae of severely burned upper extremity.

USE OF HUMAN NERVE ALLOGRAFTS FOR PRIMARY MANAGEMENT OF PERIPHERAL NERVE INJURIES - OUR EXPERIENCE

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Objective This study evaluates the outcome of patients who have undergone primary nerve allograft repair in peripheral nerve injuries

Methodology – All patients with peripheral nerve injuries were included in this prospective study and were reviewed in 3, 6 and 12 month duration from the date of operation. All of the patients in the study had used Axogen allograft as the primary reconstruction method. The following tools were utilized to evaluate the outcomes – QuickDASH. Analysis of data was done using excel.

Results There were 30 patients included in this study, three had double nerve injuries with 22 males and 8 females. The digital nerve was involved in 22 cases and the rest major nerves. The average graft length was 14.17 mm and the majority of them had general anesthesia. The average length of stay in the hospital was < 2 days as most were done as day surgery. Early results show that the two point discrimination and distal muscle power were comparable to other published data. Excellent and good results were found in 50% of the cases and one person needed amputation. One person needed reexploration due to non-progressive Tinel's sign found to have neuroma at the proximal coaptation site. Most cases had distal muscle power of more than M3 in all motor nerve injuries except in one case which was M2. One case which had M0 power was explored and found to have neuroma.

Conclusion Primary use of nerve allografts is an option in peripheral nerve surgery after acute trauma. It has the advantage as the allograft allows for truly tension free nerve repair and no post-operative immobilization is necessary. However the cost of the allograft is a significant disadvantage to its routine use.

MICROSURGERY II | 3:45 PM - 4:45 PM | NOV 9, 2017**EMERGENCY TOE-TO-HAND TRANSFER FOR ACUTE DIGITAL LOSS**

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Purpose The aim of this article is to propose the indications, advantages and disadvantages of emergency toe to hand transfer as well as to compare the overall results with elective cases.

Methods From November 1997 to July 2017, 146 of 241 cases were emergency toe to hand transfer. Average time to surgery from initial injury was 10 days (5 to 14 days). We retrospectively reviewed hand function test, active range of motion, the Disabilities of the Arm, Shoulder and Hand (DASH) score. We compared the clinical result of hand function between the emergency and elective toe-to-hand transfers

Results The success rates for emergency and elective operations are not significantly different at over 97 percent each. There is no statistical difference between the incidence of emergency re-exploration for the emergency and elective toe-to-hand transfers and the incidence of postoperative infection.

Conclusion Emergency toe-to-hand transfer is safe and reliable with specific indications for reconstruction of acute digital loss.

Keywords Emergency toe to hand transfer, Emergency toe transfer, Reconstruction

EFFECTS OF BATROXOBIN ON THE SURVIVAL OF RANDOM SKIN FLAPS IN RATS

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Objective Batroxobin as a medicinal preparation extracted from the Fer-de-Lance's snake venom, is used to lower blood viscosity and promote the blood fibrinogen decomposition. We aim to observe the effect of batroxobin on the survival of random skin flaps in rats.

Methodology Dorsal McFarlane flaps were harvested. 20 rats were assigned to the batroxobin-treated as experimental group, 20 in control group with normal saline. Batroxobin or normal saline (5BU/kg/day) was administered via the tail vein once daily. On day 2, superoxide dismutase (SOD) and malondialdehyde (MDA) were detected. On day 7, flap survival rates were evaluated with transparent graph paper, the levels of inflammation were examined by haematoxylin and eosin (H&E) staining, and the expression of vascular endothelial growth factor (VEGF) was immunohistochemically evaluated. Microcirculation flow on the flaps were measured by laser Doppler flowmetry(LDF). Flap angiography, according to a modified lead oxide-gelatin injection technique, were obtained and radiographed with a soft X-ray machine.

Results Compared to the control group, the survival area and the microvascular imaging area range of the batroxobin group was markedly larger, Microcirculation flow and SOD activity were increased significantly while MDA level was reduced. Inflammation was inhibited and VEGF expression markedly increased in the experimental group.

Conclusions This study verified that batroxobin can effectively improve random skin flap survival in rats. Batroxobin can effectively improve random skin flap survival by promoting the blood vessel growth. Batroxobin can effectively improve random skin flap survival by inhibiting inflammation and reduce the ischemic reperfusion injury.

EFFECTS OF OXYTOCIN ON THE SURVIVAL OF RANDOM SKIN FLAPS IN RATS

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Background Random flap transplantation has been widely used in the repair and rebuild of skin soft tissue flap. However, the distal of random skin flaps mortify easily. How to improve the flap survival is quite important in the plastic surgery.

Objective(s): This study aims to investigate the effects and the potential mechanism of oxytocin on the survival of random skin flaps.

Materials and Methods Overlength random skin flap models (measured 9cm*3cm) were set up on 50 healthy male SD rats' backs. They were divided into two groups. One group was assigned to be injected with oxytocin as the test group and the other was treated with saline as the control group randomly. Normal saline or oxytocin [20mg/kg] was administered daily. On postoperative day 2, malondialdehyde (MDA) and superoxide dismutase (SOD) were inspected by test kits. On postoperative day 7, the flap survival area was measured with transparent graph paper under direct visualization. The levels of microvessels were evaluated by histologic examination (HE). The expression of VEGF was immunohistochemically assessed. Angiogenesis was assessed via lead oxide-gelatin angiography, and the blood flow on models was examined by laser Doppler flowery. Assessment of the blood levels of IGF-1 were also detected in each animal by enzyme linked immunosorbent assay (ELISA). The expression of NGF and its receptor TrkA were assessed by immunofluorescence technique.

Results Compared with the control group, the flap survival rates are much higher. SOD activity is increased markedly, when MDA level decreased. HE revealed the inflammation reaction, were significantly attenuated. It as well promoted the expression of VEGF and skin flap angiogenesis increased in the tested group. It is obvious that the levels of IGF-1 in the tested group were much higher than in the control group and the expression of NGF as well as TrkA increased in the oxytocin group.

Conclusion Injection of oxytocin can improve the flap survival rate in rats through enhancing the microcirculation, increasing angiogenesis and the expression of NGF and IGF-1 in blood.

WRIST IV: Distal Radius

4:45 PM - 5:45 PM | NOV 8, 2017

COMPARATIVE STUDY OF SPLINT VERSUS CAST IMMOBILIZATION FOR DISTAL RADIUS FRACTURES IN THE ELDERLY

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Affiliations: Hand surgery, orthopedic surgery

Objective There is a high incidence of secondary displacement of distal radius fracture following manipulative reduction in individuals older than 65 years of age, regardless of position and duration of cast immobilization; calling into question the indication for casting over simpler method such as splinting. In this matched cohort study, we aim to examine the radiological and functional outcomes between patients who were treated with either below elbow casting and those treated with removable wrist splints

Methodology 62 patient matched for age, gender, and fracture configuration divided into two groups (31 casted, 31 splinted). Radiological (radial tilt, radial inclination, ulnar variance) and functional (flexion, extension, pronation, supination, grip strength, PRWE scores) outcomes at 3 months were evaluated. Results: The mean age for both groups was 66 years, with a female (80%) preponderance, and the majority of fractures were of AO type A (58%) while the rest

WRIST IV: Distal Radius | 4:45 PM - 5:45 PM | NOV 9, 2017

of the fractures were of type C (32%). There were no statistically significant difference in radiological and functional outcomes in both groups.

Conclusions There was no clinically significant advantage of cast immobilization over splint immobilization

FUNCTIONAL OUTCOME OF DISPLACED INTRA-ARTICULAR FRACTURES OF THE DISTAL RADIUS: COMPARISON OF CLOSED REDUCTION WITH OR WITHOUT PERCUTANEOUS PINNING OR EXTERNAL FIXATION VERSUS OPEN REDUCTION PLATE FIXATION

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Objective The study sought to compare functional outcomes of closed reduction, percutaneous pinning (CRPP) with open reduction, internal fixation (ORIF) for intra-articular distal radius fractures (DRF). While CRPP remains a standard of management, ORIF has been associated with faster return to function and maintenance of anatomic reduction within the first 12 months post-surgery for DRF. Philippine literature on these fractures and surgical options remain scarce, underscoring the need for local data to improve current treatment recommendations.

Methodology We compared outcomes of ORIF versus CRPP, with or without external fixation for intra-articular (AO types B and C) distal radius fractures through a multicenter, non-randomized, ambispective cohort study. A validated Filipino version of the Disabilities of the Arm, Shoulder, and Hand (FIL-DASH) score was used, with a minimum 12-months' follow-up. The ORIF group was comprised of 13 patients, with an average age of 52 years and follow-up period of 35 months. The CRPP group included 8 patients with an average age at presentation of 50 years and follow-up period of 31 months. Pain scores, incidence of post-operative complications and radiographic measurements were also evaluated.

Results The mean FIL-DASH score for the ORIF group was significantly higher versus the CRPP group (mean: 24.9 ± 12 for ORIF vs 9.9 ± 12 for CRPP; $p=0.018$). No significant difference was found between the two groups in terms of post-operative radiologic parameters (radial height and inclination, articular step-off and gap, dorsal angulation, and ulnar variance), pain score, and complications following surgery.

Conclusions While radiologic parameters, pain scores, and incidence of complications were similar, closed reduction, percutaneous pinning with or without use of external fixation compares favorably to open reduction, internal fixation in terms of functional outcomes at 1 year post-surgery, among patients with intra-articular distal radius fractures.

OPEN REDUCTION AND INTERNAL FIXATION FOR INTRAARTICULAR COMMUNUTED DISTAL RADIUS FRACTURE WITH FREE FRAGMENT BEYOND WATERSHED LINE

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Objective The surgical treatment of intra-articular fractures of the distal radius has improved significantly in recent years due to the development of surgical technique and implants. However, the surgical management for comminuted fracture with free fragment beyond watershed line is still challengeable. Authors performed open reduction and internal fixation for fracture of this type and analyzed the radiological and clinical results.

Methodology Thirty four patients were included in the study and the retrospective analysis of the medical records and radiologic data was performed. There were 16 males and 21 females with an average age of 55 years. The preoperative radiographs and computed tomography (CT) images were used to analyze the fracture patterns and assess free fragments beyond the watershed line. Radiologic evaluation included fracture union, articular incongruence, radial height, volar tilt, radial inclination, and arthritic change. Range of motion (ROM), modified Mayo wrist score, Disabilities of the Arm, Shoulder and Hand (DASH) score, Visual Analogue

Scale (VAS) and grip power were analyzed as clinical evaluation at the last follow up.

Results The average follow-up period was 15.2 months and all fractures were fixed with juxta-articular plate. Last follow-up radiographs showed fracture union in all case, and articular incongruence with a mean step-off of 1.65 mm in 17 cases. The mean radial length was 9.55 mm, the mean volar tilt was 7.3° and the mean radial inclination was 24.8° . There was no arthritic change as a sequela. Clinical evaluation at the last follow-up showed the mean modified Mayo wrist score was 76.3, the mean DASH score was 15.38, the mean VAS was 1.2 and the mean grip strength was 37.2 lbs (64.7% of opposite). The average ROM was volar flexion 69.9° , dorsiflexion 74.1° , radial deviation 18.7° , and ulnar deviation 26.3° .

Conclusions The results in this study were acceptable and authors recommend considering open reduction and internal fixation for intraarticular comminuted distal radius fractures even though they have free fragment beyond watershed line before application of external fixation.

Keywords Comminuted distal radius fracture, AO C3, Free fragment, Volar locking plate

EPIDEMIOLOGY OF DISTAL RADIUS FIXATIONS AND TIME TO FRACTURE HEALING IN THE SUPER-ELDERLY PATIENTS

Heng Qi Hui Bernice, Lim Xue Yi Joel, Kang Yong Chiang, Chee Kin Ghee Tan Tock Seng Hospital.

Department of Orthopaedic Surgery, Hand and Microsurgery section

Objective The aim of this study is to demonstrate that surgical fixation in the super-elderly population is a relatively safe procedure with good outcome results.

Methodology A list of patients who fulfilled the age criteria and underwent surgical fixation was generated from our institution's Operating Theatre record system. Their medical records and radiological films were reviewed and fractures were classified according to the AO classification. The American Association of Anesthesiologists (ASA) physical status classification was used as a surrogate of the patients' pre-operative physical fitness. Any related complications related to the anaesthesia or surgery were recorded. Radiographic union was documented when callus was seen on X-ray.

Results 71 patients were included in our study aged between 80 to 97 years old. There was a female predominance and 91% of them were independent in Activities of Daily Living (ADL) and community ambulant. 96% were in the ASA 2 to 3 categories and a large majority (70%) underwent surgery with regional anaesthesia. There were no anaesthesia-related complications. The mean number of days for fracture healing was 47 days. Only 2 (0.3%) sustained complications at follow-up: 1 non-union and 1 post-operative superficial wound infection. There were no post-operative median nerve complications reported.

Conclusion Surgical fixation of distal radius fractures is a relatively safe procedure in the super-elderly, as majority go on to achieve fracture healing without significant morbidity.

PRONATION POWER AND BONE UNION OF VOLAR PLATE FIXATION IN DISTAL RADIUS FRACTURE. COMPARISON OF PRONATOR QUADRATUS SPARING TECHNIQUE AND CONVENTIONAL TECHNIQUE

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Purpose We compared the isokinetic power and bone union period between pronator quadratus sparing technique and conventional technique for volar plating of distal radius fracture

Methodology The subjects were the patients who had volar plate fixation for distal radial fracture in our institution from January 2014 to January 2016. Follow-up period was more than at least 6 months. Patients were divided into two groups;

WRIST IV: Distal Radius | 4:45 PM - 5:45 PM | NOV 9, 2017

group 1 were 22 patients with pronator quadratus sparing technique, and group 2 were 25 patients with conventional technique. Each group was divided into two groups according to presence of comminution. Each group was compared with pronation & supination peak torque and grip strength of both side after 6 months of surgery, and measured period of bone union. For statistical management and analysis, comparative analysis was done with independent T-test.

Results The average follow-up period was 13 ± 4.2 months and the average age was 68.3 years old in group 1 and 67.6 years old in group 2. There were 31 women and 16 men. There was no significant difference between the two groups regarding follow-up period, age and sex. Patients without comminution were significantly younger than those with comminution. Bone union period was 9.4 weeks in group 1 without comminution and 10.3 weeks in group 2 without comminution, and there was no significant difference between two groups. However, in patients with comminution, there was significant difference between group 1 which is 8.1 weeks of bone union period and group 2 which is 9.5 weeks. Pronation peak torque was 84.4% of non-affected side in group 1 without comminution, and 73.5% in group 2 without comminution, and there was significant difference between two groups. However, there was no significant difference in Group 1 (74.4%) and Group 2 (72.5%) with comminution. and there was no significant difference between two groups. Supination peak torque was 91.7% of non-affected side in Group 1, and 90.8% in Group 2, and there was no significant difference between two groups. Grip strength was 85.3% of non-affected side in Group 1 and 81.3% in Group 2, and there was no significant difference between two groups.

Conclusions : It is considered to be able to preserve pronation peak torque by PQ sparing technique in patients without comminution. Comminuted fracture tend to be older ages, and pronator quadratus might be weaken as growing older. So there was no significant difference in pronation torque between comminuted fracture and non-comminuted fracture. By PQ sparing technique in comminution fracture, Bone union period might shorter than conventional technique. But, fracture line of simple distal radius fracture was pretend to be more distal than pronator quadratus insertion site. So, bone union period in simple distal radius fracture with PQ sparing technique might not affected.

Keyword distal radial fracture, volar plate, pronation power

THE INCIDENCE AND ANATOMICAL FEATURE OF VOLAR MARGINAL RIM FRACTURE/FRAGMENT IN DISTAL RADIUS

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Objective we attempt to classify volar marginal rim fracture/fragment as subtype according to traditional eponyms and the AO classification. And we investigate the incidence and morphologic feature of it.

Methodology Ninety-seven cases of the distal radius fracture treated operatively were enrolled. We identified radiologically volar rim fragment (VR) locating within the volar articular surface and including the ulno-volar corner. we additionally classified small size of VR as volar marginal rim (VMR) the maximum depth of which was defined as half of sigmoid notch. All VR and VMR cases were applied to the AO classification and applied to Colles' type (dorsal displacement type including intra articular comminution) or Smith's type (volar displacement type including intra articular comminution). The incidence of VMR were calculated and evaluated statistically. The average sizes of fragment were investigated on plain radiograph and evaluated statistically.

Results and conclusions VMR was observed in 15 cases (15%) of all 97 cases. Among 8 cases of type B3, VMR was observed in 3 cases (38%). Among 71 cases of type C, VR was observed in 15 cases and VMR was observed 11 cases (16%). VMR was more complicated by type B3 than type C (χ^2 test, $p < 0.05$). Among 20 cases of Smith type fracture, VMR was observed 10 cases (50%). Among 59 cases of Colles type fracture, VMR was observed 4 cases (5.2%). VMR was more complicated by Smith type than Colles type (χ^2 test, $p < 0.05$). VMR has average 9.1mm of width, 7.1mm of height, and 7.9mm depth. VMR was smaller than VR in all

dimensions (unpaired t test, $p < 0.05$). VMR was mainly complicated by AO type B3 and Smith's type fracture but some cases of VMR were complicated by Colles' type also. VMR was typically small height and short width.

DEGENERATIVE CONDITIONS

4:45 PM - 5:45 PM | NOV 8, 2017

DYNAMIC SUSPENSION-SLING ARTHROPLASTY WITH EXTENSOR CARPI RADIALIS LONGUS TENDON FOR THE TREATMENT OF THUMB CARPO-METACARPAL ARTHROPATHY

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Objective There still remain some complications such as proximal migration, dorsal subluxation of the first metacarpal base, and hyperextension of the first carpometacarpal (CMC) joint, even though various techniques involving ligament reconstruction for thumb CMC arthropathy are reported. However, flexor carpi radialis (FCR) tendon is sometimes too thin to keep the suspension on the first metacarpophalangeal (MCP) joint. We used one-half of the extensor carpi radialis longus (ECRL) tendon instead of FCR tendon, and compared it with conventional reconstruction using FCR tendon.

Methodology The procedures have been performed on 12 thumb CMC arthroplasties. One-half of the ECRL tendon was passed and then wrapped around the intact FCR tendon several times for 6 cases (ECRL group). One-half of the FCR tendon was passed for 6 cases (FCR group). We compared between both procedures with the thumb to index finger metacarpal angle (M1M2) and the first MCP angle (P1M1) using radiographs. Grip strength, pinch strength, and DASH score were also evaluated until one year after surgery.

Results M1M2 and P1M1 one year after surgery had significant improvements compared to those before surgery in ECRL group while they had no significant difference in FCR group, although they achieved a peak at the 3 month after surgery in both groups. There were improvements on other parameters from 3 months to 1 year after surgery in both groups.

Conclusions Postoperative progression of hyperextension of the first CMC joint was significantly reduced on ECRL group. ECRL tendon is thicker than FCR tendon. In addition, the insertion of ECRL tendon is at the dorsal side of the second metacarpal and the tendon can go from dorsal side to volar side to stabilize the first metacarpal. The thumb CMC arthroplasty using one-half of ECRL tendon is one of the useful reconstructions.

THE EFFICIENCY OF TENOSYNOVECTOMY IN A1 PULLEY RELEASE IN PATIENTS WITH TRIGGER FINGER

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Objectives The aim of this study was to clarify efficiency of tenosynovectomy in A1 pulley release in patients with trigger finger.

Methodology A total of 30 subjects (Male 11, Female 19, mean age 66.2 ± 5.9 years) with trigger fingers were selected. The A1 pulley release with tenosynovectomy were performed in all 30 participants. Flexor digitorum superficialis (FDS) and flexor digitorum profundus (FDP) tendons were exposed and marked to evaluate the excursion after A1 pulley release were performed. The subjects were instructed to flex the distal interphalangeal joint (DIP) with fixed middle phalanx position, and difference between extent of excursion of FDS and that of FDP were measured. After

DEGENERATIVE CONDITIONS | 4:45 PM - 5:45 PM | NOV 9, 2017

tenosynovectomy, same procedures were performed to evaluate difference between extent of excursion. The degree of proximal interphalangeal joint (PIPJ) contracture and the severity of pain determined by visual analog scale (VAS) on active functioning were measured to determine clinical outcomes before and after surgery.

Results The mean differences of excursion of FDS and FDP tendon before surgery was mean 4.14 ± 1.45 and mean 6.05 ± 1.80 after A1 pulley release ($P < 0.001$). The extent of PIPJ contracture showed significant improvement ($P < 0.001$). The difference between VAS score also showed significant improvement before and after A1 pulley release ($P < 0.001$).

Conclusions Performing sufficient tenosynovectomy in A1 pulley release was crucial to resolving the proximal interphalangeal joint contracture, and it could also improve clinical manifestation. Thus, the sufficient tenosynovectomy would be helpful for successful surgical outcomes.

OUTCOMES OF TOTAL WRIST REPLACEMENT: OUR 10 YEARS EXPERIENCE

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Introduction Rheumatoid arthritis and psoriatic arthritis causes progressive destruction of wrist. Current trend is shifting from total wrist fusion to partial wrist arthrodesis and total wrist replacement worldwide. Total wrist replacement (TWR) is however, to our knowledge, not practiced nor reported before in Hong Kong and seldom reported in Asia Pacific region.

Material and Methods 8 wrists of female patients undergone TWR with mean age 57.4 (50 - 64) from 2004 to 2014 on have been recruited for retrospective study having 48.4 months mean follow up. 5 suffered from rheumatoid arthritis while 1 with psoriatic arthritis. Implants used were Bi-axial, Remotion and Universal system ($n = 2$). Prospective follow up and X-ray is arranged for all surviving patients. All patients were assessed for Wrist function and radiological outcome with wrist range of motion, grip power, performance score, DASH, PRWE pain, function score and X-ray.

Results Mean performance score and pain score grip power improved 18.3% and 26.7% while grip power improved 2 kg. Extension, ulna deviation, pronation and supination have shown improvement ranged from 1.33 to 10.17 degree. Mean post op DASH is 28.3% by end of follow up. Two patients died of non orthopaedic causes after TWR surgery.

Conclusion and Discussion TWR results in good improvement in wrist's performance, reduction on pain and low complication rate which is comparable with international experience. Lack of expertise and modifiable implants can be possible reasons for not adopting TWR internationally. TWR should be more widely practiced on rheumatoid arthritis patients.

THE LONG-TERM OUTCOME OF USING ULNAR HEAD PROSTHESIS IN THE TREATMENT OF FAILED SAUVE-KAPANDJI PROCEDURES

Margaret FOK; Diego FERNANDEZ

Purpose Symptomatic radio-ulnar convergence is the most disturbing complication following Sauve-Kapandji (SK) procedure. The use of ulnar head prosthesis (UHP) for the treatment of this condition has shown to be promising in the short term. This study aims to evaluate the long-term outcome of using UHP in symptomatic radio-ulnar convergence after SK procedure

Methods and Materials 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 operations prior to the use of UHP. All patients suffered from severe pain with difficulty in performing work and daily activities. Ceramic UHP was used for the procedure except 2 patients

Result The average follow-up was 6 years (range 4-17 years). The reduction of pain was statistically significant with 11 patients remained pain free. The range of motion of the wrist and power grip showed a statistically significant improvement post-operatively and were maintained at the late follow-up. The DASH score also improved from 77 to 41 with a $p < 0.05$. No signs of loosening of the prosthesis was noted at the late follow-up. The only 2 patients who had received cobalt chrome head developed significant osteolysis as well as pain and had to revised to the Sheker total DRUJ prosthesis. There were 2 patients who suffered from traumatic dorsal subluxation of the prosthesis were treated with radial osteotomy. Satisfactory outcome was noted.

Conclusion 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.

RANGE OF MOTION MEASUREMENT USING DYNAMIC RADIOGRAPH FOLLOWING TRAPEZIOMETACARPAL JOINT ARTHRODESIS

Yasunori Hattori, Brian Dormitorio, Kazuteru Doi

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Objective There were no detailed studies to evaluate the contribution of increased motion of scaphotrapezotrapezoidal (STT) joint and compensatory hypermobility of metacarpophalangeal (MP) joint following trapeziometacarpal (TM) joint arthrodesis. The standard measurement of range of motion of thumb abduction and adduction is by conventional goniometry, defined by the angle of the first (M1) and second (M2) metacarpals. However, accurate measurement of thumb motion is difficult even when using M1 and M2 as markers. Probably, the most precise method is with the use of radiograph to measure M1M2 angle.

Methodology We conducted a comparative study on thumb motion in 56 hands who underwent TM joint arthrodesis with that of 56 hands in normal subjects. Dynamic radiographs were used to measure radial abduction and adduction, and volar abduction and adduction based on the angles formed by M1 and M2. In addition, angles formed by the thumb proximal phalanx (P1) and M2 was measured to evaluate the hypermobility of the MP joint.

Results The average total arcs of M1M2 motion of normal subjects were 24 degrees for radial motion and 35 degrees for volar motion. That of the arthrodesis group averaged 9 degrees for radial motion and 8 degrees for volar motion. The average total arcs of P1M2 motion of normal subjects were 60 degrees for radial motion and 49 degrees for volar motion. That of the arthrodesis group averaged 41 degrees for radial motion and 32 degrees for volar motion. Arthrodesis group had larger compensatory motion of the MP joint only in volar adduction compared to normal subjects.

Conclusions These findings on the potential motion of STT joint and the amount of hypermobility of MP joint after TM joint arthrodesis are valuable information for optimal postoperative rehabilitation protocol. Emphasis must be placed in obtaining maximum potential motion of the STT joint.

COST COMPARISON OF COLLAGENASE CLOSTRIDIUM HISTOLYTICUM AND FASCIOTOMY FOR TREATMENT OF DUPUYTREN'S CONTRACTURE IN THE AUSTRALIAN HEALTH SYSTEM

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Objective Dupuytren's disease results in contracted cords in the hand that lead to deformity and disability. Current treatment options include fasciotomy and an injectable, collagenase clostridium histolyticum.

The study aims to provide a direct cost comparison between palmar fasciotomy and the use of collagenase clostridium histolyticum for the treatment of Dupuytren's disease, from the health provider's point of view (e.g. the public hospital). No cost

DEGENERATIVE CONDITIONS | 4:45 PM - 5:45 PM | NOV 9, 2017

comparison studies have been published within the Australian health care environment.

Methodology A retrospective review of all patients treated for Dupuytren's disease in a major teaching hospital was undertaken to compare the costs of treatment by fasciectomy or collagenase injection.

Results Eighteen patients underwent fasciectomy and 21 collagenase clostridium histolyticum injections were performed during the study period and were eligible for inclusion under the review criteria. Of the 39 patients, 36 were male and 3 were female with an average age 66.4 years (50-85). Twenty-five digits were treated by fasciectomy in 18 patients, and 23 digits were treated by collagenase in 21 patients. The fasciectomy group attended an average 9.2 visits (5-22), incurring an average costing of \$7452.12 per patient (\$4131-40 - \$12491.06). The collagenase group attended an average 3.8 visits (3-8), incurring an average costing of \$2697.19 per patient (\$2392.52-5103.34).

Conclusion Collagenase treatment of Dupuytren's contracture represents a significant reduction in cost relative to fasciectomy, with 64% savings, length of follow up and number of visits. This is a similar finding to studies in other countries.

Brachial Plexus & Peripheral Nerve Injury**4:45 PM - 5:45 PM | NOV 8, 2017****THREE WAYS OF CC7 TRANSFER FOR ADULT PATIENTS WITH TOTAL AVULSION BRACHIAL PLEXUS INJURIES.**

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Purpose Debates concerning the CC7 transfer include the choice of donor CC7 divisions, choice among the 3 ways of CC7 transfer (conventional, pre-vertebral, pre-tracheal), and the adequacy of vascularity (one-stage versus two-stage surgery, supercharge versus pedicle VUNG). More scientific evidences and prospective randomized studies are needed to clarify the real advantages / disadvantages of these CC7 methods for BPI reconstruction. We conducted a clinical study to evaluate the effects of CC7 transfer for total root avulsion brachial plexus injuries (BPI).

Methods Forty-five patients who received neurotization for BPI were enrolled in this prospective study. Group 1 (n=15) received conventional CC7 transfer for hand function, group 2 (n=15) received pre-tracheal CC7 for lower trunk, while group 3 (n=15) received pre-vertebral CC7 transfer for lower trunk. Additional neurotization included spinal accessory, phrenic, and intercostal nerve transfer for shoulder and elbow function. The results were evaluated with an average of 5 years follow-up.

Results Group 1 had similar donor site complications comparing with group 2 and 3 (13.3%); while group 2 and 3 had significantly better hand M3 and M4 motor function (80% in group 2, and 86.7% in group 3) than group 1 (60%) ($P < 0.05$). There was no difference in sensory recovery. Group 2 and 3 also were observed with significant shorter recovery time than group 1 ($P < 0.05$).

Conclusions Pre-tracheal and Pre-vertebral route CC7 transfer to lower trunk had better clinical outcomes than conventional CC7. However, technique demands were higher in group 2 and group 3 surgeries.

THE RELIABILITY OF COMPARISONS BETWEEN PARTIAL ULNAR NERVE AND INTERCOSTAL NERVE TRANSFER IN RESTORING ELBOW FLEXION FOLLOWING C56 AND C567 BRACHIAL PLEXUS INJURIES

Dawn Sinn Yii Chia, Kazuteru Doi, Yasunori Hattori, Sotetsu Sakamoto, Abdulhakim Ezzat Montasser Mabrouk Marei

Objective Recent literature has shown superiority of the Partial Ulnar Nerve (PUN) over the Intercostal Nerve (ICN) nerve transfer to Musculocutaneous nerve (MCN) transfer for restoration of elbow flexion. These articles however used non-quantitative measures of manual muscle testing, as well as inadequate statistical power and effect size. The substitution action through the Steindler effect was also not addressed. This study compares the clinical results of these two techniques using quantitative measurements to assess strength recovery, and to determine the significance level through strict statistical analysis.

Methods Eighteen PUNs and 13 ICNs with upper type C56 and C567 brachial plexus palsies were included into the study. The postoperative elbow flexion power strength recovery was measured using the KIN-COM dynamometer. Five cases underwent multichannel dynamic EMG examination with video analysis to detect simultaneous forearm muscle contraction (Steindler effect). Statistical analysis was performed under adequate power and effect size to determine the statistical significance of the results.

Results The range of elbow flexion achieved by both procedures was similar. There was no statistically significant difference in concentric contraction between the two procedures (PUN 0.4 ± 3.6 Nm compared with ICN 7.2 ± 2.4 Nm). However, the eccentric contraction strength in PUNs was 14.9 ± 6.3 Nm, which was significantly stronger than 9.3 ± 3.4 Nm achieved by ICN transfers ($p < 0.05$) with a study power of 0.899 and effect size of 1.1. Moreover, eccentric contraction PUNs in C56 was stronger than those of C567. Multichannel dynamic EMG showed greater contribution of forearm extensors for elbow flexion in PUNs compared to ICNs, and patients with PUN transfer could not flex the elbow without forearm muscle contraction, although patients with ICN could flex without them.

Conclusion Eccentric muscle contraction involves both biceps and forearm muscles for maximal elbow flexion strength. The power of substitution action might have confounded the previous results.

SALVAGE PROCEDURE FOR HAND FUNCTIONAL RECOVERY AFTER FAILED CC7 TRANSFER

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Introduction To evaluate the clinical effectiveness of combined contra-lateral C7 transfer and free functioning muscle transfer for upper limb function in Brachial plexus injury (BPI) reconstruction.

Methods We analyzed the surgical treated BPI patients from 2001 to 2010. Forty patients (30 male, 10 female), average age 38.5 years old with total arm type BPI received contra-lateral C7 nerves neurotization on median nerve for total arm type BPI (as the 1st stage surgery). As a secondary stage surgery, a gracilis FFMT was transferred to the lesion hand in an average 1.5 years after the 1st stage C7 transfer. The previous transferred C7 was serving as neurotizer of this FFMT. The average follow up was 8.5 years. (5 to 15 years).

Results We had 32 patients (32/40, 80%) achieved at least M3 hand and finger flexion. 28 patients (28/40, 70%) with M4 hand and finger flexion. Elbow flexion M4: (34/40, 85%); Sensory recovery: (32/40, 80%). The time needed for the return of a muscle power M3-M4 in the FFMT ranged from 8 to 14 months (average 12.5 months), and recovery of sensory function from 7 to 18 months (average 11 months). No donor site morbidity except 3 patients with transient radial nerve palsy for 3 and 5 months, but spontaneous recovery was observed.

Discussion & Conclusion Based on our preliminary results, contra-lateral C7 as donor nerve, associated with FFMT (gracilis) is effective for motor recovery after BPI, and are also effective for the sensory reconstruction of BPI. Additional procedures such as neurotization on MCN / MN are beneficial. This 2-stage surgery is the changing concept for contra-lateral C7 transfer.

Brachial Plexus & Peripheral Nerve Injury | 8:30 AM - 9:45 AM | NOV 10, 2017

FUNCTIONAL RESULT COMPARISON OF NERVE TRANSFER AND FREE FUNCTIONING MUSCLE TRANSFER IN RECONSTRUCTING ELBOW FLEXION IN ADULT BRACHIAL PLEXUS INJURIES

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Objective The objective of this research are: (1) to determine demographic data of Nerve transfer and Free functioning muscle transfer in adult Brachial Plexus Injury (BPI), (2) to compare the motoric power of the elbow flexion between Nerve transfer and Free functioning muscle transfer in adult BPI, (3) to compare the range of motion of the elbow flexion between Nerve transfer and Free functioning muscle transfer in adult BPI.

Methodology Retrospective chart review was performed at minimum one year of follow up of 90 patients suffering adult BPI in one specialist hand surgeon. 49 patients underwent double fascicular nerve transfer, and 41 patients underwent free functioning muscle transfer (FFMT). Motoric recovery of elbow flexion were examined with BMRC. Active elbow flexion range of motion were examined by using goniometer.

Result Mean range of motion of elbow flexion in double fascicular nerve transfer group and FFMT group were 109.02° and 96.53° respectively, but statistically not significant ($p=0.106$). The mean motoric power of elbow flexion in double fascicular nerve transfer group and FFMT group were 3.36 and 3.08 respectively, but statistically not significant ($p=0.151$).

Conclusion There is no significant difference in mean range of motion and motoric power of elbow flexion in double fascicular nerve transfer group and FFMT group.

Keywords adult BPI, double fascicular nerve transfer, FFMT, elbow flexion

TO EVALUATE TREATMENT UPPER BRACHIAL PLEXUS INJURY WITH COMBINED NERVE TRANSFERS

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Purpose To report the results of combined nerve transfer for restoration of elbow flexion, shoulder abduction and external rotation in upper brachial plexus injury. To evaluate clinical donor nerve deficits.

Materials and Methods 65 patients (63 males, 2 females), mean age 30.3, were injured upper brachial plexus. The mean delay times operative: 4.5 months. They had been treated with double nerve transfers for restoration of elbow flexion and transfers of spinal accessory nerve to the suprascapular nerve, combined with transfer of the nerve of the long head of triceps to the anterior branch of the axillary nerve for restoration of shoulder abduction and external rotation from Jan 2012 to June 2016. All patients were observed mean 33.7 months (12 to 60 months).

Results The mean of recovery elbow flexion was 7.3 kg: 20/65 patients were very good results, scored M5 (could lift ranged 10- 15 kg); 44/65 patients were good results, scored M4 (could lift ranged 1- 9.5 kg); 1/65 patient was poor result, scored M2. The mean of recovery shoulder abduction was 120°: 44/65 patients obtained very good and good results; 12/65 patients were fair results; 9/65 patients were poor. The mean of recovery shoulder external rotation was 110°: 55/65 patients obtained very good and good results; 5/65 patients were fair results; 5/65 patients were poor. No clinical donor nerve deficits were observed.

Conclusions Combined nerve transfers for upper brachial plexus injuries were obtained good results. No clinical donor nerve deficits were observed.

Key words: Nerve transfer, upper brachial plexus injury.

THE LONG-TERM OUTCOME OF USING ULNAR HEAD PROSTHESIS IN THE TREATMENT OF FAILED SAUVE-KAPANDJI PROCEDURES

Margaret FOK; Diego FERNANDEZ

Purpose Symptomatic radio-ulnar convergence is the most disturbing complication following Sauve-Kapandji (SK) procedure. The use of ulnar head prosthesis (UHP) for the treatment of this condition has shown to be promising in the short term. This study aims to evaluate the long-term outcome of using UHP in symptomatic radio-ulnar convergence after SK procedure

Methods and Materials 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 operations prior to the use of UHP. All patients suffered from severe pain with difficulty in performing work and daily activities. Ceramic UHP was used for the procedure except 2 patients

Result The average follow-up was 6 years (range 4-17 years). The reduction of pain was statistically significant with 11 patients remained pain free. The range of motion of the wrist and power grip showed a statistically significant improvement post-operatively and were maintained at the late follow-up. The DASH score also improved from 77 to 41 with a $p < 0.05$. No signs of loosening of the prosthesis was noted at the late follow-up. The only 2 patients who had received cobalt chrome head developed significant osteolysis as well as pain and had to revised to the Sheker total DRUJ prosthesis. There were 2 patients who suffered from traumatic dorsal subluxation of the prosthesis were treated with radial osteotomy. Satisfactory outcome was noted.

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RANGE OF MOTION MEASUREMENT USING DYNAMIC RADIOGRAPH FOLLOWING TRAPEZIOMETACARPAL JOINT ARTHRODESIS

Yasunori Hattori, Brian Dormitorio, Kazuteru Doi

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Objective There were no detailed studies to evaluate the contribution of increased motion of scaphotrapezotrapezoidal (STT) joint and compensatory hypermobility of metacarpophalangeal (MP) joint following trapeziometacarpal (TM) joint arthrodesis. The standard measurement of range of motion of thumb abduction and adduction is by conventional goniometry, defined by the angle of the first (M1) and second (M2) metacarpals. However, accurate measurement of thumb motion is difficult even when using M1 and M2 as markers. Probably, the most precise method is with the use of radiograph to measure M1M2 angle.

Methodology We conducted a comparative study on thumb motion in 56 hands who underwent TM joint arthrodesis with that of 56 hands in normal subjects. Dynamic radiographs were used to measure radial abduction and adduction, and volar abduction and adduction based on the angles formed by M1 and M2. In addition, angles formed by the thumb proximal phalanx (P1) and M2 was measured to evaluate the hypermobility of the MP joint.

Results The average total arcs of M1M2 motion of normal subjects were 24 degrees for radial motion and 35 degrees for volar motion. That of the arthrodesis group averaged 9 degrees for radial motion and 8 degrees for volar motion. The average total arcs of P1M2 motion of normal subjects were 60 degrees for radial motion and 49 degrees for volar motion. That of the arthrodesis group averaged 41 degrees for radial motion and 32 degrees for volar motion. Arthrodesis group had larger compensatory motion of the MP joint only in volar adduction compared to normal subjects.

Conclusions These findings on the potential motion of STT joint and the amount of hypermobility of MP joint after TM joint arthrodesis are valuable information for optimal postoperative rehabilitation protocol. Emphasis must be placed in obtaining maximum potential motion of the STT joint.

Brachial Plexus & Peripheral Nerve Injury | 8:30 AM - 9:45 AM | NOV 10, 2017

INTERCOSTAL NERVE TRANSFER TO TRICEPS AND DELTOID MUSCLES VERSUS INTERCOSTAL NERVE TRANSFER TO TRICEPS AND SERRATUS ANTERIOR MUSCLES FOR TREATING C5-C7 BRACHIAL PLEXUS INJURY : A COMPARATIVE STUDY

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Objective This study aims to compare two surgical techniques for treating patient with C5-C7 brachial plexus injury. First, simultaneous intercostal nerves transfer to long head triceps and deltoid muscles using posterior approach. Second, simultaneous intercostal nerves transfer to long head triceps and serratus anterior muscles using anterior approach.

Methodology We conducted retrospective comparative study by reviewing the records of patient with C5-C7 brachial plexus injury in our institute. From January 2004 - December 2007, we performed simultaneous intercostal nerve transfer to long head triceps and deltoid muscles. From November 2012 - September 2014, we performed simultaneous intercostal nerve transfer to long head triceps and serratus anterior muscles. The concurrent procedure in all cases were Oberlin's nerve transfer and spinal accessory nerve transfer to suprascapular nerve. All cases were followed up for more than 24 months postoperatively. We reviewed the range of motion and motor power of shoulder abduction and elbow extension.

Results Nine patients were treated with simultaneous ICN transfer to long head triceps and deltoid muscles and nine patients were treated with simultaneous ICN transfer to long head triceps and serratus anterior muscles. In the first group, 8/9 patients (89%) achieved shoulder abduction grade 3 or more and 3/9 patients (33%) achieved elbow extension grade 3 or more. In the second group, 7/9 patients (72%) achieved shoulder abduction grade 3 or more and 5/9 patients (55%) achieved elbow extension grade 3 or more. For range of motion, mean shoulder abduction were 69 degrees and 71 degrees respectively.

Conclusions Both techniques are reliable for restoration of shoulder abduction in patient with C5- C7 brachial plexus injury. Range of motion and motor power are comparable. But for elbow extension, simultaneous ICN transfer to long head triceps and serratus anterior muscles seem to result in better outcome.

RADIAL TO BRACHIORADIALIS NERVE TRANSFER, DOES IT IMPROVE ELBOW FUNCTION IN UPPER BRACHIAL PLEXUS INJURIES?

[Kamrani Reza Sh](#)

Introduction Oberlin procedure improved dramatically the results of upper brachial plexus injuries (UBPI) with root avulsion. Modification of this procedure by adding nerve transfer for brachialis further improved the results. The third component of the elbow flexion means brachioradialis has been overlooked yet. We evaluated the results of our patients with C5-C6 root avulsion who underwent a fascicle of median nerve to biceps, one fascicle of ulnar nerve to brachialis, and compare between patients who underwent transfer of one fascicle of radial nerve to brachioradialis and those without this transfer.

Material and Method We reviewed our patients with C5-C6 root avulsion who underwent modified Oberlin procedure between January 2005 and December 2005. From 42 patients 7 cases had an additional procedure with transferring a fascicle of radial nerve to brachioradialis nerve. We reviewed of the anatomical finding in the operating note, and compare the results of these patients with the patients without this additional transfer with respect to force of elbow flexion, and the speed of elbow flexion. At the final follow up the additional transferred group underwent electromyographical examination to be assessed for reinnervation of the brachioradialis muscle.

Results In two patients with radial to brachioradialis transfer we failed to anastomosis of this transfer because of thinness of the recipient nerve which was branched

before exiting of the radial nerve. In the other 5 cases the mean force of the elbow flexion was 5 kg which was more than the other group with 3.8 kg but the differences was not statistically significant. The mean speed of the elbow flexion was 16 seconds for ten full range of motion of the elbow in additionally transferred group and 21 seconds in the other group. In all of these 5 patients electromyography patients showed reinnervation of brachioradialis.

Conclusion Radial to brachialis transfer can help to improve the results of the classic modified Oberlin procedure in C5-C6 avulsion for elbow flexion, but this improvement is not significant. This transfer is theoretically helpful in the cases with C5-C6 avulsion that neuromuscular junction of biceps and brachialis has been injured due to the primary trauma.

WRIST III: Carpal Bone / Tumor

8:30 AM - 9:45 AM | NOV 10, 2017

NON-VASCULARISED ILIAC BONE GRAFTING FOR SCAPHOID NONUNION WITH AVASCULAR NECROSIS

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Objective To present the surgical outcomes of non-vascularised bone grafting in patients with scaphoid nonunion and AVN.

Methodology The 24 consecutive patients with established scaphoid nonunion and proximal fragment AVN were treated with non-vascularised iliac bone grafting. The Fisk-Fernandez technique was used in 11 patients, and cancellous bone grafting in 13 patients..

Results Bony union was achieved in 12 of 13 (92%) patients who had undergone surgery with a non-vascularised cancellous bone graft and in 10 of 11 (91%) patients who underwent surgical management using the Fisk-Fernandez technique.

Conclusions Non-vascularised iliac bone grafts provided excellent union rates and good clinical outcomes in patients with scaphoid nonunion combined with AVN of the proximal fragment.

SCAPHOID ROLE OF 1,2 INTER-COMPARTMENTAL SUPRA-RETINACULAR ARTERY (1,2 ICSRA) VASCULARIZED BONE GRAFTING IN SCAPHOID NON-UNION AND ITS CORRELATION WITH ARTERIAL DUPLEX SCAN

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Role of 1,2 Inter-Compartmental Supra-Retinacular artery (1,2 ICSRA) vascularized bone grafting in scaphoid non-union and its correlation with Arterial Duplex scan
Objectives: Vascularized bone grafts based on 1,2 Inter-compartmental Supra-retinacular Artery (ICRSA) has solved the short falls of non -vascular bone graft techniques and remained one of the main stay of treatment for stable and unstable scaphoid non unions. There is always a literature paucity about confirmed vascularity and the patterns shown by vascularized bone graft at the scaphoid nonunion site. Arterial duplex scan is a non-invasive method of assessing the vascularity, presence of vessels and the vascularity of the callus tissues can be very valuable for gauging the status of the healing process.

Methods 20 patients with scaphoid non-union were admitted and operated between April 2012 and March 2015. The radiographs, CT scan, MRI findings and the post-operative radiographs, CT scan, arterial duplex scans and functional outcomes

WRIST III: Carpal Bone / Tumor | 8:30 AM - 9:45 AM | NOV 10, 2017

were assessed. An attempt was made to correlate the findings between the diagnostic tools of CT scan in establishing the union across the scaphoid nonunion site and Arterial duplex scans in establishing the vascularity pattern of the vascularized bone graft and presence of vessels helping towards the union of the scaphoid which is known for its precarious blood supply and subsequent complications. Results: The average follow up in our study was 2.3years (range 1.9 to 2.8 yrs.). All patients were operated under brachial block. Serial monthly radiographs were taken and recorded. Post-operative CT scan oral presentation 2016-11-26 05:10:22 Jerome Terrence Jose A-0210 in all patients showed bridging trabeculae and good union. Arterial Duplex Scan confirmed the triphasic flow and vascularity pattern across the vascularized bone graft incorporated into the non-union site, presence of vessels and neovascularization, thus making its role very eminent.

Conclusion 1,2 ICSRA vascularized bone grafting has completely changed the treatment modalities of scaphoid non-union further by achieving good bony union, symptom free and excellent functional outcomes. Arterial duplex scan of dorsal wrist is a significant non-invasive tool of investigation in confirming the vascularized bone graft incorporation into the non-union site.

Level of Evidence: IV Key words : scaphoid; nonunion; vascularized; bone grafting; 1,2 ICSRA graft; union; arterial duplex scans oral presentation 2016-11-26 05:10:22

ARTHROSCOPIC WAFER PROCEDURE FOR ULNOLUNATE IMPACTION SYNDROME POST DISTAL RADIUS FRACTURES

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Objective Ulna-carpal abutment is commonly the result of distal radius fracture malunion, or collapse of a fractured radial head. The wafer procedure is designed to decrease force transmitted through the distal ulna. The purpose of this study was to measure the effects of the arthroscopic wafer procedure on distal ulnar loading with varying degrees of ulnar positivity at the wrist.

Materials and Methods From August 1998 to April 2010, we treated 35 patients of ulno-carpal impaction with old fracture of distal radius. All patients had symptoms and received arthroscopic wafer procedure. The sample included 19 women and 16 men with mean age of 44.5 years (range, 40 to 54 years). All patients had static or dynamic ulnar positive variance (mean 2.6mm, range 2-4mm).

Results All patients underwent regular clinical follow-up at a mean of 35 months (range, 24 to 57 months). Pain scores improved in 31 (89%) patients after operation. All patients were satisfied with the results and improved the daily activities.

Conclusions The arthroscopic wafer procedure is very helpful and effective for ulno-carpal impaction with old distal radius fractures.

PREVALENCE OF TFCC INJURY ON MRI SCANS OF SYMPTOMATIC WRISTS AND THEIR OUTCOME

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Purpose Triangular fibrocartilaginous complex (TFCC) tears are common sources of ulnar-sided wrist pain and resultant functional disability. Magnetic resonance imaging (MRI) of the wrist is increasingly used for its diagnosis. As clinical examination has high specificity for detecting TFCC injuries, the diagnosis of a TFCC should not require an MRI. Our study aims to establish the prevalence of TFCC injury on MRI scans of symptomatic wrist pain and their outcome, which would lead to better utilisation of MRI in treatment of TFCC injuries.

Methods A retrospective review of 101 consecutive wrist MRIs from Jan 2015 to Dec 2016 were conducted. Evaluation of TFCC is defined as full thickness or partial thickness tears as reviewed by a musculoskeletal radiologist using standardized protocols. Patients diagnosed with TFCC injuries on MRIs were followed up for 1 year.

Results Out of 101 wrist MRIs, 63 MRIs were performed for clinically suspected TFCC injury. We diagnosed a TFCC injury in 18 wrists. The results of clinical treatment and outcomes will be discussed.

Conclusion This study shows that the routine use of MRI scans for managing ulnar sided wrist pain is not a cost effective means of screening for TFCC tears and a thorough clinical examination and expectant management can be used safely in the majority of cases.

THE MANAGEMENT AND SURGICAL INTERVENTION TIMING OF ENCHONDROMAS: A 10-YEAR EXPERIENCE

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Objective To investigate the impact of pathological fractures on the treatment outcomes in patients with fractures due to enchondromas and evaluate the optimal surgical intervention timing for these patients.

Patients and Methods Medical records and X-rays of patients treated for enchondroma of hand between 2005 to 2015 were retrospectively reviewed. Enchondroma located in phalanges and metacarpal bones were included in the study. There were 92 patients with solitary enchondromas of the hand, including 52 males (56.5%) and 40 females (43.5%) in this series, aged from 2 to 69 years (mean, 29.4 years). Based on the clinical data, patients with pathologic fractures were assigned into the group with fractures (n=27) and those without fractures, who were diagnosed by accident or routine physical examinations were assigned into the group without fractures (n=65). All the patients were treated with operation. According to the timing of surgical intervention, the patients in the group with fractures were divided into two subgroups: primary (<=4w, mean 16d) and delayed surgery (>4w, mean 87d) groups. The operative methods were simple curettage or combined with bone grafting with autologous or bioactive materials. The DASH upper limb function scale was used to evaluate the function of the affected hand. The time of returning to work, complications as well as the recurrence rate and in-hospital costs were recorded.

Results No significant differences in terms of consolidation time after surgery, recurrence rate and DASH scores were noted between the groups with and without fractures (all p>0.05); the in-hospital costs were higher in the group with fractures than those in the group without fractures (p<0.05); however, patients without fractures returned to work much earlier than those with fractures (p<0.01). Of the patients with fractures, there were no significant differences in terms of consolidation time after surgery, recurrence rate, DASH scores as well as the occurrence rate of complications between the primary surgery group and the delayed surgery group (all p>0.05); however, the time returning to work was statistically longer in the delayed surgery group, with an average 76 days than that of the primary surgery group, with an average 36 days (P <0.01). Of all the patients, different surgical options of curettage only or combined with different filling materials had no effects on the follow-up outcomes (all p>0.05). Healing was noted to be progressive and complete in all cases and no functional restriction was observed.

Conclusion The pathological fractures associated with enchondromas have no significant impact on the treatment outcomes compared to those with simple non-fractured enchondromas. Although a little bit more expense was needed for patients treated primarily with pathological fractures due to enchondroma, these patients could resume to their original work much earlier than those treated by a delayed surgery. Early surgical intervention is recommended with similar results and no increased risks for patients with pathological fractures caused by enchondromas.

WRIST III: Carpal Bone / Tumor | 8:30 AM - 9:45 AM | NOV 10, 2017**SCHWANNOMA IN THE UPPER EXTREMITY: CLINICAL FEATURES AND MICROSCOPIC INTRA-CAPSULAR ENUCLEATION**

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Background Schwannoma is the most common neoplasm of the peripheral nerve. Enucleation is a standard surgical procedure, but this sometimes results in iatrogenic nerve injury even with atraumatic procedures. In this review, we present the clinical characteristics of schwannoma arising in the extremities and discuss clinical outcomes for the techniques of extra- and intra-capsular enucleation.

Objective We reviewed 35 schwannomas treated in our institute. Schwannomas arising from the minor nerve (n=5) or intramuscularly (n=4) were all operated using the extra-capsular technique. Of the 26 major nerve schwannomas, 21 were treated using the intra-capsular technique and 5 using the extra-capsular technique.

Results Neurological deficit following enucleation was significantly lower using the intra-capsular compared to the extra-capsular technique. Patient age, duration of symptoms, maximum tumor diameter and site of occurrence were not associated with subsequent neurological deficit. With both techniques, no tumor recurrence was observed at the final follow-up.

Conclusion These results support the use of intra-capsular micro-enucleation as a safe and reliable treatment for every type of schwannoma. To minimize the risk of nerve injury, en bloc resection should not be used because the main purpose of schwannoma surgery is the relief of symptoms, not tumor resection.

TROUBLESOME LIPOMA REVISITED

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Objectives Lipoma is most common soft tissue tumor, and is generally regarded as harmless tumor occurring anywhere in the body. Most of them arise superficially, and deep lipomas are far rare. Although lipoma seldom affects peripheral nerve function, lipoma arising in the upper extremity may cause disturbances, which were called as "troublesome lipoma" by White & Hanna. We have experienced four similar cases of lipoma around the elbow, and here we reported the cases with thorough literature review.

Patients and Methods All four patients were middle-aged females, and their age ranged from 58 to 68 years. All tumors located lateral side of the elbow, and three were deep-seated, and one was superficial. All tumors were pathologically confirmed as benign lipoma after surgical resection. Postoperative follow-up period ranged from one to 12 months.

Results Two patients did not complain any symptom except for soft tissue mass. In the remaining two patients, one complained of inability to extend her left ring and little fingers, and the other noticed some discomfort. The patient with posterior interosseous nerve palsy, complete recovery was obtained 6 months after surgery. In two patients with deep lipomas with or without symptoms, superficial branch of radial nerve run over the tumor, and attached the capsule. Meticulous dissection was undertaken during surgery. In the fourth case with superficial lipoma, lateral antebrachial cutaneous nerve run over the tumor, and tingling sensation remained in spite of careful dissection of the nerve.

Conclusion During resection of lipoma in the upper extremity, peripheral nerves sometimes exist besides the tumor. There have been reported approximately 30 cases of posterior interosseous nerve palsy due to lipoma arising around the radial neck. It is important to carefully evaluate patients with lipoma in the elbow region, and atraumatic dissection is required to avoid postoperative nerve complication.

PREVALENCE OF HAND AND WRIST TUMORS AND TUMOR- LIKE LESIONS SEEN AT EAST AVENUE MEDICAL CENTER: A 10-YEAR DESCRIPTIVE STUDY

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A vast array of tumors may occur in the hand. These tumors may be of soft-tissue or bony origin. **OBJECTIVES:** The general objective of the study is to describe the types of hand and wrist tumors seen at East Avenue Medical Center from 2007 to 2017. The specific objectives is to identify the number of patients who have a particular type of hand and wrist tumor and to identify the common types of hand and wrist tumors seen at this institution.

Methodology This is a Descriptive Study design. Chart and Histopathologic review of all patients with hand and wrist tumors seen from 2007 to 2017 were done. Descriptive statistics were used for this study.

Results A total of 97 patients were included in the study. Forty seven patients were female and 50 were male. Based on the population, the highest number of cases are those of Giant cell tumor of the tendon sheath (16 cases) followed benign fibrous histiocytoma (7 cases), capillary hemangioma and tendon cyst (5 cases each). Of the 97 cases, 85 % are benign, 7% are malignant and 8% are infections. Almost 50% of the masses are found on the fingers, 30% occur on the palm and 42% occur on the wrist.

Conclusion Despite the complex and unique anatomy of the hand and wrist, the standard principles of orthopedic oncology can be applied to both diagnosis and treatment of hand and wrist tumors. A careful history and physical exam performed by a hand surgeon can narrow down the possibilities as to the type of tumor a patient has. Recommendations for treatment are based on the type and extent of the tumor and the experience of the hand surgeon.

ANESTHESIA

2 CASES OF PLATING OF A NIGHTSTICK FRACTURE UNDER LOCAL ANAESTHESIA AND PERIOSTEAL NERVE BLOCK

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We present 2 case reports of plating of a nightstick fracture under local anaesthesia and periosteal nerve block. A 46-year-old and a 20-year-old male presented to us with a Nightstick fracture (displaced distal 3rd ulna fracture). Due to financial constraints, both refused admission and general anaesthesia. An option of doing the ulna plating under a combination of WALANT (wide awake, local anaesthesia, no tourniquet) and periosteal nerve block as a day care procedure was offered and both agreed. Anaesthesia of the operative site were achieved by local infiltration of the underlying skin and periosteal nerves using lignocaine and adrenaline. The addition of adrenaline ensured haemostasis thus negating the use of a tourniquet. This method was done without sedation and obviated the need for general anaesthesia. There were no difficulty in reducing or fixing the fracture and the most important thing was both patients did not complain of any pain during the operation. **Key words:** WALANT, periosteal block, ulna plating, local anaesthesia, lignocaine, adrenaline, daycare.

WIDE-AWAKE APPROACH FOR HAND SURGERY : ANESTHETIC TREND SHIFTING ON HAND SURGERY

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Background: There are many surgery with short operation time on hand and wrist surgical field. So many hand surgeons have applied local anesthesia to limited hand surgery with tourniquet. But recently many hand surgeons take advantage of vasoconstrictive effect of the epinephrine and apply it to hand surgery without consideration of operation time and tourniquet. Wide-awake approach on hand surgery has significant merits in a pre-operative preparation and an intra-operative field. Also it has cost-efficiency. So we think wide-awake approach would be anesthetic trend shifting on hand and wrist surgery field.

Methods: In this retrospective comparative study, We enrolled 62 patient who underwent hand and wrist surgery (Tendon transfer, Tendon repair on finger, Multiple tendon rupture on wrist) between march of 2013 and march of 2015. We compared 2 groups with pre-operatively, intra-operatively and post-operatively field.

Result: At a mean follow-up of 12months, the result is no significant statistically differences on Both group. Blood loss is no significant statistically differences on Both group. Total operation time is significant statistically differences Between Both group. Wide-awake group has merits on economic benefits and waiting time as well.

Conclusion: The wide-awake approach has allowed the surgeon to know how much tendon tension on tendon repair site and tendon transfer site. Need not to wait NPO time and not to use tourniquet. Anesthetic time can be longer with bupivacaine if we need long surgical procedure time. The wide-awake approach makes surgeon do tendon surgery much easier and more reliable. And this would change the method of anesthesia on hand and wrist surgery.

EFFECTS OF HANDHOLDING IN PATIENTS FOR HAND SURGERY UNDER REGIONAL/LOCAL ANAESTHESIA

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Hand holding is usually not routine for patients undergoing hand surgery but it is frequently used for patients in pain.

This prospective study aimed to evaluate the effect of handholding on anxiety and satisfaction in patients for hand surgery under local/regional anaesthesia.

The following data points were collected: - pulse rate, oxygen saturation, blood pressure, anxiety level and a survey on whether hand holding was helpful. These variables were collected before, during and at the end of surgery. The hand-holder will sit with the patient on the opposite side of the operated hand and would grasp the patient's hands. Anxiety levels was noted before and during surgery using visual analogue score (VAS) from 1 to 10 (consisting of a 10mm horizontal line with the descriptors "calm, relaxed, confident" at the left end, nervous, worried in the middle and "scared" at the right end). Patients were asked to indicate about anxiety by pointing to a place on the line.

Satisfaction of the hand handling process was measured using a questionnaire on the usefulness of the process in reducing anxiety and their recommendation of hand holding to other patient for hand surgery under regional/ local anaesthesia.

The preliminary data of this study shows that hand holding is a useful tool and reduces anxiety and most participants would recommend this process to others undergoing a hand surgery procedures.

SCOPE OF HAND SURGERY USING LOCAL ANAESTHESIA IN A TERTIARY HOSPITAL IN SINGAPORE

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Objective: There is a growing trend for hand and wrist surgery to be carried out under local/regional anaesthesia. This has shown to increase productivity and efficient utilization of day surgery resources. This article describes our experience of this type of surgeon administered local/regional anesthesia (SALoRA) without sedation to deliver acute and elective hand surgery anesthesia in a busy tertiary public hospital in Singapore.

Methodology: Retrospective analysis was conducted on all surgeries performed under SALoRA from 2013 to 2016 at Khoo Teck Puat Hospital in Singapore. The records were reviewed to analyze the demographics of the patients, case profile of cases performed and their outcomes.

Results: A total of 2021 patients (1290 men, age 45 ± 16) were available for analysis for the study period. Most of the cases were done as day care in the day surgery suite. The case distribution was similar for most other published day hand surgery. Tourniquet was utilized in 1360 (63%) of cases with an average operation time of 26 ± 18 minutes. Detailed analysis will be presented.

Conclusions: A wide spectrum of elective and acute hand surgery of the hand, wrist and elbow can be performed using SALoRA safely even with the use of tourniquet. This has increased productivity, cost reduction and improve efficiency and utilization of resources in a busy tertiary hospital.

ANESTHESIA

QUALITATIVE ANALYSIS OF PERCEPTION OF THE REGIONAL ANAESTHESIA IN HAND SURGERY

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Background: As with improvements in the knowledge, resources and expertise in RA, more and more hand surgeries are now preferred to be done under RA.

Method: We conducted this prospective patient and surgeons reported experience of regional anaesthesia in hand surgery. The survey questionnaire for the experience was adapted from Evans LR et al. We collected responses over 8 months (July 2016-Feb 2017), from 100 hand surgery patients, willing to receive regional anaesthesia. The patients were verbally consented for their willingness to participate in this experience survey that were to be done in postoperative phase.

Results: 73% of the RA blocks were done by anaesthetist using US guidance, rest 27% were done by surgeons as landmark technique.

Patients' experience: 98% patients agreed that they felt assured and were able to ask questions before operation and 100% patients agreed to have received information about what is going to happen. 9% patients were bothered by feeling of anxiety/hunger/thirst. 15% patients felt unbearable pain and 75% felt tolerable pain during RA injections, 10 declined remembering any injection pain 6% patient felt significant pain during surgery needing further infiltration of LA and sedation and only 1% needed conversion to GA. 75% patient would strongly prefer to have same block, 20% would agree for RA and 3% would prefer GA next time if they have same surgery. 2% were indecisive. Post operatively 99% strongly agreed that nurses were helpful and attentive in PACU. 93% felt no nausea/hunger/thirst.

Surgeons and OT staff's experience: 80 % times surgeons were very satisfied, 19% acceptable to type of block given to patients, only 1%, where GA was given 95% operating room nurses feel RA reduces turnover time 90% PACU nurses strongly agree that patients with RA meet discharge criteria before the ones with GA. 92% anaesthetic nurses feel that getting ready for RA is not a hassle.

Conclusion: The use of regional/ local anaesthesia in hand surgery provides:
• Good outcome in terms of satisfaction with the quality of the perioperative care for both surgeons and patients.
• More efficient and effective use of the OT This quality improvement programme may be adopted for the delivery of hand surgery in Singapore.

ARTHROSCOPY

ARTHROSCOPIC-ASSISTED TREATMENT FOR ATHLETES WITH DISTAL RADIUS FRACTURES

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Objectives: This presentation used percutaneous or open plating techniques augmented by simultaneous wrist arthroscopy to visualize the articular fractures and thus confirm the fracture alignment post reduction, also assesses the concurrent associated ligament injuries.

Methods: Arthroscopy was used to help to reduce distal radius fractures and assess soft tissue injuries in 31 athletes (29 male and 2 female); including 11 baseball players, six basketball players, two gymnasts, seven tennis players, 2 rugby players and 3 football players. The average age of the patients was 28.2 years (range, 19-40). The fractures were treated by reduction under arthroscopic control and percutaneous or open fixation with implants. In our series, soft tissue injuries in

wrist fracture of are common. The soft tissue lesions also treated at same operation including debridement, suture repairing or Kirschner wires tranfixation.

Results: Night (29.0%) of the patients had scapholunate ligament injuries. Eight (23.7%) of the patients suffered lunotriquetral ligament injuries, and received ligament debridement or Kirschner wires fixation of the joint and splinting. A further 10 (33.8%) of the patients exhibited chondral fractures. Additionally, the triangular fibrocartilage complex was torn in 13 (39.0%) of the patients. Finally, 9 (28.8%) of the patients suffered volar carpal ligament injuries. All fractures healed without malunion or nonunion, and at follow up (more than 48 months), most patients (92%) displayed excellent and good results, based on Mayo modified wrist scores.

Conclusions: We believe that arthroscopic reduction may be considered for distal radius fractures because this approach can use a minimal operation to achieve acceptable restoration of fractures as well as assessment and management of soft tissue lesions in high demand athletes.

ARTHROSCOPIC DEBRIDEMENT FOR OSTEOCHONDritis DISSECANs OF THE CAPITELLUM: A CASE SERIES

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Objective: To review the results of arthroscopic debridement of unstable fragments in patients with osteochondritis dissecans (OCD) of capitellum.

Methodology: Fourteen elbows in fourteen patients (all male; mean age, 14 years; age range, 11 to 16 years) who underwent arthroscopic debridement for OCD of the capitellum between 2007 and these cases. Active assistive exercise was started on the day after the surgery. Patients were allowed to return gradually to sports activity around six weeks after the surgery. Mean follow-up duration was 23 weeks (range, 10–40 weeks). The medical records of the patients were reviewed for the following information: (1) diameter of the OCD lesion (2) preoperative and final range of motion, (3) preoperative and final Trimmerman and Andrew score (TA score), (4) return to sports, and (5) complications.

Results: The mean diameter of the OCD lesion was 9.2 mm (range, 5–12 mm). Preoperative range of flexion and extension were 130.7 ± 10.7 degrees (mean \pm standard deviation) and -9.6 ± 16.9 degrees, respectively. Final range of flexion and extension were 132.9 ± 8.0 degrees and -0.4 ± 6.6 degrees, respectively. There were no significant differences in preoperative and final range of motion. TA score significantly improved from 149.3 ± 33.0 before surgery to 192.9 ± 13.3 at final follow-up ($p < 0.0001$). Sports the patients performed included baseball (11 patients), swimming (1 patient), disc-throw (1 patient), and Japanese fencing (1 patient). All patients returned to sports activity within six months after surgery. Thirteen of fourteen patients returned to the same sports, but one patient changed to other sports. There were no complications.

Conclusions: The short-term outcomes of the debridement of the OCD lesion were good when the lesion was relatively small.

OSTEOCHONDRAL LOOSE BODY IN THE DISTAL RADIOULNAR JOINT DRUJ REMOVED BY DISTAL RADIOULNAR JOINT ARTHROSCOPY

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Objective: Loose body in the wrist is rare and the lesions are reported in the pisotriquetral, radiocarpal, and distal radioulnar joint (DRUJ). Some cases of loose body in DRUJ were resected with arthrotomy. The purpose of this study is to report the case of the loose body in DRUJ resected with DRUJ arthroscopy.

Methods: A 34-year-old man presented with a chief complaint of right wrist pain and painful click during forearm rotation. He was suffered from traffic accident one month

ARTHROSCOPY

ago. Initial examination showed tenderness on volar side of ulnar head, decrease of grip strength, and painful wrist and forearm motion. Radiograph and computed tomography of right wrist showed a deformity of sigmoid notch, conical type described by De Smet, and a round small bone volar to the ulnar head. Conservative treatment was performed, but the pain remained. Serial radiograph showed the change of the position of small bone. We diagnosed as unstable loose body in DRUJ and performed surgical treatment under regional anesthesia. A 1.9mm arthroscope was used. There was no rupture of TFCC and loose body was invisible via radiocarpal joint. DRUJ arthroscope showed arthritis of sigmoid notch and ulnar head, and cartilage defect was observed on ulnar head. While making a volar portal of DRUJ, loose body was visible from dorsal portal and resected. The size of loose body was 3×7×3mm. Histological analysis showed an osteochondral loose body.

Results: Postoperative course was uneventful. His disability of daily life and work disappeared and range of motion recovered without pain at one year after surgery.

Conclusions: The loose body in DRUJ is rare, and osteocartilaginous loose body in this case was associated with osteoarthritis. The Developed arthroscopic technique and small diameter of arthroscope enabled us to resect the loose body in DRUJ using DRUJ arthroscopy.

ARTHROSCOPIC PARTIAL TRAPEZIECTOMY FOR THUMB CARPOMETACARPAL JOINT OSTEOARTHRITIS: RADIOGRAPHIC CHANGES AFTER TWO YEAR FOLLOW UP AND ARTHROSCOPIC PITFALLS

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Objective: The purpose of this study was to evaluate the radiographic changes after arthroscopic partial trapeziectomy combined with ligament shrinkage and K-wire fixation to treat thumb carpometacarpal joint arthritis.

Methodology: From February 2013 to March 2014, twenty-four patients with thumb CMC joint arthritis underwent arthroscopic partial trapeziectomy combined with thermal shrinkage and pin fixation operation at our hospital. The results of radiographic staging classified the patients as having Eaton stage II through stage III thumb carpometacarpal arthritis. Clinical follow-up visits for all patients were scheduled after surgery at 4 weeks, 8 weeks, 6 months, 12 months and 24 months. We used radiographs to measure the preoperative and postoperative CMC distance, scaphoid-metacarpal distance, trapezium-metacarpal distance, the distance from the first to the second metacarpal, and the metacarpal prominence distance. We also reported the associated complications and arthroscopic technique pitfalls.

Result: Sixteen patients completed 2 years radiographic follow up. The pre- and postoperative evaluation of radiographic changes revealed significant differences in the carpometacarpal joint distance (0.88 versus 2.60, $p = 0.000$), scaphoid-metacarpal distance (14.13 versus 12.20, $p = 0.000$), trapezium-metacarpal distance (7.34 versus 6.01, $p = 0.004$), and metacarpal prominence distance (5.45 versus 3.49, $p = 0.000$). The major complication was index flexor digitorum profundus tendon rupture occurred in one patient.

Conclusion: Arthroscopic partial trapeziectomy combined with thermal shrinkage and K-wire fixation is an effective procedure to treat thumb CMC arthritis without the major complications that can occur with an open procedure. In this short-term study, our procedure helped patients with thumb CMC joint arthritis successfully preserves the mechanical height of the trapezium, increases the CMC space, and decreases metacarpal subluxation. To achieve satisfactory clinical results, it is important to heed some arthroscopic pitfalls, particularly the completion of the flat residual trapezium surface and the necessity that the procedure be performed by an individual skilled in arthroscopy.

Level of Evidence: Level IV.

ARTHROSCOPICALLY ASSISTED INTRA-ARTICULAR DISTAL RADIUS FRACTURE SURGERY WITH VOLAR LOCKING PLATES OR EXTERNAL FIXATOR AND K-WIRES. EARLY RESULTS OF ONGOING STUDY.

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Objective: To find or disclaim any benefits of one or another method of treatment for displaced intra-articular distal radius fractures.

Methodology: 52 patients with intra-articular distal radius fractures of one hand are already recruited for this prospective randomized study which started in 2015. Patients were treated with K-wires and monolateral external fixator (EF + KW group) or volar locking plate (VLP group) under the arthroscopic control. Results of treatment were assessed with X-ray exams, PRWE (Patient-Rated Wrist Evaluation), Gartland & Werley, MASS07 scores, Grip/Pinch strength and range of motions (ROM). Evaluation was performed in 1st, 3rd, 6th and 12th month postoperatively. 31 patients (18 women and 13 men) have already finished the 1 year follow-up period – 15 patients in VLP group and 16 patients in EF=KW group.

Results: Data analysis was performed by IBM SPSS v.22.0 programme, descriptive statistics, Shapiro-Wilk test, Chi-Square test, Independent sample nonparametric test, Independent sample T test were performed. All fractures are healed, early results show that ROM is better in VP group, PRWE and MASS07 scores also have better outcomes in VP group. Final results – tables, curves and measurements will be presented in congress venue.

Conclusions: Imperfection of randomisation in such trials is restriction of the choice of the surgeon. Both methods are applicable under specific circumstances, but according to early results of our trial, volar plating gives a chance for early rehabilitation and better outcomes in first months after surgery. EF-KW group has longer period of rehabilitation, but have no complaints about scars.

BPI AND PERIPHERAL NERVE

TRIPLE NERVE NEUROTIZATION FOR RESTORATION OF SHOULDER AND ELBOW FUNCTION IN UPPER TRUNK AVULSION BRACHIAL PLEXUS INJURY ----- USING SPINAL ACCESSORY NERVE, RADIAL NERVE TRICEPS BRANCH, AND ULNAR NERVE

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Purpose: To evaluate the clinical effectiveness of triple nerves (spinal accessory nerve, radial nerve triceps branch, and ulnar nerve fascicle) neurotization for shoulder and elbow function in Brachial plexus injury (BPI) reconstruction.

Materials and Methods: The authors analyzed the surgically treated BPI patients from 2000 to 2010. 60 patients (50 male, 10 female), average age 30.5 years old (16–65 y/o) sustained upper arm type BPI and received triple nerves neurotization (spinal accessory nerve and radial nerve transfer for shoulder function, and ulnar nerve fascicle transfer to elbow flexion). The spinal accessory nerve was directly sutured with suprascapular nerve, while the ulnar nerve fascicle was identified and sectioned, with distal stump neurotization to the proximal stump of musculocutaneous nerve by 10-0 Nylon suture. The triceps branch of radial nerve was sutured to the axillary nerve. Functional recovery was assessed by the Medical Research Council Grading System and range of motion. The average follow up was 8.5 years. (6 to 12 years).

BPI AND PERIPHERAL NERVE

Results: We had 56 patients achieved at least M3 elbow flexion and 90% (54/60) with M4 elbow flexion. The time needed for the return of a muscle power M3 in the Biceps muscle ranged from 4 to 11 months (average 6.4 months), and recovery of M4 ranged from 7 to 20 months (average 10.5 months). The shoulder function was also satisfactory with 83.3% (50/60) achieved M4 muscle power, and an average of 1050 abduction and 1250 elevation.

Discussion and Conclusion: Based on our surgical results, triple nerve neurotization by using spinal accessory nerve, radial nerve triceps branch, and ulnar nerve fascicle transfer is an acceptable method for the reconstruction of upper arm type BPI. Both elbow and shoulder functions are quite satisfactory after neurotization procedures.

CORRELATION BETWEEN PREOPERATIVE TIME AND AMOUNT OF MYOD EXPRESSING SATELLITE CELL IN BICEPS MUSCLE OF BRACHIAL PLEXUS INJURY PATIENTS

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Objective: Operative procedure still become a big challenge in management of brachial plexus injury. Some factors have been thought being responsible in determining the clinical outcome postoperatively. A nuclear protein (MyoD) expressed by satellite cell is a parameter which highly related to muscle regeneration process after injury and considered as a role factor in determining clinical outcome. The aim of this study is to determine the correlation between preoperative time and amount of MyoD-expressing satellite cell in biceps muscle of brachial plexus injury patients.

Methodology: Twenty-two brachial plexus injury patients that underwent surgery between May 2013 and December 2015 were registered and grouped based on preoperative time, age of patient, and type of injury. Muscle specimens collected from biceps muscle during surgery and underwent immunohistochemistry examination microscopically for MyoD-expressing satellite cells counting.

Result: Preoperative time has a strong inverted and significant correlation with number of MyoD-expressing satellite cell in biceps muscle of brachial plexus injury patients ($R=0.895$ $p<0.005$). Preoperative time within 6 month after injury is the optimal time to perform surgery in which significant found of MyoD-expressing satellite cell amount ($p<0.005$).

Conclusion: Preoperative time is the most important predictor in determining the optimal time to perform surgery of brachial plexus injury related to amount of MyoD-expressing satellite cell that became a crucial indicator of muscle regeneration process after injury.

Keywords: brachial plexus, satellite cells, MyoD, preoperative time

TRICEPS MOTOR FUNCTION RECONSTRUCTION WITH DIFFERENT NERVE TRANSFER TECHNIQUES.

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Objective: To analyze and report our first results of triceps function reconstruction using three different techniques - 1) transferring a motor branch nerve to the flexor carpi ulnaris (FCU) to the triceps long head motor branch, 2) branch of thoracodorsal nerve (TDN) to the motor branch of long head of triceps and 3) long thoracic nerve (LTN) to the triceps long head motor branch in brachial plexus injuries.

Methodology: 4 patients were available for postop follow-up with nerve transfer to a long head of triceps motor branch of the radial nerve as part of complex brachial plexus reconstruction.

Results: Two patients had a transfer using an ulnar nerve motor fascicle to the flexor carpi ulnaris muscle, yielding a motor recovery of MCR grade M5 elbow extension strength in one case and M3 in the other with very short follow-up. In other two patients, a TDN branch and LTN was used as the donor; these patients recovered M5 strength. Mean follow-up was 19 months ranging from 3 to 37 months.

Conclusions: These outcomes indicate that expendable fascicles of otherwise antagonist muscles - the ulnar, TDN and LTN are viable donors in the surgical reconstruction of elbow extension. LTN transfer has higher morbidity with scapular winging being the most prominent. These results highlight that procedures are so well established and described that no lengthy learning curve is necessary to use them even in the countries with extremely small load of brachial plexus injuries. Reader is directed to video files for clarity of the presentation.

IATROGENIC PERIPHERAL NERVE INJURY DURING THE INTERNAL FIXATION OF HUMERAL FRACTURE: REPORT OF 4 CASES.

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Objective: We report four cases of iatrogenic peripheral neuropathy, which occurred during surgery for humeral fracture.

Case presentations: Case 1 is of a 31-year-old man. Retrograde intramedullary nailing was performed for the humeral shaft fracture, and median nerve paralysis was recognized immediately after the first surgery. In the second surgery, a partial rupture of the median nerve was observed at a portion corresponding to the distal end of the distal screw. Case 2 is of a 79-year-old woman. Intramedullary nail fixation was performed for humeral neck fracture, and radial nerve paralysis was recognized immediately after the first surgery. In the second surgery, twisting and partial rupture of the radial nerve was found at the portion corresponding to the distal screw. For case 3, a 61-year-old woman, fixation of the medial and lateral plates to the humeral condylar fracture was performed, and radial nerve paralysis was recognized immediately after the first surgery. A sural nerve grafting surgery was performed because the complete tear of the radial nerve was observed at a portion corresponding to the tip of the distal screw of the inner plate during surgery one month postoperatively. For case 4, a 28-year-old man Plate fixation was performed after stabilizing the fracture part with an external fixator for the humeral shaft fracture, and radial nerve paralysis was recognized from the day after the first surgery. In the second surgery, partial radial nerve rupture was found in the pin insertion part of the external fixator.

Conclusions: In the four cases, it was perceived that each of the nerves were damaged by drilling during the operation, specifically at the screw and pin sites. When drilling perioperatively, care should be taken not to excessively protrude the drill from the contralateral cortex keeping in mind the anatomical course of the nerves.

SYSTEMATIC REVIEW ON OUTCOME OF FREE FUNCTIONING MUSCLE TRANSFERS FOR ELBOW FLEXION IN BRACHIAL PLEXUS INJURIES

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Purpose: To review the literature regarding the clinical outcome of free functioning muscle transfers (FFMT) for elbow flexion in patients with brachial plexus injuries (BPI).

Methods: A systematic review of MEDLINE, EMBASE, Trip, Google Scholar, Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials databases from inception to April 2016 was conducted for patients with BPI who had undergone FFMT for restoration of elbow flexion. Single case reports and non-English articles were excluded. Data regarding details of surgery as well as outcome measures was extracted and analyzed.

Results: Over a thousand (state the exact number) articles met the search criteria. This was narrowed to 60 relevant articles, of which 13 articles met the criteria for inclusion. There were a total of 194 patients with age up to 60 years old (the youngest patient is a OBPI patient whose age is not included). FFMTs were most commonly performed in patients with total BPI, and the most common muscle used was the gracilis. 133 patients (68.6%) achieved a Medical Research Council (MRC) muscle grade of M4 and above. Over 28 patients had M3 power, and over 22 patients had less than M3 power. The number discrepancy in latter two categories was due to authors using different ranges of MRC grades to present their results.

Conclusions: In patients with BPI, the use of the gracilis muscle in FFMT is a viable option for restoration of elbow flexion, with almost 70% of patients achieving a useful outcome of M4 or more.

FUNCTIONING FREE MUSCLE TRANSFER FOR THE RESTORATION OF ELBOW FLEXION IN BRACHIAL PLEXUS INJURY PATIENTS

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Background: Restoration of elbow function in traumatic brachial plexus injury patients remains the priority in the reconstruction of the involved extremity. In cases of complete nerve root injuries and in delayed cases, the only option for elbow reconstruction is the functional free muscle transfer. The purpose of this paper was to present the clinical outcomes and complications of functioning free muscle transfers using the gracilis muscle for the restoration of elbow flexion in brachial plexus injury patients in a tertiary institution from January 1, 2005 to January 31, 2014. **Patient and Methods.** A retrospective review of all patients who had functioning free muscle transfers for elbow flexion was done with a minimum of 12 months follow-up. Outcome measures were elbow flexion in terms of range of motion in degrees, muscle strength of the transferred muscle, VAS (visual analogue scale) for pain, postoperative DASH scores and complications of the procedure. **Results** There were 39 males and three females. The average age at the time of surgery was 28.6 (SD, 8.5) years. The average delay to surgery was 16 months (range, 3-120 months). The flap success rate for viability was achieved in 38 of 42 patients. The average follow-up for the 38 patients was 30 months (range, 12-103 months, SD 19 months). Success rate of at least M3/5 muscle strength was achieved in 37 of 42 patients with an average range of elbow flexion of 107° (SD, 20.4°). The average post-operative VAS for pain was 3.6 (SD, 3.0). The average post-operative DASH score was 43.09 (SD, 14.9). There were a total of 10 minor complications and five major complications.

Conclusion: Functioning free muscle transfer using the gracilis muscle was a reliable procedure in the restoration of elbow flexion in patients with incomplete brachial plexus injury treated beyond 6 months from the time of injury and in patients with complete injuries.

NERVE TRANSFERS IN UPPER AND EXTENDED UPPER TYPE BRACHIAL PLEXUS INJURIES TREATED BEFORE AND AFTER SIX MONTHS

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BPI AND PERIPHERAL NERVE

Patient and Methods: The purpose of this study was to present the outcomes of nerve transfers for upper and extended upper type brachial plexus injuries treated before and after six months from injury. A retrospective review was done on the results of treatment using nerve transfers to restore elbow flexion and DASH scores in patients with upper type and extended upper type traumatic brachial plexus injuries from 2005-2014. Treatment outcomes were in terms of elbow flexion, and postoperative pain and DASH scores.

Results: There were a total of 32 patients with an average age of 29 years (range, 19-48 years). The average time from injury to surgery was 4.5 months (range, 3-12 months). There were 11 patients with C56 injuries, 15 patients with C567 and 4 patients with C5-C8 injuries. Fifteen (n=15) patients were operated on less than six months from injury, while 17 patients were operated after 6 months or more from injury. The average postoperative DASH score was 32 (range, 5-71.66). The average elbow flexion strength was 3.2, (SD, 1.1), average elbow flexion range was 124 degrees (SD, 16). Patients surgically treated with nerve transfers before or after six months from injury had similar elbow flexion strength and range of motion and had similar postoperative DASH scores.

Conclusion: Nerve transfer procedures can result in good functional recovery of elbow flexion in patients with upper and extended upper type injuries. There was no difference in functional outcome in terms of elbow function and DASH scores between patients treated before or after six months from injury.

CARPAL BONES

EVALUATION OF THE PERIOD UNTIL UNION OF SCAPHOID FRACTURES ACCORDING TO AGE

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Purpose: Scaphoid fractures occur mostly in youth, whereas distal radius fractures are mostly encountered in elderly women. We investigated acute scaphoid fractures retrospectively, and assessed the time until union according to age.

Methods: Seventy-nine cases of acute scaphoid fracture were diagnosed at our institutions between 2010 and 2014. Forty cases were treated by casting and the other 39 by surgery. The patients were divided into three groups; <17 years old with open physes, 17-45 years old with closed physes, and >45 years old including postmenopausal women. We classified the fractures using the Filan and Herbert (F-H) classification, and investigated the time until union and the period of cast application. Statistical analysis of differences was performed using Student's t test and Bonferroni; $p < .05$ was considered significant.

Results: In the cast group, 30 cases were classified as F-H type A and 10 as type B. There was no significant difference in the time until union or period of cast application between type A and type B. In the surgery group, 5 cases were classified as type A and 34 as type B. There was no significant difference in the period of cast application between them ($P = 0.83$). The mean period until union was 9 weeks in the <17-year age group, 13.4 weeks in the 17-45 year age group, and 10.4 weeks in the >45-year age group.

Discussion: The period until union of scaphoid fractures was much longer in the 17-45-year age group because patients of this generation tend to be highly active and have high-energy injuries.

CARPAL BONES

VASCULARIZED BONE GRAFT FROM DISTAL RADIUS WITH EXTERNAL FIXATION FOR THE TREATMENT OF PREISER'S DISEASE

Kim Yoon-Soo

Introduction: The purpose of this study was to examine the outcomes of vascularized bone grafts (VBGs) from the distal radius with external fixation for the treatment of Preiser's disease.

Methods: Seven patients with Preiser's disease who underwent VBGs surgery based on the 1,2 intercompartmental supraretrinacular artery, were placed in an external fixator for 10 weeks after grafting. Diagnosis was based on radiographic findings of sclerosis, fragmentation, and scaphoid collapse in the absence of any clear antecedent trauma. All patients underwent preoperative magnetic resonance imaging (MRI) scans that confirmed the diagnosis of avascular necrosis of the scaphoid. The average patient age was 53 years old and the mean follow-up period was 28 months. Postoperative evaluations included a pain evaluation (visual analogue scale), X-ray, MRI, disability of the arm, shoulder and hand (DASH) evaluation, and modified Mayo wrist scoring.

Results: Six MRIs showed evidence of revascularization, with improvement T1 or T2 signal. Two patients were rated as excellent, 3 as good, 2 as fair and poor by modified Mayo wrist scoring. A 53-year-old woman was classified as having Herbert stage 3 and Kalainov type 1 disease, and a 67-year-old woman was classified as having Herbert stage 3 and Kalainov type 2 disease. Both patients showed evidence of revascularization, with improvements on T1 and T2 MRI; however, incomplete revascularization of the entire proximal pole was observed in the 67-year-old patient. In both cases, the clinical results were satisfactory (modified Mayo wrist scores of 95 and 80 points, respectively).

Conclusion: The clinical results of 6 cases in VBGs with external fixation were satisfactory. Wrist pain, ROM, and grip strength were improved. X-ray, MRI findings post-operatively showed good vascularity of scaphoid. VBGs with external fixation are an efficacious treatment for Preiser's disease and are thus a recommended surgical treatment.

TRANSSCAPHOID PERILUNATE DISLOCATION: IMMEDIATE VERSUS DELAYED SURGICAL TREATMENT IN CASE OF POLITRAUMA.

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Objective: To analyze and compare functional outcome of two similar politrauma patients with transscaphoid perilunate dislocation.

Methodology: Two patients with similar hand trauma acquired in politrauma case, were followed –up and functionally measured to show retrospective results of immediate vs delayed surgical treatment.

Results: Both patients were of the same age. Politrauma didn't include brain, chest or abdominal injury. Both scaphoid fracture were fixed with cannulated screws and dislocation fixed with K – wires, dorsal capsular repair was performed. Additionally carpal tunnel release was also done in both cases. Immobilization with spica thumb cast followed for 8 weeks. After the removal of the cast identical ergotherapy programme was performed for both patients. Functional measurements and grip strength was done at 3 and 6 months.

Conclusions: Comparison of two similar hand trauma patients with emergent vs delayed surgical treatment, showed better results and faster recovery period for the patient of the immediate surgical tactic.

CAT SCAN CAN PREDICT DELAYED TENDON INJURY AFTER HAMATE HOOK FRACTURE

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Objective: Delayed flexor digitorum profundus (FDP) tendon rupture in the little finger is a well-known complication after hamate hook fracture (HHF). We hypothesized that radiological parameters of CAT scan may be useful predictors for this delayed complication.

Methodology: We retrospectively assessed 36 patients with HHF who were treated at two hand specialized units from January 2008 to December 2015. Only those who were diagnosed with CAT scan and treated surgically with checking flexor tendon status were included in this study. 28 patients 27 males and 1 female, mean age 31.6 (15 to 57) y.o. at the time of operation were included. We determined the fragment height ratio (FHR) and the fragment gap as radiographic parameters of CAT scan. We assessed the tendon status and were classified as intact, worn or ruptured according to intraoperative observation by the operators. Intact was defined as smooth surface, worn as rough surface and ruptured as torn apart of flexor. We investigated the association between the radiographic parameters and intraoperative tendon status.

Results: Tendon status in accordance with intraoperative observation, there were 18 intact, 8 worn, and 2 ruptured. Sixteen were in the group which FHR was less than 75 (FHR:50-75) and 12 were in FHR of 75 and over (FHR:75- 100). Ten of 16 patients (FHR:50-75) had tendon worn or ruptured, while all with FHR:75-100 had intact tendon ($p=0.004$). Two cases of tendon ruptured were FHR 58.9 and 60.6. The fragment gap of 28 patients were from 0 to 5.2 mm and that of the 16 patients (FHR:50-75) was from 0.56 to 5.2mm. 10 of 16 were above 2.1mm, 9 of these 10 cases (90%) were the cases of tendon injury. All tendon injuries were above 1.0mm ($p=0.002$).

Conclusions: This study indicates clearly that FHR and fragment gap measured on CAT scan are useful predictors of delayed tendon rupture.

COMPRESSION NEUROPATHY

ULNAR NERVE STRAIN IN FUNCTIONAL ELBOW AND SHOULDER MOTIONS

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Objective: Motion of shoulder and elbow affects ulnar nerve strain. Creating awareness of activities that involve deep elbow flexion has been a reliable conservative management. However, there is yet no evidence that links this kind of strain to these activities. The purpose of this study was to report on ulnar nerve strain at the elbow as a result of daily activities, both in normal nerves and those in which with gliding motion had been restricted.

Methodology: This study was conducted using thirty fresh frozen cadaveric elbows from subjects who had no deformities and history of previous upper extremities surgery. Strain was calculated based on the elongation of nerve. Ulnar nerve strain at the elbow resulting from motion related to common daily activities was measured in both normal nerves and nerves which gliding motion was restricted. The results of these measurement were then compared.

Results: Activities related to extreme elbow and shoulder motions, such as eating with a spoon, resulted in the highest amount of the nerve strain (mean = 7%).

However, motion associated with cellphone use yielded the highest maximum strain at 14%. In addition, we found that nerve strain increased significantly in conditions in which gliding motion was restricted. Nerve strain in motion associated with computer use rose double from 3.3% to 6.9% ($p < 0.001$) when gliding motion was limited, while restriction of gliding motion in the cellphone use increased strain from 6.3% to 9.9% ($p < 0.001$).

Conclusions: The mean ulnar nerve strain that results from motions associated with daily activities cannot cause the permanent damage to the nerve. However, motion of the elbow and shoulder while the nerve's motion is restricted can cause more strain which could lead to irreversible nerve damage. Our results showed the importance of avoiding some activities in early stages of cubital tunnel syndrome.

ULTRASONOGRAPHIC LOCALIZATION OF ULNAR NEUROPATHY AT THE ELBOW

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Objective: The present study was undertaken to identify the distribution of changes in Cross-sectional area (CSA) of the ulnar nerve in normal elbows and those with ulnar nerve entrapment (UNE), in order to clarify the sites at which the ulnar nerve is mostly compressed in UNE patients.

Methodology: We prospectively studied the ultrasound characteristics of the ulnar nerve in 20 patients with UNE and 20 healthy control subjects, at standardized locations across the elbow. Seven sites were studied for each case; 2, 4, 6 cm proximal to the medial epicondyle (ME), the ME, and 2, 4, 6 cm distal to the ME. The cross-sectional area (CSA) was measured just within the hyperechoic rim of the nerve. In control subjects, a single limb was studied, with the side chosen at random.

Results: Mean CSA values for the ulnar nerve at levels 6, 4, 2 cm proximal to the ME, ME, and 2, 4, 6 cm distal to the ME were 0.053, 0.063, 0.082, 0.130, 0.098, 0.074, 0.063 cm² respectively in the neuropathic group and 0.060, 0.067, 0.069, 0.062, 0.060, 0.072 cm² respectively in the healthy control group. The difference among intervals was statistically significant in the neuropathic group.

Conclusions: Ultrasound is a useful tool to localize ulnar nerve entrapment at the elbow, and the most frequent site of enlargement of the ulnar nerve at the elbow was at the level of the cubital tunnel, close to the junction of the two heads of the FCU.

CAN WE REPLACE THE ELECTROPHYSIOLOGIC STUDY WITH THE ULTRASONOGRAPHIC EXAMINATION IN THE DIAGNOSIS OF CARPAL TUNNEL SYNDROME

Chae Seung Bum

Keywords: Carpal tunnel syndrome, Diagnosis, Ultrasonography, median nerve

Background: In orthopaedic field, ultrasonography has been used in diagnosis as time goes by and the usefulness of that has been also increasing in many occasion. Recent studies have carried out to compare the diagnostic value of the ultrasonography with electrophysiologic study in the diagnosis of carpal tunnel syndrome. This study aimed to know the usefulness of the ultrasonography in diagnosis of carpal tunnel syndrome and possibility of replacement of the ultrasonography in diagnosis of the carpal tunnel syndrome instead of electrophysiologic study.

Method: 51 patients with unilateral carpal tunnel syndrome confirmed by single hand surgeon with Carpal Tunnel Syndrome-6(CTS-6) for the diagnosis of carpal tunnel syndrome were enrolled in the study. Ultrasonography was performed on both wrists by single radiologist who didn't know the affected side. Electrophysiologic study was performed on the both side by single examiner without any information of the affected side. The cross-sectional area and the ratio of those between the inlet and the outlet was measured on the median nerve of the both side. We compared the accuracy of the ultrasonography and the electrophysiologic study in the diagnosis of carpal tunnel syndrome.

COMPRESSION NEUROPATHY

Result: In patients diagnosed with CTS by the CTS-6, sensitivity and specificity of ultrasonographic measurement of the median nerve inlet diameter for diagnosing CTS was 0.818 mm² and 0.864 mm², and cutoff value was 0.105mm² respectively. Also, the sensitivity and specificity of ultrasonographic measurement of the inlet/outlet diameter for diagnosing CTS was 0.886 and 0.886, and cutoff value was 1.29 respectively. The sensitivity and specificity of the nerve conduction study was 0.841 and 0.818, respectively. There were no significant difference in diagnosing CTS by ultrasonography or nerve conduction study.

Conclusion: Ultrasonography have similar sensitivity and specificity for the diagnosis of carpal tunnel syndrome. But ultrasonography is non-invasive examination and has cost-effectiveness as well. We conclude that ultrasonographic studies are highly accurate in the diagnosis of carpal tunnel syndrome and the electrophysiologic studies are not necessary in most cases.

EFFECTS OF THE SURGICALLY-INDUCED EXTERNAL COMPRESSION OF THE MEDIAN NERVE IN THE RAT CARPAL TUNNEL: TWO POTENTIAL MODELS OF CARPAL TUNNEL SYNDROME

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Objective: CTS is a peripheral compression neuropathy. The majority of CTS cases are idiopathic. Idiopathic CTS is characterized as well by non-inflammatory fibrosis of the subsynovial connective tissue within the carpal tunnel. In previous studies, there are some animal model can mimic the progression of CTS with the inflammation cytokine stimulation. However, the time of CTS onset is about 6-8 weeks and the time of neuropathy cannot be sustained until 12 weeks. The animal models we generated are induced by physical stress which potentially can prolong and sustain the neuropathy symptom.

Methodology: The SD rats were the model to act as the CTS pathological progression model. There are two methods to induce the physical stress within the transverse ligament of carpal. One group is to create the dead space between transverse ligament and median nerve. The other group is to create the pressure and shorten the transverse ligament distance in order to generate the pressure behind the median nerve. The animal were be used to examine the electrophysiological and pressure change.

Results: The electrophysiology data showed that the action potential in first week were still similar with the operation day in these two groups. Delayed and decreased in the latency, amplitude and duration are showed after 8 weeks physical compression. The pressure levels increased in both groups compared with control group.

Conclusions: In previous studies, the neuropathological change happened at 6-8 weeks but the effect cannot sustain. In our studies, we prolong the end point to identify the time window of neuropathological change. If the pathological change can be maintained, the animal model will be used to investigate the progression of CTS.

A COMPARISON OF COMPLICATIONS ASSOCIATED WITH ENDOSCOPIC AND OPEN CARPAL TUNNEL RELEASE: A RETROSPECTIVE STUDY

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Objective: Endoscopic carpal tunnel release (ECTR) has been widespread because it can be performed minimally invasively. However, because complications such as nerve injuries in ECTR have been reported, some doctors recommend open surgery with emphasis on safety. On the other hand, scar tenderness or pillar pain

COMPRESSION NEUROPATHY

after conventional full open procedure is often a problem, but it is not certain whether the midpalmar skin incision causes the postoperative pain. The purpose of this study is to determine the difference in incidence of complications between the three different surgical methods: endoscopic, full-open and mini-open carpal tunnel release.

Methods: This single-center retrospective study included 333 patients with 397 hands who underwent carpal tunnel release from April 2008 to September 2016 with a minimum of 2-months follow-up. Postoperative complications such as nerve injury, carpal pain (scar tenderness or pillar pain), surgical site infection and reoperation were investigated.

Results: 203 hands were operated on with ECTR, 87 hands were operated on with full open procedure (full-open) and 107 hands were operated on with mini open procedure (mini-open). 97 hands were male and 300 hands were female. The mean follow-up period was 88.1 weeks (range 9-430 weeks, median 55.0 weeks). A case of digital nerve neurapraxia of ring finger in ECTR group and a case of injury of the nar branch in mini-open group were occurred. 60 (30%), 26 (30%) and 34 (32%) of carpal pain, 2 (1.0%), 2 (2.3%) and 1 (0.9%) of surgical site infection, 0 (0.0%), 1 (1.2%) and 1 (0.9%) of CRPS, and 1 (0.5%), 0 (0.0%) and 1 (0.9%) of reoperations were recorded in the groups of ECTR, full-open and mini-open, respectively.

Conclusions: In this study, complications following carpal tunnel release were examined. There was no difference in the incidence of postoperative complications among the three different surgical groups.

POSTOPERATIVE IMPROVEMENT IN DASH SCORE, CLINICAL FINDINGS, AND NERVE CONDUCTION VELOCITY IN PATIENTS WITH CUBITAL TUNNEL SYNDROME

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Objective: The aim of this study was to investigate a recovery pattern in subjective and objective measures in patients with cubital tunnel syndrome after anterior subcutaneous transposition of the ulnar nerve.

Methodology: Disabilities of the Arm, Shoulder and Hand (DASH) score (primary outcome), a visual analogue scale numbness score, grip and pinch strength, Semmes-Weinstein monofilament score, static 2-point discrimination (2PD) score, and motor conduction velocity (MCV) stage among 52 patients (mean age: 67 years) were examined preoperatively and 1, 3, 6, 12, and ≥ 24 months postoperatively. This study was confined to the patients with cubital tunnel syndrome arise from elbow osteoarthritis. Statistical analyses were conducted to evaluate how each variable improved after surgery. A linear mixed-effects model was used for continuous variables (DASH score, numbness, grip and pinch strength), and a proportional odds model was used for categorical variables (SW and 2PD tests and MCV stages). Covariates comprised age, sex, and preoperative disease severity (McGowan grade) in both models.

Results: DASH score significantly improved by 6 months. Significant recovery in numbness and SW test scores occurred at 1 month. Grip and pinch strength, 2PD test scores, and MCV stage improved by 3 months. Subjective measures (DASH scores and numbness) recovered regardless of age, sex, or disease severity. It was still unclear if both subjective and objective measures improved beyond 1-year postoperatively.

Conclusions: These data are helpful for predicting postoperative recovery patterns and tend to be most important for patients prior to surgery.

A PROSPECTIVE RANDOMIZED COMPARATIVE STUDY OF OPEN AND PERCUTANEOUS RELEASE OF ACQUIRED TRIGGER THUMB.

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Introduction: Application of percutaneous needle release to thumb for stenosing tenosynovitis is less favored than open release because of unique anatomical position of A1 pulley with respect to digital neurovascular bundles. To compare the safety and effectiveness of percutaneous versus open release, a prospective randomized study for Green's stage 2 to 4 trigger thumbs was conducted.

Methods: A single-centre prospective randomized study was performed with 30 patients randomized and operated: open release (n=15, 1 male and 14 female; age 58 ± 7.23 years) and percutaneous release (n=15, 1 male and 14 female; age 56.3 ± 7.66 years), using 19G needle with proper thumb positioning under local anaesthesia. Subjective and objective parameters including pincer power, grip power, active and passive range of motion of the interphalangeal joint (IPJ) and the metacarpal-phalangeal joint (MPJ), Kapandji score, DASH score, Visual Analog scale (VAS) at-rest and on-exertion and satisfaction were recorded. Patients were assessed on day 7, 28 and 90 after surgery.

Results: The mean surgery durations of open and percutaneous release are 11.1 and 3.9 minutes respectively ($p < 0.01$). Statistical significance improvement was noted in DASH total score and DASH function score both at 7 days after surgery, DASH symptom score between "day 7" and "before surgery", VAS at-rest between "day 7" and "before surgery", and DASH work score between "day 90" and "day 28" in percutaneous group (all $p < 0.05$). No statistical difference was found in other parameters between groups (all $p > 0.05$). There was no wound or neurovascular complication in both groups.

Conclusion: Our study demonstrated that percutaneous needle release has similar efficacy and safety as open release for treating grade 2 to 4 trigger thumb, with imperceptible scar and less surgery duration. Therefore, percutaneous needle release can be advocated in clinical practice.

THE POSITIVE CORRELATION BETWEEN IL-20 AND TNF-ALPHA CAN BE THE BIOMARKER IN DE QUERVAIN DISEASE.

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Objective: De Quervain's disease is a stenosing tenosynovitis of the first dorsal compartment of the wrist. It affects the tendon sheath of the adductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons, which leads to pain at the styloid process of the radius. In 1895, Fritz de Quervain described de Quervain's disease as tenosynovitis of the first dorsal compartment as a consequence of repetitive activity. Histopathological studies report that the thickening of the first dorsal retinaculum in de Quervain's disease is characterized by degeneration rather than inflammation. A study of a torn supraspinatus tendon reported significant infiltration of mast cells and macrophages, which suggests that innate immune pathways are part of the mechanism used to mediate early tendinopathy. Recently, IL-20 has been reported to provoke potent inflammation and to regulate angiogenesis and chemotaxis, all of which are important for the pathogenesis of those inflammatory diseases. In our study, we want to investigate that the correlation between IL-20 and TNF-alpha and the potential to be the predictor in tendinopathy progression.

Methodology: The IHC were be stained and scored to analysis the clinical outcome. IL-20 and related inflammation cytokine were be examined. Tenocyte were be cultured with stimulat or and examined the inflammation cytokine secretion level. The real time PCR was used to detect the gene expression profile.

Results: The IHC data showed that TNF-alpha is up-regulated in grade 3 de Quervain's disease. The analysis data showed that IL-20 has the positive correlation with inflammation cytokine (TNF-alpha) and disease severity. The real time PCR data showed that tenocyte with inflammation stimulator can increase the IL-20 mRNA expression level.

Conclusions: The inflammation cytokines like TNF-alpha, TGF-beta and IL-1 were used to be the predictor in de Quervain disease. However, IL-20 is the new predictor in de Quervain, IL-20 expression level involved in molecular mechanism of the severity in de Quervain is need to be investigated in future.

COMPARATIVE STUDY OF ULTRASONOGRAPHY-GUIDED PERCUTANEOUS A1 PULLEY RELEASE VS BLIND PERCUTANEOUS A1 PULLEY RELEASE

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Objective: The purpose of this study was to compare the results of blind vs ultrasonography-guided percutaneous A1 pulley release for treatment of trigger finger.

Methodology: This prospective study included 21 patients (25 fingers) who underwent blind release, and 20 patients (23 fingers) who underwent ultrasonography-guided release. Visual analog scale (VAS) score, proximal interphalangeal joint contracture, complications, and patient satisfaction were compared between groups. At the final follow-up, triggering had disappeared in all patients who underwent ultrasonography-guided release, whereas three patients who underwent blind release required revision surgery for postoperative triggering.

Results: The VAS score was 3.63 points in the blinded group and 1.78 points in the ultrasonography group at the 2nd week after surgery. And 1.52 points in blinded group, 0.57 points in ultrasonography group at the 4th week after surgery. At the final follow up, the VAS score was 0.57 points in blinded group, 0.31 points in ultrasonography group. There was a statistically significant difference at 2 and 4 weeks after surgery. No rupture of the tendon was observed, and no other complications such as nerve injury or surgical site infection were observed. The range of motion was recovered in all cases after the procedure, but complete restoration of the range of motion was not obtained when the joint stiffness exists initially. All patients who underwent ultrasonography-guided release were satisfied, whereas three patients who underwent blind release were not satisfied. Ultrasonography-guided percutaneous.

Conclusions: A1 pulley release for treatment of trigger finger is considered to reduce postoperative pain and complications, such as incomplete release, compared with a blind procedure.

Keyword: trigger finger, ultrasonography, A1 pulley release

FOUR-WEEK HAND THERAPY PROGRAM" AFTER COLLAGENASE CLOSTRIDIUM HISTOLYTICUM INJECTION FOR DUPUYTREN CONTRACTURE

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Objective: We report our hand therapy program which completes in four weeks after Collagenase Clostridium Histolyticum (CCH) injection.

Methodology: This study enrolled four male patients (5 fingers) with Dupuytren contracture with a mean age of 69 years (range; 59 to 78 years) had CCH injection treatment. Over 24 hours after the injection, digital manipulation was performed and hand therapy was started: Day 1-7; active finger exercise only, Day 8-14; active finger exercise and passive finger extension exercise by hand therapist and Day

COMPRESSION NEUROPATHY

15-30; passive finger extension exercise with maximum resistance by hand therapist. Application of a night splint was started from Day 1. Patients visited us every 3 or 4 days during 4 weeks. After Week 4, patients are allowed to use their fingers without any limitation in daily activities.

Results: The improvement of fixed flexion contractures (FFC) of MP joint was shown; averaged 56.8 degree (range; 40-74 degree, before manipulation) to averaged 3 degree (range; 0-10 degree, Day 1), averaged 12.8 degree (range; 6-30 degree, Week One), averaged 5.6 degree (range 0-10 degree, Week 2) and averaged 4 degree (range; 0-10 degree, Week 4). The FFC of PIP joint was averaged 2.8 degree (range 0-10 degree) before manipulation and this was not changed through the protocol. Most common adverse events were swelling, contusion and pain, however those were mild to moderate, did not interrupt the hand therapy and resolved within one week.

Conclusions: The improvement of FFC after CCH injection and further improvement were observed during 4-week hand therapy program. Our program with phased finger exercise and night splint application was practical to maintain the improved range of motion, monitor the adverse events and guide the patients to use their fingers in daily activities.

ADDRESSING TRIGGER FINGERS POST ZANCOLLI LASSO PROCEDURE

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Objective: We present a case with triggering following a successful Zancolli lasso procedure. We hypothesise that by excising the FDS loop and releasing the A1 pulley, the triggering will resolve without recurrence of clawing.

Methodology: A 56-year-old housewife presented with a left complete claw hand after a traumatic injury 30 years ago. She is diagnosed with an incomplete lower brachial plexus lesion. She underwent a Zancolli Lasso procedure and her grip, ulceration and hygiene in the flexor creases improved. However, 8 months post-surgery, she began having triggering over her left index and middle fingers. As we were unsure of the best operative treatment we opted to try two different procedure on each finger. On her index finger, we performed an adhesiolysis of the lasso-ed FDS and on her middle finger, we released the A1 pulley which resulted in the lasso and sutured FDS to retract proximally. Post-operatively the triggering over the middle finger resolved but remained in the index finger. Six months later, she returned for an A1 pulley release of her index finger.

Results: We were unable to find any documented or reported case of triggering post zancolli lasso procedure. We attributed the cause of locking due to adhesion between those two tendons and soft tissue adhesion causing disruption in FDP tendon excursion. Interestingly, once the A1 pulley was released, the FDS retracted proximally but yet the finger did not return to its clawed state. Despite unopposed extension of the MCPJ, patient had an acceptable hand cascade. We cannot explain this.

Conclusion: Triggering post zancolli lasso remains a rare complication and could be due to soft tissue adhesions. We suggest excising the whole FDS loop and cutting the A1 pulley to resolve triggering.

COMPRESSION NEUROPATHY

COMPARATIVE STUDY ON THE EFFECTIVENESS OF CORTICOSTEROID INJECTION FOR CARPAL TUNNEL SYNDROME WITH AND WITHOUT RAYNAUD PHENOMENON

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Objective: The reported prevalence of Raynaud's phenomenon (RP) in patients with Carpal tunnel syndrome (CTS) varies, ranging from 1 to 60%. As a co-occurrence of CTS, RP might affect treatment outcomes with local corticosteroid injection. The aim of this study was to compare the outcomes of a corticosteroid injection for CTS in patients with or without RP.

Methods: In a prospective study with 139 series, 34 patients with CTS and RP treated with corticosteroid injection (10 mg triamcinolone acetonide) were compared to 105 control patients without RP. Grip strength, perception of touch with Semmes-Weinstein monofilament, and Boston Carpal Tunnel Questionnaires (BCTQ) were assessed at baseline and at 6, 12 and 24 weeks of follow-up. The Cold Intolerance Severity Score (CISS) questionnaire was also assessed at baseline and at 24 weeks follow-up.

Results: The two groups had similar baseline BCTQ scores, but the BCTQ symptom and function scores of the RP group were significantly greater than those for the control group at 12 and 24 weeks follow-up. Throughout the 24-week follow-up, there were no significant differences in the grip strength between the groups, whereas the Semmes-Weinstein monofilament sensory index for the control group was significantly greater than that of the RP group. No significant differences were observed in terms of the CISS between baseline measures and those at 24 weeks after the injection. After 24 weeks, 16 patients (15%) in the control group and 11 patients (32%) in the RP group had carpal tunnel surgery ($p = 0.028$). A multivariable regression analysis indicated that concurrent RP and severe electrophysiological grade were independently associated with a treatment failure after corticosteroid injection.

Conclusions: CTS patients with RP are at risk of poor functional outcomes and treatment failure after a single corticosteroid injection. The results offer insight into predicting prognosis and interpreting treatment outcomes of corticosteroid injection for patients with CTS.

IPSILATERAL STENOSING TENOSYNOVITIS OF ALL FINGERS AND THUMB AFTER OPEN CARPAL TUNNEL RELEASE IN A FEMALE WITH DIABETES: A CASE REPORT

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Introduction One of the most common condition hand conditions surgeons address is stenosing tenosynovitis (ST). Its pathogenesis of entrapment and compression owing to the connective tissue proliferation causing fibrocartilaginous metaplasia of the A1 pulley, is further aggravated by soft tissue proliferation from systemic diseases like diabetes. It frequently involves the ring, thumb and middle finger and seldomly the index finger and even rarely, the small finger.

Objective: In this report, we present a case of ST of all digits in a post-open carpal tunnel release (OCTR) diabetic patient and the subsequent operative management that provided complete relief of symptoms and return to work. Case: Our patient is a 48-year old right-handed female, with diabetes who presents with triggering of all digits on the ipsilateral hand post-OCTR. Patient underwent open surgical release of A1 pulleys of all digits of the right hand under WALANT. Absence of triggering was observed with no feeling of locking as reported by the patient. Patient was allowed light non-forceful grip at 2 weeks post-surgery and was able to return to work without limitations at 4 weeks. Discussion: The development of ST after carpal tunnel release is hypothesized to be due to the loss of the flexor retinaculum enabling the flexor

tendons to bowstring, thereby placing more tension on the proximal pulleys. It was also identified that there is alteration of grasping function even with involvement of only one digit affecting subtle force coordination during simple tasks, which is theorized to further increase with multiple digit involvement.

Conclusion: The similar pathogenesis of ST and carpal tunnel syndrome should always be recognized. With the increased possibility of having ST of all digits after OCTR in patients with diabetes, earliest detection and timely intervention are recommended for successful outcome.

Keywords: Multiple trigger digits, multiple stenosing tenosynovitis, carpal tunnel syndrome

EVIDENCE BASED STUDY TO EVALUATE EFFECTS OF CONSERVATIVE AND OPERATIVE TREATMENT FOR CARPAL TUNNEL SYNDROME BY MRI AND EVOLVE A MANAGEMENT PROTOCOL

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Keywords: CTS-Carpal Tunnel Syndrome; CSA-Cross-sectional-Area; MN-Median-nerve

Background: CTS is the most common nerve entrapment syndrome of upper limb. Treatment protocol, whether conservative or surgical has always been an area of debate. Conservative treatment includes physical therapy, drugs and Corticosteroid injection. Open or endoscopic Carpal tunnel release has been the surgical modality of treatment as of now.

Objective: Devise a management protocol for CTS based on MRFindings. Study design: Non randomized comparative assessment based on MR Findings was undertaken over 30 patients between May2016 to Jan2017. Based on DASH, CTSAQ, SF 30 and SCL-90 and MRfindings patients were divided into two groups for Conservative and Surgical treatment. A treatment protocol has been evolved based on MRfindings. Follow up was done for 6 months.

Results: Out of total 35 patients, 5 were excluded, remaining 30 patients revealed significant MN alteration on MRI. MN CSA at wrist of an average Indian measures 8mm^2 to 11mm^2 . In our study patients who had an average median nerve CSA of 18mm^2 at proximal border of carpal ligament had significant symptoms without any motor changes. Patients with average median nerve cross section area of 22mm^2 and above suffered with variable motor deficiencies along with entrapment symptoms and signs.

Conclusion: MRI assisted radiological findings can help in early surgical intervention, when MN CSA is between 18mm^2 - 22mm^2 , leading to considerable decrease in morbidity and motor loss. MRI findings help to decide whether a patient has to undergo conservative management for CTS or surgical management. Also, the protocol evolved from the study can help decrease significant morbidities in patients suffering from CTS.

ROLE OF VIDEO CONSENTING IN OPEN CARPAL TUNNEL SURGERY

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Introduction: Consent is fundamental to good surgical practice. Informed consent is a legal prerequisite for procedures. When consent is given, sufficient information is given to ensure adequate appreciation and understanding of the facts and implications of the said procedure. Informed consent is only valid if [1] the information provided is adequate [2] the patient is fully competent to make a decision and [3] the patient voluntarily accepts to the treatment or procedure.

COMPRESSION NEUROPATHY

Aim: The purpose of this study was to determine the effectiveness and usefulness of informed video consent for open carpal tunnel surgery in comparison with traditional verbal informed consent.

Type of study: Prospective study.

Method: An educational video was designed and developed for open carpal tunnel surgery in English and was validated for usefulness amongst the surgical team. A questionnaire was designed to evaluate understanding of the procedure and included diagnosis, indication for surgery, alternative options, surgical procedure, awareness of complications and post-operative instructions. This was administered to all patients after the verbal consenting process in the outpatient clinic. On the day of surgery the patients were shown the educational video on open carpal tunnel surgery and the same questionnaire were administered on all patients. A validated tool (System Usability Score) was used to measure the effectiveness of the video consent.

Conclusion: The video consent is an effective and efficient tool in obtaining informed consent in patients undergoing open carpal tunnel surgery. We recommend this technique of video consenting for busy hand surgery practices which allows for efficient utilisation of time while maintain standards of quality and robust consenting process.

CONGENITAL HAND

PARENTING STRESS IN MOTHERS OF CHILDREN WITH CONGENITAL HAND OR FOOT DIFFERENCES AND ITS EFFECT ON THE DECISION-MAKING

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Objective: The main purposes of the present study were to assess the levels of parenting stress in the mothers of children with congenital hand or foot differences and to evaluate the effects of this stress on the preferred roles of mothers in surgical decision-making for their children.

Methodology: This study included 89 mothers of children with polydactyly of the hand, polydactyly of the foot, a hypoplastic thumb, or macrodactyly. The parenting stress level was assessed using the Parenting Stress Index-Short Form (PSI-SF). Additionally, the mothers were requested to indicate their preferred and retrospectively perceived levels of involvement in surgical decision-making for their children using the Control Preferences Scale, which is comprised of five levels ranging from fully active to fully passive. Demographic factors that could potentially affect the mothers' stress levels were also collected.

Results: The average PSI-SF score was 73.9, and 15 mothers (16.9%) had a clinically significant level of stress ($\text{PSI-SF} \geq 90$). In the mothers of children with polydactyly of the foot, the PSI score was associated with the preferred role in surgical decision-making. Additionally, as the PSI score increased, the mothers preferred to be actively involved in the decision-making process.

Conclusions: The assessment of parenting stress levels in the mothers of children with congenital hand or foot differences can play an important role in the screening of candidates who require psychiatric treatment or support. The mothers of children with polydactyly of the foot who had higher levels of parenting stress preferred to have a more active role in surgical decision-making for their children. Thus, an evaluation of the PSI in mothers of children with congenital hand or foot differences can aid physicians to modify their style of decision-making based on the preferred role of the mother.

QUANTITATIVE MEASUREMENTS OF THE CROSS-SECTIONAL CONFIGURATION OF THE FLEXOR POLLICIS LONGUS TENDON USING ULTRASONOGRAPHY IN PATIENTS WITH PEDIATRIC TRIGGER THUMB

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Objective: Pediatric trigger thumb is regarded as an acquired condition characterized by flexion deformity of the interphalangeal joint of the thumb. However, the exact etiology and pathoanatomy of this condition remain unknown. The purpose of this study was to evaluate cross-sectional configurations of the flexor pollicis longus (FPL) tendon and the inner space of the A1 pulley quantitatively using ultrasonography.

Methodology: Forty-three patients, 23 boys and 20 girls, with unilateral pediatric trigger thumb were enrolled in this study. We measured the anteroposterior (AP) distance, radioulnar (RU) distance, and cross sectional area of the FPL tendon at the level of the greatest AP distance of the FPL tendon proximal to the A1 pulley and those of the inner space of the A1 pulley using ultrasonography. The measurements were repeated on the contralateral normal side. The average age at the time of the measurements was 32 months.

Results: Although the average AP and RU measurements of the FPL tendon were 13% and 55%, respectively, larger than those in the inner area of the A1 pulley in the trigger thumb, the ratio of AP measurement to RU measurement in the FPL tendon was similar to that on the contralateral side. The average AP measurement in the inner space of the A1 pulley was significantly larger in the trigger thumb than on the normal side. Notta's nodule was a swollen FPL tendon just proximal to the A1 pulley.

Conclusions: Using ultrasonographic measurements, we were able to identify enlargement of the FPL tendon proximal to the A1 pulley in the trigger finger, compared to the inner space of the A1 pulley in the trigger thumb or FPL tendon on the contralateral side. Developmental mismatch between the FPL tendon and the inner space of the A1 pulley is a possible cause of pediatric trigger thumb.

NEUROVASCULAR ISLAND FLAP FOR PULP AND NAIL AUGMENTATION IN DUPLICATED THUMB RECONSTRUCTION - A NOVEL TREATMENT WITH LONG TERM FOLLOW UP OF 7.9 YEARS

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Introduction: Pulp and nail asymmetry is commonly seen in thumb duplication condition. Conventional or modified Bilhaut-Cloquet procedure may lead to poor cosmetic outcome or may not be applicable. To improve aesthetic and functional results, a novel reconstruction technique with neurovascular island with long-term outcome is described.

Materials & Methods: 14 patients aged 8 to 18 months were operated between 2002 and 2013 in our center. There were cases of Wassel type I, II, III, IV, and VII. All patients had significant hypoplasia and asymmetry of the pulp and nail of their digits. A surgical technique was developed, which utilized an island flap raised from the planned ablated digit basing on its single neurovascular bundle. This was transferred to and combined with the retained digit using fine sutures under microscope. All patients were assessed for functional and aesthetic outcome

CONGENITAL HAND

parameters, and Tada, JSSH and a proposed aesthetic scoring system were used. **RESULTS:** The mean follow up period was 7 years 11 months. Of the 15 cases, 14 flaps survived. The improvement in mean nail width at final assessment was significant ($p=0.006$). Nail ridging was prominent in 4 cases, mild in 2 and inconspicuous in 9. The mean Tada and JSSH scores were 4 (3-5) and 17.5 (16-19) respectively. Aesthetic score was not related to suture size, the use of microscope, or combination of bone.

Conclusions: In selected cases of thumb duplication where an ablation procedure would result in a hypoplastic and asymmetrical thumb, the neurovascular island flap is a safe and effective means to improve size and aesthetics.

CAN THE PROXIMAL PHALANGEAL HEAD REMODEL AFTER STRETCHING EXERCISE OR SURGICAL TREATMENT IN PATIENTS WITH CAMPTODACTYLY?

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Objectives: The aim of this study was to verify the remodeling patterns of proximal phalangeal head after conservative and/or surgical intervention in patients with camptodactyly using radiograph.

Methodology: A total of 47 subjects (Male 21, Female 26, mean age 4.2 ± 1.9 years) with camptodactyly were selected. The regular stretching exercises were performed in 36 participants and the others got surgical correction. Flexor digitorum superficialis (FDS) tenotomy and volar plate release were done through surgical procedure. The acute angle between the volar cortex of proximal phalanx shaft and that of proximal phalanx head on finger were measured using true lateral radiographs at initial visit. The same procedures for measurement on finger were done two years after surgery. The extent of proximal interphalangeal joint (PIPJ) contracture on passive functioning was evaluated to determine clinical outcomes from conservative and surgical intervention.

Results: The mean acute angle between the volar cortex of proximal phalanx shaft and that of proximal phalanx head before surgery was mean 24.14 ± 8.45 degree and mean 16.05 ± 5.80 degree after medical intervention ($P < 0.001$). The extent of PIPJ contracture also showed significant improvement ($P < 0.001$).

Conclusions: Remodeling of proximal phalanx with camptodactyly after conservative and/or surgical intervention were confirmed on radiograph.

A DESCRIPTIVE STUDY ON RADIAL CLUB HAND

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Introduction: Radial club hand is a rare congenital anomaly of hand involving preaxial border of hand with incidence of 1 in 30000 to 1 in 100000. It is associated with deformities in forearm, arm and several other systemic anomalies. Its severity ranges from mild hypoplasia of radius to complete absence of radius. In Indian context there were very less studies describing anomalies and this study aims at describing this anomaly.

Materials and Methods: This study was a descriptive study aimed at describing Radial club hand anomalies and its association with other systemic anomalies during March 2014 to March 2016 collected from outpatient department of Balaji Institute of Surgery Research and Rehabilitation for the Disabled hospital (B.I.R.R.D.), Tirupati, Andhra Pradesh, India.

Results: We report a total of 62 cases of radial club hand among which 24 were bilateral and 38 were unilateral. Male to female ratio was 2.1:1 and no significant history of environmental or familial factors was reported. Type 4 Bayne radial deficiencies were most common and type 5 Blauth hypoplastic thumb was most common finding. All the finger deformities were more pronounced in index finger and were least seen in little finger. Other systemic anomalies recorded were absence of kidney (6.4%) and atrial septal defect (9.7%), Tibial hemimelia, Spina bifida, hemangioma.

Conclusion: This study had recorded unilateral involvement of radial club hand to be more prevalent than bilateral. Association of systemic anomalies was less with bilateral radial club hand.

POLYDACTYLY OF THE HAND, SURGICAL STRATEGY AND CLINICAL OUTCOME

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Background Polydactyly is the most common congenital digital anomaly of the hand. It may appear an isolation or in association with other birth defect. Polydactyly varies from unnoticeable rudimentary finger to a fully developed extradigit. The type could be preaxial, central and post axial. Pre axial polydactyly (thumb polydactyly) is the most common type in the hand. The incidence is 8 in 100,000 population. The most widely accepted classification is Wassel to categorize the pathoanatomy of the preaxialpolydactyly and to guide respective surgical procedure, based on the level of duplication.

Objectives: Patient with preaxialpolydactylyWassel IV who underwent surgery. First case was a girl 6 years old and the second was a boy 11 months old. They complained uncomfortable when using their involved hand and also cosmesisappearent as well. Result Sacrifice the radial thumb for both cases with exposures entails a racquet- shaped incision of some type with extension proximally and distally, suturing duplicated extensor of radial digit to long extensor of the ulnar digit and reattachment of abductor pollicis brevis and extensor pollicis brevis to the base of proximal phalanx. Both cases were good in result after several weeks surgery and also function and cosmesis as well.

Conclusion: Surgery remains the definitive treatment with a goal to improve hand function and cosmesisappearent of the involving thumb.

Keywords: Preaxialpolydactyly of the hand, Surgical strategy, Clinical outcome

OPEN REDUCTION OF THE DISTAL RADIUS >4 WEEKS AFTER PHYSEAL INJURY: A REPORT OF THREE CASES

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Objective: Closed reduction should be performed for largely displaced physeal injury of the distal radius, but there is no consensus on performing this reduction within a few weeks after the original injury. We report three cases of performing open reduction of the distal radius >4 weeks after physeal injury.

Methodology: We performed open reduction for >50% translationally displaced physeal injuries of the distal radius by using Kirschner wires >4 weeks after the injury. All patients were male and the average age was 11.7 years (range, 10–14

years). According to the Saltar and Harris classification system, all patients had type II injuries. The average time to surgery was 36.7 days (range, 28–42 days). The average follow-up was 16.5 months (range, 15–18 months). We evaluated the clinical outcomes of grip strength and range of motion, and the radiological outcomes of ulnar variance, nonunion, and premature epiphyseal closure.

Results: Per radiological findings, there were no nonunion cases, but all of them exhibited premature epiphyseal closure. Average ulnar variance was 1.93 mm positive (range, 0.8–3.7 mm positive) at the site of injury and 0.17 mm negative (range, 0.5–0 mm negative) at the site of non-injury. Average wrist flexion and extension angles were 90° and 95°. Average supination and pronation angles were 88.3° and 95°. Average grip strength was 91.9% of that of the non-injured wrist.

Conclusions: Physeal arrest of the distal radius is rare, but all our patients exhibited premature epiphyseal closure at the last follow-up. All patients have displayed good results until now, but deformity and pain may appear in the future. We recognized the risk of physeal arrest and the need for atraumatic reduction for largely displaced physeal injury of the distal radius at the original injury site.

DEGENERATIVE CONDITIONS

INCIDENCE OF HAND AND WRIST PROBLEMS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND LIKE-CONDITIONS SEEN AT THE PHILIPPINE ORTHOPEDIC CENTER

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Abstract Objective: Rheumatoid arthritis (RA) is an inflammatory disease affecting joints. Involvement is most common in the hands, wrist, and the feet. This study aims to identify common hand and wrist problems among patients with RA and like conditions presenting at the Philippine Orthopedic Center (POC).

Methodology: Out of 98 patients seen at the Rheumatology clinic of the POC from July 2016 to July 2017, 39 are newly diagnosed cases of Rheumatoid Arthritis and like conditions. Fourteen were referred to the Hand service for the study, with ten (9 = female, mean age 56 years) able to complete baseline and follow-up evaluation. Patients were managed medically with Disease-Modifying Antirheumatoid drugs (DMARDs). Participants were evaluated [1] clinically (presentation of hand and wrist deformities), [2] via Disabilities of the Arm, Shoulder and Hand (DASH) measure, [3] Larsen radiographic score, [4] changes in Total Active Motion [TAM] of digits, and [5] changes in power and pinch grip.

Results: PIPJ synovitis was the most common finding (8 of 10). Two patients had severe deformity upon recruitment (wrist synovitis, MCPJ ulnar drift & subluxation, PIPJ synovitis, etc.). Follow-up DASH scores were significantly improved (mean difference 11.25, $p = 0.03$), as well as bilateral power grip tests (right mean difference 1.59 $p = 0.04$; left mean difference 1.43 $p = 0.056$). Pinch grip tests and TAM measurements were not significant. Radiographic scoring showed disease progression (increased 1.3 points, $p = 0.003$). One patient underwent surgery to alleviate wrist pain.

Conclusion: The study showed that all patients of POC that have rheumatoid arthritis present with hand and wrist problems. Most patients on DMARDs present with self-reported improvement, however still with radiographic disease progression. A longer follow-up period shall provide more information regarding the characteristics and disease progression of patients with Rheumatoid Arthritis of the hands and wrists.

ARTHROSCOPIC SURGERY FOR ARTHRITIS OF THUMB CARPOMETACARPAL JOINT

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Objective: Thumb carpometacarpal (CMC) arthritis is one of the most common arthrosis of the upper limb. The most common surgical treatment currently used is trapezium excision combined with a ligament reconstruction and tendon interposition. In an effort to maintain the osseous foundation of the thumb, partial trapezium resection and interposition arthroplasty has been described. Advances in arthroscopic technology allow examination and treatment of the small joints through the body with minimal morbidity. Synovitis, osteophytes, and ligamentous tears or lax are successfully managed with arthroscopic surgery. Moreover, arthroscopy is reliable for direct evaluation and treatment of the thumb CMC joint.

Material and Methods: From August 2004 to April 2010, we treated 35 thumbs with symptomatic thumb basal joint arthritis (Eaton stage I-III) using arthroscopic partial trapeziectomy and palmar longus tendon interposition. The sample included 25 women and 10 men with a mean age of 53.2 years (range, 19 to 68 years).

Results: All patients underwent regular clinical follow-up at a mean of 38 months (range, 26 to 78 months). Pain scores improved in all patients after operation. The thumb pinch strength significantly improved in all thumbs after operation ($P < .01$). All patients were satisfied with the results and improved the daily activities.

Conclusion: The arthroscopic surgery is very effective for arthritis of thumb basal joint.

USEFULNESS OF CUSTOM-MADE SPLINTS FOR DETERMINING POSITION OF THUMB CM JOINT ARTHRODESIS—A CASE REPORT

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Background: Thumb carpometacarpal (CM) joint arthrodesis is seldom indicated for a hand with ulnar nerve palsy. For a patient with crushed hand, we made thumb-post-splints in order to determine the CM joint position preoperatively.

Patient & Method: A 19-years-old male patient crushed his non-dominant left hand. He sustained the CMC joints fracture dislocation, ulnar nerve avulsion and thenar muscles defect. Due to severe soft tissue damages and bone defect, the 1st CM joint fracture dislocation and deep branch of the ulnar nerve could not be repaired. After the soft tissue coverage, all fingers gained useful range of motion, then arthrodesis of the unstable thumb CM joint was planned. We made three types of thumb-post-splint with radial/palmar abduction angles of 0/25 degrees (splint 1), 0/35 (splint 2), and 10/25 (splint 3). The hand function was compared with wearing each splint. Preoperatively, lateral pinch and grip strength was 20% and 32% of the contralateral hand. Simple-Test-for-Evaluating-Hand-Function (STEF), Visual analog scale of pain (VAS), and quick-DASH was 88, 5/10, and 29, respectively.

Result: With splint 1, 2, and 3, pinch strength was 0.8, 1.2, 0 kg, Grip strength was 7.5, 7.7, 0 kg, respectively. STEF was 86, 88, 82 points, and qDASH was 22, 11, 18, respectively. The thumb CM joint was fused as the position of the splint 2. Five-month postoperatively, the hand function improved both objectively (pinch: 36%, grip: 47%, STEF: 97) and subjectively (VAS: 0, qDASH: 9). He returned his work and was satisfied with the results.

Conclusion: Custom-made splint was useful to determine the optimum position of thumb CM joint arthrodesis in patient with unstable thumb with ulnar nerve palsy.

DEGENERATIVE CONDITIONS

TIN RING SPLINT TREATMENT FOR OSTEOARTHRITIS OF THE DISTAL INTERPHALANGEAL JOINTS

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Objective: Though splinting for osteoarthritis of the distal interphalangeal (DIP) joint shows good results, adherence to splints is not good due to their appearance and inconvenience. To improve adherence, we made a tin ring splint which looks attractive and is easy to wear. We report here the results of pain reduction and satisfaction with this splint.

Methodology: We enrolled 30 patients with painful osteoarthritis of the DIP joint of the fingers in this cohort study. A tin ring splint was made with tin alloy containing small quantities of silver. The splint is circular to fix the DIP joint, with an open dorsal side to prevent irritating the osteophytes. Three sizes of the splint were prescribed depending on the size of the involved fingers. Patients were instructed to wear the splint freely when they felt pain. The numeric pain scale and Hand 20 for functional evaluation and range of motion of the DIP joint were assessed at baseline and after one month. Additionally, data were collected on time to symptom relief and satisfaction related to usability and appearance of the splint (with 0 being dissatisfied, and 10 as completely satisfied). Differences between baseline and one month were compared by the Wilcoxon signed ranks test.

Results: The numeric pain scale showed significant pain improvement from 57.2 ± 4.3 at baseline to 31.3 ± 4.4 at one month. Hand 20 and range of motion were not changed significantly. Most patients responded that symptoms were relieved by the 10th day after treatment. Satisfaction related to usability was 8.7 ± 0.3 , and appearance was 7.5 ± 0.4 .

Conclusion: Tin ring splint quickly reduced pain after about one week. Moderate variability and superior esthetics of tin alloy were thought to be main factors for the high satisfaction related to usability and appearance. This splint could be one choice for conservative treatment of osteoarthritis of the DIP joint.

FLEXION CONTRACTURE FIVE FINGERS OF THE LEFT HAND, A CASE REPORT

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Background: Flexion contracture finger cause the finger in flexion condition and cannot extension passive and actively. One cause of flexion contracture is burn. Surgery is done to release scar by Z-plasty incision

Case: Male 20 years old cannot moving all of his left fingers since he was 4 years old due to burn injury. Scar at the palmar site radiating all of five fingers, no hyperemia, no range of movement for flexion and extension of the fingers at proximal and distal interphalangeal joints and also metacarpophalangeal joints actively, but still remain limited flexion and extension movement passively, no abnormalities of the bones and joints at the X-ray examination of the left hand. General condition is in normal and the laboratory findings as well. He suffering from flexion contracture five fingers of the left hand dermatogenic type.

Treatment: Surgery was done to incise the scar and make Z-plasty incision of all the fingers, put K-wire in full extension position, full thickness skin graft to coverage soft tissue that cannot covering with soft tissue primarily taken from thenar region and sutured with nylon 5-0. Foreslab for three weeks in full extension position all of the fingers and wrist joint. After three weeks taken out the foreslab and K-wire for evaluating the skin graft and encourage the patient to move his fingers in flexion and extension passively and actively as many as possible for exercises. Four months after surgery the patient was be able to move all of his left fingers actively and passively. The progress of his fingers flexion extension was progressively increased

by exercises actively and passively. Surgery by doing multiple Z-plasty and put full thickness skin graft also inserting k-wire remains reliable treatment for flexion contracture of the finger.

ANOMALOUS COURSE AND STENOSING TENOSYNOVITIS OF THE EXTENSOR POLLICIS LONGUS TENDON AT RADIAL STYLOID - A CASE REPORT-

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Key Words: Anomaly, Extensor pollicis longus, Tenosynovitis, De Quervain disease

Introduction: We report a case of an anomalous course and tenosynovitis of the extensor pollicis longus tendon, who presented the symptoms of the de Quervain disease.

Materials & Method: A 44-year-old right-handed man visited the clinic because of the left wrist radial-side pain, which was aggravated during the previous 10 days. When we examined the patient, the wrist showed radial-side mild swelling, severe tenderness on the radial styloid process and moderate tenderness on the mid dorsal aspect of the radio-carpal joint which was sometimes swollen. He turned out to be positive on the Finkelstein's test and displayed limited range of motion of the left wrist. Motion of the thumb and wrist aggravated pain. Magnetic resonance imaging (MRI) of the left wrist was interpreted as mild tenosynovitis at the third extensor compartment and intersection syndrome. But clinical symptoms were not matched with the MRI findings. Therefore we clinically diagnosed him with de Quervain disease and focal synovitis of radio-carpal joint. A zig-zag skin incision on the radial styloid process was made. The operative findings revealed stenosing tenosynovitis with partial tearing. We initially considered the tendon to be the extensor pollicis brevis (EPB). When we retracted this tendon the thumb interphalangeal joint was extended, so we suspected that this tendon was the extensor pollicis longus (EPL) instead of EPB. When the operation was finished, we reviewed the MRI of the patient. It revealed that obliquely coursed EPL tendon, was originated from ulnar side of forearm to radial styloid at the radial and proximal site of Lister's tubercle. The EPB could not be found.

Results: At 12 months follow-up, the patient was completely asymptomatic at the radial styloid process and able to resume full daily activities.

Conclusion: Anomalous course of the EPL is rarely reported with associated similar symptoms of de Quervain disease. But we consider that knowledge and understanding of this potential anomaly in the course of EPL is very important in the treatment of de Quervain disease to decrease the dissatisfaction after surgery.

DETERMINANTS OF THE JAPANESE SOCIETY FOR SURGERY OF THE HAND VERSION OF THE DISABILITY OF THE ARM, SHOULDER, AND HAND (DASH-JSSH) QUESTIONNAIRE IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: The Disability of the Arm, Shoulder, and Hand (DASH) questionnaire is now available in several languages and is the most widely used upper extremity-

DEGENERATIVE CONDITIONS

specific health status measure. The aim of this study was to investigate the determinants of the Japanese Society for Surgery of the Hand Version of the Disability of the Arm, Shoulder, and Hand (DASH-JSSH) in rheumatoid arthritis (RA) patients and the relationship between physical and psychological functions.

Methodology: Twenty-nine right-handed RA patients were included in this study. Disease activity was measured with Disease Activity Score 28, and patients were evaluated using the DASH-JSSH questionnaire and visual analogue scale for pain. Motor and sensory functions of the upper limb, including range of motion (ROM), hand grip and pinch strength, two-point discrimination for sensation, and Purdue Pegboard test for finger dexterity, and Jebsen-Taylor test for comprehensive hand function were measured in both hands. Psychological examinations involved the following measurements: the Self-Rating Depression Scale, the State-Trait Anxiety Inventory, the WHO-Five Well-Being Index, and the Mini-Mental State Examination.

Results: Multiple regression analysis indicated that DASH-JSSH scores were associated with shoulder flexion of the dominant hand ($\beta = 0.482$, $p < 0.001$), elbow flexion ($\beta = -0.260$, $p = 0.014$) and grip force ($\beta = -0.273$, $p = 0.018$) of the non-dominant hand, and depression ($\beta = 0.319$, $p = 0.009$). Furthermore, these scores correlated with ROM of the upper extremities, muscle strength, and depression in RA patients.

Conclusions: The findings of the present study may facilitate the development of hand therapy.

EFFECTIVENESS OF A CUSTOM-MADE FUNCTIONAL SPLINT FOR OSTEOARTHRITIS OF THE TRAPEZIOMETACARPAL JOINT

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Objective: The effectiveness of splint therapy for osteoarthritis of the trapeziometacarpal joint (TMOA) is well established, but the design of the splint still requires improvement, especially with fitting. To solve this problem, we developed a custom-made splint using neoprene. To evaluate the effectiveness of our splint, it was prescribed to 20 patients, whose subjective and objective outcomes were analyzed.

Methodology: Twenty-six hands (6 male, 20 female) of 20 patients with TMOA were examined for pain using a visual analogue scale (VAS, mm), strength by Grip and Pulp pinch, subjectively by the Disability of the Arm, Shoulder, and Hand (DASH-JSSH) questionnaire, Patient-Rated Wrist Evaluation (PRWE), and an original questionnaire about satisfaction, comfort, and frequency of use in work involving water. The evaluation was performed three times, before starting splint therapy, and 1 and 5 months after starting. $P < 0.05$ was considered significant using Student's *t*-test.

Results: The VAS improved significantly from 66.8 to 41.8 at 1 month and 8.7 at 5 months; grip strength did not improve. Pulp pinch improved significantly from 1.7 kg to 2.1 kg at 1 month and 2.4 kg at 5 months. DASH-JSSH improved significantly from 35.7 to 34.5 at 1 month and 22.3 at 5 months. PRWE improved significantly from 49.9 to 37.9 at 1 month and 22.3 at 5 months. Satisfaction and comfort maintained high values from immediately after starting. Use in work involving water increased with time.

Conclusions: Since neoprene is elastic and waterproof, it is well suited for splint therapy. Our splint for TMOA showed significant effectiveness in reducing pain, pulp pinch and subjective outcomes. On the other hand, there were some problems: difficulty putting it on and taking it off, and or sweating under the splint. Further improvements and comparison with existing splints are needed.

DISTAL RADIUS

COMPARISON OF DIFFERENT SPLINTS USED FOR POST-OPERATIVE SPLINTING IN DISTAL RADIUS FRACTURES

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Objective: To compare available wrist and forearm range of motion after the application of radial slab, ulnar-based forearm splint, volar splint, and long arm posterior mold in healthy adults and to evaluate these in terms of satisfaction.

Methods: Ten healthy subjects without previous injury to the dominant upper extremity were included in the study. Active wrist and forearm range of motion of the dominant extremity was measured by a single examiner using a goniometer. The following splints: radial slab, ulnar-based forearm splint, volar splint, and long arm posterior mold, were applied by the researcher in a randomized order. The subjects wore these for one hour. Range of motion was again measured with each type of immobilization, and the subjects completed the QuickDASH. The subjects were also asked to rate the different splints from 1 to 4, 1 being the splint that they preferred the most.

Results: Ten adults with a mean age of 27 (range 23 to 32), equal gender distribution, and majority of whom were right-handed (9:1) were included in the study. A significant difference in flexion and extension was observed in all types of splint compared with no immobilization. A significant decrease from baseline range of motion was also observed among the RS for radial deviation; RS, US, and LAPM for ulnar deviation; RS, UF, and LAPM for pronation; and LAPM for supination. There was no significant difference between mean QuickDASH scores of the RS, US, and VS compared with each other; however, a significant difference was found with these three when compared to the LAPM ($p = 0.039$, $p = 0.003$, $p < 0.001$, respectively). There was a significant difference in the perception of patient ranking per splint (chi-square with three degrees of freedom = 11.640, $p = 0.009$) with the VS ranking the highest.

Conclusion: The long arm posterior mold provided the overall greatest restraint to range of motion compared with the other types of splints, especially in pronation and supination. The volar splint had significantly better functional scores and subjective perception, but provided the least amount of restriction. For a balance between good decrease in range of motion as well as better tolerance, the ulnar-based forearm splint can be used.

DISTAL RADIUS FRACTURE PATIENTS SHOWED DECLINED DYNAMIC BODY BALANCING ABILITY AND GRIP STRENGTH.

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Objective: Fragility fractures of the distal radius are associated with an increased risk of future fragility fracture, so the importance of body balancing ability and bone quality in fall and secondary fracture prevention is well recognized. We assessed body balancing ability, grip strength and bone quality of women patients with distal radius fractures (DRF) who underwent surgery, and identified the characteristic of the patients.

Methodology: A prospective multicenter study, approved by IRB, of 151 women with their first fragility fracture of the distal radius who underwent surgery in registered hospitals in 2015 was conducted. Two weeks after surgery, their body balancing ability was measured by four methods: Functional Reach Test (FR), Timed Unipedal Stance test (TUS), Timed Up and Go test (TUG), and 2 Step test (2S). Grip strength on the non-fracture side (GS) and bone density (T-score) were also measured at the same time point. Statistical analysis was performed using the Student's *t* test to compare the Japanese normative values of same age range and $p < 0.05$ was considered significant.

DISTAL RADIUS

Results: FR and TUS showed no significance. TUG was 7.7 seconds (s) in women in their 50s ($p < 0.001$), 7.1s in women in their 60s ($p = 0.002$) and 8.1s in women in their 70s ($p = 0.004$). 2S was 1.32 in women in their 50s ($p = 0.003$), 1.29 in women in their 60s ($p < 0.001$), 1.21 in women in their 70s ($p < 0.001$) and 1.02 in women in their 80s ($p = 0.01$). GS was significantly lower in all age. Only 25% of subjects showed a lower T-score than -2.5 .

Conclusion: Patients with DRF showed significantly lower body balancing ability, especially during dynamic motion like TUG and 2S, thus, these patients should be identified as those at "high risk" of falls and secondary fractures. Intensive training could be effective for fracture prevention.

RADIAL DISTRACTION TO STABILIZE DISTAL RADIOULNAR JOINT IN DISTAL RADIUS FIXATION

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Objective: Persistent distal radioulnar joint (DRUJ) instability following internal fixation of distal radius fractures can be managed with soft tissue or bony stabilization and prolonged immobilization. These strategies limit early motion. To address this limitation, we report our technique of indirect ulna shortening by radial distraction followed by early mobilization and provide clinical results.

Methodology: We performed this technique intraoperatively in cases of persistent DRUJ instability during standard volar plating of distal radius fractures. Radial lengthening was achieved by distraction through the fracture site using the oblong hole of the plate until DRUJ stability was obtained. There was no immobilization of forearm rotation and standard, early mobilization rehabilitation programs were used.

Results: We report the radiographic and clinical outcomes in 23 patients. In all cases, the postoperative 12-month evaluation demonstrated acceptable wrist range of motion, a stable DRUJ, and there were no cases of distal radius nonunion. Average postoperative ulnar variance was -1.4 mm (-2.1 - 2.2 mm). VAS was 0.78 (0 - 2). QuickDASH score was 11.2 (0 - 29).

Conclusions: In our series, indirect ulnar shortening by distraction through distal radius fracture site provided a simple and novel strategy for management of persistent DRUJ instability during volar plating obviating the need for prolonged immobilization without additional complications.

PRWE TRENDS OF PATIENTS WITH DISTAL RADIUS FRACTURE

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Objective: Clinical outcome after treatment of distal radius fractures is traditionally based on assessment that look at objective clinical variables. The relationship between functional score (i.e. PRWE) and clinic attendance is unclear. The study examines the trend of PRWE scores as a predictor of follow-up clinic attendance, with the hypothesis that improvement in PRWE score is correlated to reluctance in attending follow up consults.

Methodology: The study is a retrospective review of patients with distal radius fractures seen and treated at the department of Hand and Reconstructive Microsurgery from January 2014 to December 2015. The patients were then stratified into age categories of 20-40, 41-64, above 65, as well as treatment modalities of conservative

or surgery. Patient-Rated Wrist Evaluation (PRWE) scores and follow-up visits at various time points (3 months, 6 months, and 1 year) were then compared against based on the difference stratified groups.

Results: The general PRWE trend in the above 65 age group showed the most constant reduction over the 3 time points, followed by the 41-64 group, and lastly the 20-40 group. The age group ranging 41-64 showed the fastest improvement (59%) from 3 months to 6 months, then slowing down from 6 months to 1 year. The age group of 20-40 appears to have the least improvement in PRWE scores over the 3 time points.

Conclusions: The velocity of improvement in PRWE scores is most marked between 3-6 months, and patients who demonstrate significant improvement may not require further review.

SURGICAL TREATMENT OF THE DISTAL RADIUS FRACTURE IN THE UPPER LIMB WITH DIALYSIS SHUNT ; A CASE REPORT.

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Background: Fracture treatment in the limb with dialysis shunt is basically difficult because of the necessity for the management of shunt. We report a case of the surgical treatment of the distal radius fracture with dialysis shunt in which we obtained good outcome.

Case: A 68 year-old female , sustained a distal radius fracture after she fell down from the bed. She has a past medical history of renal sclerosis and received dialysis for 10 years. We waited for the subsidence of swelling of the affected area, and the surgery was performed after 15 days. We checked out a blood flow of the vessel with ultrasound before incision. Ultrasound showed the branch of radial artery located over FCR. We performed surgery with modified Henry approach to avoid the branch. The fracture was fixed with a volar plate (Zimmer-Biomet P-type plate) and a splint was applied for two weeks after surgery. She received rehabilitation for 6 months. Wrist range of motions in the final check-up were 75°, 85°, 90° and 90° (palmar flexion, dorsal flexion, pronation and supination respectively). Mayo wrist score was also good.

Discussion: In Japan there are 320 thousand dialysis patients. They break bones easily because of osteoporosis secondary to dialysis. When we treat distal radius fracture in the limb with dialysis shunts, immobilization with cast is often chosen as a treatment of choice to avoid bleeding and shunt dysfunction although sometimes such conservative treatment leads to malunion and dysfunction. Then we used ultrasound to check the exact location of the shunt in advance and were able to perform osteosynthesis with a volar plate without air tourniquet safely.

Conclusion: Volar plating with ultrasound was useful in the treatment of a distal radius fracture in the limb with dialysis shunt.

CONSERVATIVE TREATMENT FOR DISTAL ULNAR FRACTURES ASSOCIATED WITH DISTAL RADIUS FRACTURES

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Background: Distal ulnar fractures (DUFs) associated with distal radius fractures (DRFs) are relatively common. Although the volar locking plate (VLP) is a standard device for treating DRFs, treatment of DUFs is controversial.

Methods: Our policy is VLP fixation for DRFs and conservative treatment for DUFs. Generally, if contact of the ulnar fragment is achieved after fixation of the DRF, we accept translation of 1/2 of the ulnar shaft or angulation of 20°. Cast immobilization is removed within 2 weeks. Between 2011 and 2014, we treated 20 patients with a DUF and DRF according to our policy. Ulnar fractures were classified according to Biyani

DISTAL RADIUS

(type 1 : 8 patients, type 2 : 3 type 3 : 5, and type 4 : 4). The amount of ulnar shortening between just postoperatively and the final examination was investigated radiologically. The wrist range of motion, grip strength, pain, and Disabilities of the Arm, Shoulder, and Hand (DASH) score were evaluated in 9 patients with long-term follow-up (average, 35.6 months (range, 19-63 months).

Results: There were 2 men and 18 women (average age, 74.4 years). All DUFs achieved union. The mean amount of ulnar shortening was 0.31 mm. Mean values of flexion, extension, pronation, and supination were 58°, 72°, 85°, and 85° respectively. Grip strength of the contralateral side was 90.3%. The mean DASH score was 3.9 points.

Discussion: All DUFs achieved union with slight shortening and good results. We speculated that in patients in whom DUFs are reduced because of fixation of DRFs, the triangular fibrocartilage complex or interosseous membrane may not be injured, and the distal radioulnar joint (DRUJ) stability would be preserved.

Conclusions: Operation for aged people with a DUF and DRF is unnecessary when reduction is generally achieved after VLP fixation of the DRF.

EFFECTIVENESS OF A CUSTOM-MADE FUNCTIONAL SPLINT FOR OSTEOARTHRITIS OF THE TRAPEZIOMETACARPAL JOINT

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Purpose: Distal radius fractures were associated with a high incidence of triangular fibrocartilage complex (TFCC) tear. This study aims to evaluate the status of TFCC after the union of distal radius fractures and to assess the functional outcome of patients with and without tears.

Materials and method: Patients who were elected for the removal of implants after union of distal radius fractures were recruited. Concomitant wrist arthroscopy was performed to assess the status of TFCC. Repair of TFCC was attempted for patients with symptomatic distal radioulnar joint (DRUJ) instability.

Results: 87 distal radius fractures were studied. There were 19 extra-articular distal radius fractures. 33 patients had ulnar wrist pain and 52 were noted to have DRUJ instability on examinations. The findings of wrist arthroscopies revealed 16 patients with intact TFCC. There were 58 complete tears and 17 incomplete tears showing signs of healing. 38 tears were repaired and 32 were not repaired, based on patients' symptoms and whether the tear was deemed repairable. At 6 months post wrist arthroscopy, the average pain score, power and the DASH score were noted to be statistically improved for all 3 groups i.e. patients with intact TFCC, patients with unrepaired TFCC tear and patients with repaired TFCC. There was no difference in the pain, DASH score and power between all groups for pre-arthroscopic period and post-arthroscopic period.

Conclusion: A large majority of TFCC tears remained to be unhealed. However, their functional outcome may not differ from those with intact TFCC.

EXAMINATION OF SAUVÉ-KAPANDJI METHOD FOR RA PATIENTS WITH SEVERELY DESTROYED WRIST USING BIOLOGICS

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Purpose: Articular surfaces of small joints destroyed from rheumatism are frequently remodeled after treating with biologics. The Sauvé-Kapandji (S-K) method was performed in these patients even when the radiocarpal joints were extensively destroyed. We examined usefulness of S-K method.

Subjects & Methods: Forty-six RA patients (51 joints) were treated with S-K method. Average age at the time of surgery was 57.8 years. All cases had been treated with biologics prior to the surgery. The Larsen classification of the radial carpal joint before the surgery was grade III / IV. The proximal end of the 45 ulnas was fixed using the ECU half slip. The carpal height ratio (CHR), ulnar carpal distance ratio (UCDR), radial rotation angle (RRA) and palmar carpal tunnel dislocation ratio (PCSR) were evaluated as X-ray parameters. Pair t test was used for statistical testing.

Result: CDAI was between 1.5 and 19.5 and 31 cases were evaluated as low activity or remission. The range of wrist joint pain and forearm rotation was improved but the range of palmar-dorsal flexion was not improved. In X-ray evaluation CHR decreased significantly. UCDR and RRA decreased immediately after the surgery. The ulna deviation increased at the time of the investigation. There was no change in PCSR value immediately after the surgery or during the investigation. The radiocarpal joint became bony ankyloses in only four cases (7.8%). Remodeling of the joint surface was confirmed in 47% of the cases.

Conclusion: In patients who showed good response to treatment with biologics the S-K method was effective in maintaining the range of motion of the wrist joint even for those cases in which joint destruction was extensive.

PREVENTION OF DEBRIS SCATTERING DURING SCREW DRILLING ON DIFFICULTY OF LOCKING-PLATE REMOVAL

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Background: Difficulty in removing screws from a locking plate (LP) is well-known. Stripped screw head of the recess needs to use high-speed carbide drill bits, it takes time to remove the debris scattered in the surroundings by excavating the screw head. We report on prevention of scattering using bone wax (BW technique).

Materials and Methods: Six cases who had difficulty pulling out screws of LP from August 2015, which introduced BW technique to prevent debris scattered. Survey Items are surgical site, number of screws difficult to remove, operation time, use of BW technique, presence of residual debris by X-ray after operation. We describe BW technique. Stripped screw head is covered by BW formed like mountain. Then Drill bit pull down until screw head. Until finished drilling, we need to keep BW mountain. Drill bit is pulled off, debris remains under the BW mountain, and we can throw away debris with BW.

Results: All surgical sites were forearms. Screws hard to remove: average 3.3(1-7). Operation time: average 116 minutes (57-181). 4 cases with BW, 2 cases without BW. Debris remained in 1 case with BW, 2 cases without BW.

Discussion: When it is difficult to remove the LP, it is necessary to excavate the stripped screw head at a high rate. There were reports of covering the surrounding with gauze or film to prevent scattering. It is necessary to widening the surgical field for prevention of involvement such as gauze or film by the drill. It became unnecessary to develop a surgical field which is considered to be a relatively simple and useful method by BW technique.

Conclusions: It is Inexpensive & effective method for prevention to debris scattered on Difficulty in removing screws from a locking plate.

DISTAL RADIUS

EFFECT OF SARCOPENIA ON THE FUNCTIONAL OUTCOME AFTER SURGERY FOR DISTAL RADIUS FRACTURES

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Objective: Loss of skeletal muscle mass and consequent loss in muscle function associate with aging, and this condition negatively impacts the activities of daily living and increases elderly individuals' frailty to falls. Thus, patients with low appendicular lean mass would show different functional recovery compared to those without this condition after surgery for distal radius fracture (DRF). This study compares the functional outcomes after surgery for DRF in patients with or without sarcopenia.

Methods: A total of 157 patients older than 50 years of age with a DRF treated via volar plate fixation were enrolled in this prospective study. A definition of sarcopenia was based on the consensus of the Asian Working Group for Sarcopenia. The researchers compared functional assessments (wrist range of motion and Michigan Hand Questionnaire [MHQ]) and radiographic assessments (radial inclination, volar tilt, ulnar variance, and articular congruity) 12 months after surgery between patients with and without low appendicular lean mass plus slowness or weakness. Multivariable regression analyses were performed to determine whether appendicular lean mass, grip strength, gait speed, patient demographic, or injury characteristics accounted for the functional outcomes.

Results: Patients with low appendicular lean mass plus slowness or weakness showed a significantly lower recovery of MHQ score than those in the control group throughout 12 months. There was no significant difference in the range of motion between the groups. The radiologic outcomes showed no significant difference between groups in terms of volar tilt, radial inclination or ulnar variance. According to multivariable regression analysis, the poor recovery of MHQ score was associated with an increase in age, grip strength and lower appendicular lean mass, and these three factors accounted for 37 % of the variation in the MHQ scores.

Conclusions: Patients with sarcopenia are at risk for poor functional recovery after surgery for DRF, even when they have similar radiologic outcomes.

CLINICAL RESULTS OF SAUVE-KAPANDJI PROCEDURE

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Objective: We evaluate the clinical result of the Sauvé-Kapandji (S-K) procedure without bone grafting. Methodology Twenty patients, including 5 males and 15 females, who underwent the S-K procedure in our department were enrolled. Mean age at surgery was 68.4 years (44 to 85 years). The mean postoperative observation period was 22.0 months (2 to 53 months). Underlying diseases were rheumatoid arthritis of the wrist (14 patients), ulnocarpal abutment syndrome (4 patients), and ulnar head dislocation (1 patient). In all patients, an Acutrak 4/5® screw was used to fix the distal radioulnar joint surgically without bone graft. As outcome measures, we compared the preoperative and postoperative range of motion (ROM), carpal height ratio (CHR), ulnar translation index (UTI), and palmar carpal subluxation ratio (PCSR) measured with simple radiographs. In addition, we confirmed the presence or absence of bone union at final follow-up.

Results: Mean ROMs (°) of palmar flexion, dorsiflexion, forearm pronation, and forearm supination increased from 55.4, 45.8, 78.9, and 78.5 preoperatively to 62.1, 52.0, 82.5, and 83.8 postoperatively, respectively. There was no significant difference between the two groups. CHR and UTI were 0.48 ± 0.06 and 0.30 ± 0.07 preoperatively and 0.43 ± 0.09 and 0.34 ± 0.06 at final follow-up, respectively; this difference was significant ($p < 0.05$). PCSR was 0.22 ± 0.06 preoperatively and 0.22 ± 0.06 at final follow-up; this difference was not statistically significant. Although only 16 of 20

patients achieved bone union, no screw loosening or ulnar head dislocation occurred, and no patient underwent reoperation.

Conclusions: Although the S-K procedure, which we have performed to date, is simple and does not require bone graft, some patients did not achieve bone union. In the S-K procedure, some patients may require a bone graft, although no effect on wrist function was observed even in case of non-union.

FLEXOR TENDON CHANGES POST DISTAL RADIUS FRACTURE FIXATION WITH SYNTHES VA LCP VOLAR RIM DISTAL RADIUS 2.4MM PLATE—AN IN VIVO ULTRASOUND EVALUATION

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Background: Volar locking plate fixation for distal radius fracture has gained popularity in recent years. However, flexor tendon injury is a recognized complication of this technique and the prevalence of rupture has been reported to be as high as 12%. One of the possible reasons is implant positioned distal to the watershed line. We conducted an ultrasound study to look for morphological changes of flexor tendons following fixation of distal radius fracture using Synthes VA LCP volar rim distal radius 2.4mm.

Methods: A total of eight patients were included in the study. Ultrasound studies of the wrist were conducted by a senior radiology consultant six months after fixation to determine the anatomical relationship of the flexor tendons to the plate.

Results: We found that evidences of tendon injuries to both flexor pollicis longus (FPL) and flexor digitorum profunda (FDP). Among these patients, one had FPL partial tear, one had FPL impingement by screw head, and three had FPL synovial sheath thickening. As for FDP, two had undersurface attrition by hardware while two showed chronic synovial sheath thickening.

Conclusions: Based on this study, we recommended that patient should be advised for early removal of implant to prevent late flexor tendon injury.

THE BREAKAGE OF VOLAR LOCKING PLATE SYSTEM FOR DISTAL RADIUS FRACTURES. WHAT IS THE CAUSE?

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Object: Open reduction and internal fixation using the volar locking plate system is the primary surgical treatment option for distal radius fractures. Implant breakage following this procedure had been reported as a rare complication, however, the cause remained unclear. Thus, we aimed to elucidate the cause of implant breakage and as well as measures for its prevention.

Methods: We experienced implant breakage of the volar locking plate system in 3 wrists of 40 wrists who had underwent surgery using the plate system during the 1-year period from January, 2014 to December, 2015. Medical data of patients without and with implant breakage were retrospectively compared using the Mann-Whitney and χ^2 test.

Results: Breakage of distal locking screw and plate was occurred at the locking head-shaft junction and at an unused proximal row screw hole for distal locking screws, respectively. Any significant implant fixation factor associated with plate breakage was not identified. On the other hand, an absence of a distal locking screw aiming at the radial styloid and plate fixation with a gap formation of 2 mm or greater from the volar surface of the distal radius were significantly associated with breakage of distal locking screws.

Conclusions: We were able to identify significantly affected factors for the breakage of distal locking screws. Our results suggest that plate fixation with

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sufficient contact of plate with the volar cortical surface of the distal radius and distal locking screws directed at the radial styloid may prevent the breakage of the distal locking screws. Additionally, filling a screw hole around fracture site may be useful to prevent the breakage of the plate.

DOUBLE PLATE FIXATION WITH INTRAOPERATIVE COMPUTED TOMOGRAPHIC NAVIGATION FOR DISTAL HUMERUS FRACTURES: A REPORT OF TWO CASES

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Objective It is important to prevent contracture and nonunion of distal humerus fractures, so correct and strong fixation should be implemented and early exercise treatment should be encouraged. We have used intraoperative computed tomographic (CT) navigation to insert the screws accurately in the distal humerus fragments. Herein, we report the user experience and postoperative results of double plate fixation with intraoperative CT navigation for distal humerus fractures.

Methodology This study consisted of two male patients (mean age, 55 years) who were treated with double plate fixation using the VariAx Elbow Plate (Stryker). AO classification indicated 13A2 and 13C1. We initiated early range of motion (ROM) exercise without external fixation after operation. The mean follow-up time to the final interview was 6.5 months (6–7 months). We used SOMATOM Definition AS (Siemens) for CT and Kolibri (Brainlab) for navigation. We considered the number and location of distal screws using postoperative CT, ROM of the elbow joint, and the Mayo elbow performance score (MEPS) in the final interview.

Results There were five distal screws in distal fragments in each case. There was no incorrect insertion, such as intra-articular penetration or penetration through contralateral cortical bone. The mean elbow flexion angle was 132.5° (range, 130–135°). The mean deficit in extension angle was 12.5° (range, 10–15°). The mean MEPS was 92.5 points out of 100 (range, 85–100).

Conclusions Intraoperative CT navigation was useful for correct screw insertion to the regions adjacent to articular and contralateral cortical bone. Double plate fixation with intraoperative CT navigation for distal humerus fractures enables early postoperative exercise to improve fixation, so we expect good results from operative treatment.

TRANSOLECRANON FRACTURE-DISLOCATION OF THE ELBOW ASSOCIATED WITH COMMUNUTED DISTAL HUMERAL FRACTURE: A CASE REPORT

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Introduction Surgical treatments of complex elbow fracture dislocations are the most challenging procedures for orthopedic surgeons. Transolecranon fracture-dislocation of the elbow is rare injury and a type of anterior dislocation of the elbow in which compromise of the ulnohumeral articulation occurs through an often complex injury to the proximal ulna. We report the case of a patient with a transolecranon fracture-dislocation with a 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 (1) an open femoral shaft fracture with 17cm of bone defect; (2) a left proximal and distal tibia fractures; (3) a left fibula comminuted fracture (4) an open calcaneus fracture; (5) a Lisfranc joint fracture dislocation; and (4) an open transolecranon fracture-dislocation of the left elbow with associated a distal humeral fracture. The radial head is dislocated anteriorly and an olecranon fracture was classified as Gustilo grade II and the 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 of the left elbow fracture dislocation

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 The transolecranon fracture-dislocation is different from the anterior Monteggia, Bado 1 lesion because in the former, there is a loss of stability in the ulno-humeral joint but the radioulnar relationship is preserved. The capsuloligamentous restraints, in particular the annular ligament remained intact. Most of the 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.

DUAL PLATE FIXATION ON DISTAL THIRD DIAPHYSEAL FRACTURE OF THE HUMERUS

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Introduction Displaced unstable distal third fractures of the humeral diaphysis are treated surgically through open reduction and internal fixation. Conventionally surgeons prefer using long plates for secure fixation; however, we performed short plate dual plating for robust fixation that required a smaller incision and less dissection through anterior approach. In this study, we report the results of dual plating of fractures of the humeral shaft, with radiographic evidence and clinical analysis.

Methodology This retrospective study included 29 patients with distal third diaphyseal fractures of the humerus. There were 18 men and 11 women, with the average age of 43 years, and the mean follow-up period was 21.2 months. We investigated the type of fracture, plate length, number of fixed screws, and fracture union. Range of motion, Disabilities of Arm, Shoulder, and Hand (DASH) score, and complications during follow-up were analyzed for clinical results.

Results All fractures were classified according to AO classification. We used 4.5 mm narrow locking compression plates (LCP) and 3.5 mm LCP reconstruction plates. Fracture union was achieved in all cases during the follow-up. All patients recovered favorable elbow range of motion at final follow-up. At the final follow-up, average DASH score was 10.0, and no patient showed postoperative complications.

Conclusions Satisfactory radiographic evidence and clinical results suggest that dual plating for distal diaphyseal humeral fractures may be considered a surgical option, with the advantages of strong fixation, less invasion of soft tissue, and early rehabilitation.

Keywords Humerus · Diaphysis · Fracture · Open reduction and internal fixation · Dual plate

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OPTIMAL OPERATIVE MANAGEMENT OF DUBBERLEY TYPE 3B CORONAL SHEAR FRACTURE OF THE DISTAL HUMERUS: A RETROSPECTIVE REVIEW OF SIX CASES

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Objective To consider the optimal surgical approach and internal fixation method for Dubberley type 3B coronal shear fracture of the distal humerus.

[Methodology] Six cases with Dubberley type 3B coronal shear fracture were reviewed retrospectively. The factors examined included surgical approach, types of implant used, supplemental bone graft, radiological evaluation of fracture healing, complications, active range of motion of the elbow and of the forearm and Mayo Elbow Performance Score.

Results Posterior approach with an olecranon osteotomy was superior to two incision technique (extensile lateral and medial approach, anterior and posterolateral approach) in handling and reducing the impacted articular fragments. Multiple bioabsorbable threaded pins (1.5~2.0mm in diameter) were superior to a number of compression headless screws in handling and fixation for the articular fragments. To achieve reliable stabilization of comminuted fragments of posterior wall, precontoured anatomical locking plate with lateral support was needed in five cases. Supplemental bone graft was required in 5 cases. Only one case resulted in partial osteonecrosis and nonunion of capitellum, and the others got complete bone union. Active flexion of the elbow averaged 129 degrees (range, 125 to 135 degrees), with an average flexion contracture of 23 degrees (range, 10 to 30 degrees). Active rotation of the forearm averaged 162 degrees (range, 135 to 180 degrees). The average Mayo Elbow Performance Score was 84 points (range, 65 to 100 points).

Conclusions Posterior approach with an olecranon osteotomy, precontoured anatomical locking plate with lateral support for lateral column, block bone graft harvested from iliac crest and multiple bioabsorbable small-diameter threaded pins was a recommended sequential method to achieve reliable fracture reduction and fixation for Dubberley type 3B coronal shear fracture.

OLECRANON FRACTURE WITH DEPRESSION FRAGMENTS USING A COMBINED TECHNIQUE OF TWO LOW PROFILE LOCKING PLATES AND TENSION BAND WIRING; A CASE REPORT

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There is no gold standard method for the olecranon fractures with depression fragments. We presented a case report of olecranon fracture with depression fragments using a combined technique of two low profile locking plates and tension band wiring. Thirty-one-year old female fell from her apartment fifth floor and injured her left sided elbow and bilateral calcaneus. We diagnosed Colton type 2d olecranon fracture. Operation was performed 4 days after the injury. After articular fragment reduction, two low profile locking plates (LCP Distal Radius System 2.4 straight plate for radial side, made by Depuy Synthes) were positioned on both lateral and medial sides. Locking screws were placed under the subchondral bones. β -TCP grafting was performed into the fracture void. Then, separated proximal fracture fragment was reduced and two parallel 1.5-mm K-wires were inserted from the olecranon into the distal fragment and the circumferential wire was tightened around the K-wires using double knots. The fracture union was confirmed by CT scan at 3 months after the operation. Finally her elbow ROM was flexion 150° and extension -5°, and she had no pain and no functional loss. Combined technique of two low profile locking plates and tension band wiring has never been reported as far as we investigated. In comminuted olecranon fractures, it is difficult to provide sufficient buttress to the impacted articular fragments only by tension band wiring. If the main fragment is small like our case, it may be insufficient only by using locking plate fixation. Although this is the first report of this method, and therefore there is no comparative study to other methods, we believe that our method is useful for comminuted and depressed intraarticular olecranon fractures.

COMPLICATIONS ASSOCIATED WITH DOUBLE PLATING TECHNIQUE FOR THE OPERATIVE TREATMENT OF COMPLEX DISTAL HUMERUS FRACTURE

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Introduction: To access outcomes and post-operative complications of complex distal humerus fractures (AO type C) treated with double plating in several institutions.

Materials and Methods The functional and radiographic outcomes following treatment of thirty-one (9 male and 22 female) intra-articular fractures of the distal humerus (AO/OTA type C) with double plate fixation in thirty-one consecutive patients were evaluated at a mean of 2 years postoperatively. According to the AO/OTA classification, 4 patients had type C1, eighteen had type C2 and nine had type C3. Eighteen fractures were approached through an olecranon osteotomy, thirteen by a bicipital approach.

Results All thirty-one patients have united completely and maintained the postoperative alignment. According to the modified Cassebaum's rating scale, ten elbows were graded as excellent; sixteen, as good; and five, as fair. Complications occurred in ten patients, but only one underwent surgical treatment, for an ulnar neuropathy. Complications included postoperative ulnar nerve neuropathy (5), locking screw penetration (2), skin irritation by hardware (3), heterotopic ossification (2). All patients with fair result (5 of 31) had one or two complications.

Conclusion Stable fixation and a high rate of union of complex distal humeral fractures can be achieved when a double plating technique is utilized. Although satisfactory functional results were achieved in twenty-six of the thirty-one patients with double plate fixation, several complications should be prevented to improve the clinical outcome furthermore.

CUBITAL TUNNEL SYNDROME IN THE PATIENTS WITH HAEMOPHILIC ARTHROPATHY OF THE ELBOW

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Purpose Cubital tunnel syndrome combined with hemophilic arthropathy of the elbow is uncommon condition. Only 7 cases had been reported in the English literatures until now. We will add 8 cases.

Patients and Methods Eight patients with hemophilic elbow arthropathy are diagnosed as having cubital tunnel syndrome at our institution. The average age was 45.4 years old. Preoperative Arnold stages were grade III ~ V and McGowan stages are II a ~ III. Range of motion (ROM), carrying angle are evaluated. Pre and, postoperative McGowan scores and grip strengths were compared. Average follow-up time was 26.3M.

Result ROM was seriously restricted (flexion 70, extension -40), carrying angle was 17 degree and ganglion was found at the cubital tunnel in one patient (Patient 1) with Arnold stage III, McGowan stage II a. In other 7 patients, their Arnold stages were III ~ V, McGowan stages were II b, the mean flexion was 107.5 degree, extension was -24.4 degree, and carrying angle was 24.1 degree. In these 8 cases, postoperative 12months' McGowan score became better, and grip strength improved in all patients, 4.6kg on average.

Discussion Two factors which may relate to the etiology of cubital tunnel syndrome combined with hemophilic arthropathy of the elbow, are static and dynamic factors. The static factor means space occupying lesion such as hematoma, ganglion, and hemophilic pseudo tumor. These patients required surgical release of the ulnar nerve for decompression. And these patient's also have a dynamic factor, such as change of route of ulnar nerve by serious hemophilic elbow arthropathy. So that we believe that, these patients may require transposition of ulnar nerve, too. In our cases, we performed anterior subcutaneous transposition of ulnar nerve following neurolysis in all patients. Consequently, satisfactory outcomes were obtained in this small series.

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COMPLICATIONS AFTER SURGERY FOR DISTAL HUMERAL FRACTURES IN ADULTS.

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Background: Distal humeral fractures usually require operative treatment with anatomic reduction and stable internal fixation. However, these procedures are complicated and carry a risk of various postoperative complications. The purpose of this study was to evaluate the complications of open reduction internal fixation (ORIF) for distal humeral fractures at our institutions.

Materials and Methods: We retrospectively reviewed a total of 222 adult patients with distal humeral fractures who were treated at our 12 institutions between 2012 and 2016. All patients were 19 years of age or older, and were observed for at least 13 weeks. Postoperative complications were studied.

Result: Our analysis included 93 patients (55 women and 28 men) with a mean age of 71 years (20-92 years). The mean follow-up period was 42 weeks (13-229 weeks). Complications occurred in 45 cases (48%). Nerve palsy was found in 16 cases (17%). Ulnar nerve palsy was seen in 12 cases (13%). This resolved within an average of 10 weeks (1-53 weeks) in 9 cases, but no recovery was seen in the other 3 cases. Radial nerve palsy was seen in 3 cases (3%) and this resolved within an average period of 13 weeks (1-30 weeks). Median nerve palsy was seen in 1 case (1%), but the time taken for recovery was not recorded. There were 10 cases (11%) of non-union, 8 cases (9%) of delayed-union, and 6 cases (6%) of implant failure. Infection occurred in 6 cases (6%). Among them, antibiotic administration led to improvement in 3 cases, and reoperation was necessary in the other 3 cases. Ectopic ossification was found in 2 cases (2%).

Conclusion: In the current series of distal humeral fractures treated by ORIF, the complication rate was 48%. As non-union and delayed-union occurred in 20% of our cases, careful consideration of ORIF methods is needed.

ANNULAR LIGAMENT REPAIR IN THE ELBOW UTILISING A SYNTHETIC GRAFT (ORTHO-TAPE)®

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Objective: We hypothesize a successful repair of a ruptured annular ligament of the elbow following a traumatic Monteggia fracture with irreducible radial head dislocation with a synthetic polyester tape graft (Ortho-tape)® and an anchor suture in two patients.

Methodology: A 45-year-old male in an MVA sustained a Monteggia fracture (Bado class II) whilst a 27-year-old lady was thrown on an outstretched hand sustaining a Monteggia fracture (Bado class I). The ulnar was plated followed by examination revealing a torn and severely ruptured annular ligament. The ligament edges were irregular and interposed in the radio-capitellar and proximal radio-ulna joint. We reconstructed the annular ligament using a synthetic graft Ortho-tape® (Neoligaments, Leeds, UK) together with a Mitek® bone anchor (Johnson & Johnson) in the first patient. After reducing the radial head, the Ortho-tape was slung around the radial neck and anchored using the anchor suture to the lateral border of the proximal ulnar bone. The force of the anchoring must be just adequate to overcome the anterior deforming force of the radial head. Joint capsule and superficial fascial repair added stability to the reconstruction. The patient was placed in an above elbow backslab for 1 month. The second patient was treated similarly but without a bone anchor. Instead a transosseous hole was drill in the anterior portion of the ulnar shaft and the synthetic tape slung through.

Results: At 2 months post-surgery the patient had a good range of motion of elbow of 0° to 110° and able to pronate up to 45° and supinate up to 60°.

Conclusion: Reconstruction with a combination of synthetic graft (Ortho-tape®) and anchor bone suture provide stable fixation with good clinical outcome and minimizes donor site morbidity, smaller scar, shorter surgical time and has fewer post-operative complication.

POSTTRAUMATIC ANKYLOSIS OF THE ELBOW ASSOCIATED WITH MASSIVE HETEROTOPIC OSSIFICATION: A CASE REPORT

Okamoto Masao

Purpose Surgical treatment of ankylosis associated with heterotopic ossification (HO), is problematic especially with regard to the timing of operation, postoperative instability, and recurrence. We present a case of elbow ankylosis associated with massive heterotopic ossification treated by release two years subsequent to injury.

Case report A 30-year-old man with a 7-year history of schizophrenia attempted suicide by jumping from a height and presented by ambulance to our emergency room with multiple fractures (ISS:18). He was initially treated by temporary external fixation for an open comminuted fracture of the distal humerus. Double plating with autogenous bone graft was performed on the 24th day of admission. Two years after injury, the patient presented to our outpatient clinic with severe elbow stiffness. Plain X-rays showed massive heterotopic ossification (Hastings type IIIA) on 45° elbow flexion. Based on the patient's strong request for surgical treatment, he underwent an operation using the posterior and lateral approaches, and removal of the HO and anterior capsule, purging of the olecranon fossa, coronoid and radial fossas, and resection of the tip of the olecranon followed by release of the ulnar nerve were performed. Intraoperative findings showed moderately degenerated joint cartilage and -10 degree/100 degree of extension/flexion was obtained. At the 6-month follow-up, ROM of -20 degree/90 degree of extension/flexion without pain was preserved.

Conclusions Although the medial collateral ligament could not identified despite careful dissection, instability of the elbow was not observed on the 6-months follow-up examination. Intra-operative resection of the HO only, and preservation of the postero-medial capsule, which may have included the anterior oblique ligament, possibly contributed to elbow stability. Range of motion was maintained for 6 months postoperatively, although intermediate and long-term follow-up is necessary.

VOLAR PLATING ORIF FOR ELBOW CORONOID PROCESS FRACTURE

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Volar Plating ORIF for Elbow Coronoid Process Fracture

Introduction Fractures of the coronoid process of the ulna generally occur in relatively high-energy injuries. Damage to the coronoid process in addition to other elbow structures may complicate treatment. Treatment of the coronoid process and the anterior elbow capsule may be important for postoperative elbow stability. For small avulsion (Regan and Morrey type I), suture anchors may provide well primary fixation and anterior joint capsule repair. In this study, we reports a series of coronoid process fracture fixation by plating for mainly larger coronoid process fragment (Regan and Morrey type II/III).

Materials and Methods Ten patients (aged 27 to 57 years) were referred for coronoid process fracture between January 2014 and April 2017. Six of the patients were male and four were female. All of the patients were right-hand dominant, and injuries occurred in the left elbow in 4 patients and in the right elbow in 6 patients. Four patients were found with elbow dislocation and were initially treated in the Emergency Department with closed reduction and splinting. All patients demonstrated radiographic or motion instability. The patients underwent operative intervention between 1 and 7 days after the initial injury. These ten patients underwent open reduction and internal fixation with volar plating with Acumed coronoid anatomical locking plate by 5 surgeons at our hospital. Surgical dissection is performed to allow for adequate exposure of the anterior aspect of the ulna, including the coronoid fracture fragment and the trochlear notch. For cases of fracture dislocation, three posterolateral approach were used to dissect between the extensor carpi ulnaris and

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the anconeus, and one was with combined medial and lateral approach. For pure unstable coronoid process fracture, anterior/posterior medial approach were used.

Results In our cases of coronoid process fracture, one was Regan and Morrey type I, six were Regan and Morrey type II and three were Regan and Morrey type III. Nine were with relatively larger fragment (Regan and Morrey type II/III) and the only one type I fragment was combined with dislocation injury. All of the 10 fractures healed with an average of 4.8 months. There were no postoperative infection, no long term neuropathy with only one transient ulnar palsy. Functional rehabilitation using active assisted range of motion of the elbow started immediately out of splint. Posterior splint for 7-10 days to allow wound healing. At follow-up after an average of 12 months, Range of motion was on average 120 degrees /5 degrees of flexion/extension, and 75 degrees /70 degrees of pronation/supination. One patient had his hardware removed.

Discussion Few volar plating of fracture of the coronoid process literature were found currently. In our experience, pure coronoid process fracture or combined with elbow dislocation could obtain satisfactory results with volar plating which allows firm fixation and early mobilization of the elbow joint.

THE RESULTS OF TREATMENT IN PEDIATRIC MONTEGGIA FRACTURE

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Objective The principle of treatment of acute Monteggia fracture is correction and maintenance of ulnar length and ulnar alignment in addition to reduction of radial head. In order to achieve this principle, therapeutic strategy for acute Monteggia fracture have been proposed and there are reports on its effectiveness. In this study, we investigated the treatment outcomes of pediatric Monteggia fracture in our hospital from the viewpoint of the therapeutic strategy for acute Monteggia fracture.

Methodology The study included 6 children (4 males, 2 females; mean age 5.8 years; range 3 to 9) who underwent operation for acute Monteggia fracture. Clinical data assessed included fracture pattern, type of operation, complications, length of follow-up, and range of motion follow-up. Relation between the strategy and type of performed operation was investigated with treatment outcomes.

Results The mean follow-up period was 5.0 months (3-9). Bado type 1 was 1 case, type 3 was 5 cases. Letts type B was 1 case, type E was 5 cases. The treatments of all cases fulfilled the strategy for acute Monteggia fracture. None of the patients had loss of reduction of the radius head or limitation in the range of motion of the elbow joint. Accompanying posterior interosseous nerve palsy in one patient disappeared in the final follow-up.

Conclusions The essence of the therapeutic strategy for acute Monteggia fracture is to select a treatment based upon ulnar fracture pattern. In the present study, all treatments fulfilled the strategy and maintained ulnar length and alignment. It is probable that they led good treatment outcomes. The therapeutic strategy is useful for acute Monteggia fracture.

IDIOPATHIC ANTERIOR DISLOCATION OF THE RADIAL HEAD

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Anterior dislocation of the radial head may occur in trauma such as Monteggia lesion, association with congenital diseases, muscle imbalance around the elbow or maldevelopment of the forearm. Idiopathic dislocation is defined as a dislocation which occur spontaneously or for which the cause is unknown. We treated 8 cases of such idiopathic anterior dislocation of the radial head during past 27 years.

Patients and Methods : The patients' ages averaged 12.5 years ranging from 9 to 16 years. Boys were 5 and girls were 3 cases. Affected side was right in 6 and left in

2 cases. There was no history of traumatic accident and any considerable causes. Chief complaints are pain and bulging in the cubital fossa in 4, limited elbow flexion in 4 cases. Radiographically we found thickening of the anterior margin of the ulna in 5 cases and convex or flat shape of the proximal surface of the radial head. Treatment was open reduction of the radial head with annular ligament repair and ulnar angulation osteotomy except 1 case. Mean follow up period was 5.5 years (1.3 to 8.4 years).

Results : No patients complained any pain in the elbow. Bulging in the cubital fossa was improved in all patients. Limited motion of the elbow flexion was improved in all patients. On radiographs dislocated radial head was reduced position in 7 osteotomized cases, subluxation of the radial head was remained in the nonosteotomized case.

Discussion and conclusions :

Radiographic characteristics of this dislocation were deformed radial head and thickness of the anterior cortex of the ulna. Treatment choice of this dislocation is open reduction of the radial head with annular ligament repair and angulation osteotomy of the ulna. Idiopathic anterior dislocation of the radial head is rare but we have to keep in our mind.

THE FUNCTION OF FLEXOR CARPI ULNARIS AND PRONATOR TERES AS DYNAMIC STABILIZERS ON ELBOW JOINT

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Introduction: The flexor carpi ulnaris (FCU) and pronator teres (PT) locate on the medial side of the elbow joint and is adjacent to the collateral ligament, so that we hypothesized that these muscles have specific activities for stability of the medial side of the elbow joint. However, it is not obvious how these muscles relate to the stability of the elbow joint. The purposes of this study were to examine activities of the FCU and PT during varus movement of the elbow joint.

Materials and Methods: The experiments were carried out on 6 normal human subjects (35±9 years). The experimental tasks were MVC during varus movement of the right elbow joint. The measurement position of the elbow joint were 0, 45, 90 degrees and pronation and supination of the forearm were set at each elbow position. The electromyography (EMG) activities were detected through bipolar Teflon-coated tungsten steel wire electrodes from the FCU and ulnar head and humeral head of PT. The integrated EMG (IEMG) values were calculated and normalized with the IEMG values during MVC in manual muscle testing position (NIEMG).

Results and Conclusion: NIEMG of the humeral head of PT was 30% and the ulnar head 45% in all positions. No differences were found between the elbow joint and the forearm positions. Comparison of NIEMG between the two heads showed that the ulnar head was significantly higher than the humeral head in all positions. The activities of the FCU were hardly observed in all positions. The results of this study suggested that the ulnar head of PT was stronger muscle as a dynamic stabilizer than the humeral head. The FCU did not function as dynamic stabilizer in the open condition.

RECONSTRUCTION OF SAGITTAL BAND USING AUTOGRAFT TENDON FOR THE EXTENSOR AVULSION INJURY FROM THE ELBOW: A Case report

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Case A 43-year-old man injured his right dorsal hand while repairing rotating ventilating fan. Therefore, he visited our institute emergency. It was contaminated with the oil, and defected skin was observed on his right dorsal hand of third MP joint.

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Extensor digitorum tendon 3 (EDC3) was pulled out distally from the scar forearm length. It was caused by the rotating ventilating fan to like spaghetti. The bony complications were metacarpal head and neck fractures. Operation was performed. At the level of CM joint, EDC3 transferred to extensor indicis proprius tendon (EIP). Then, proximal portion of EDC3 was resected. However, passive flexion MP joint, EDC3 dislocated to radial side. For augment the tendon, we made a pulley as a sagittal band, using resected tendon from EDC3. For the procedure, EDC3 moved smoothly. After 12 days operation, we allowed the patient to grasp freely.

Results 10 months after surgery, Active ROM of the MP joints improve to 5°-85°, and the percentage of total active motion (%TAM) was 83% and good. There was no pain and catching while activity of daily life.

Conclusions EDC3 was dislocated to radius side, but soft tissue of ulnar side was too damaged. Therefore, it was difficult to relocate EDC3 to the original position, using the usual way. Our procedure enabled to relocate the tendon without the damage of normal tissue. Earlier active motion refrained the adhesion. We need more follow-up observation.

EFFECT OF METABOLIC SYNDROME ON THE FUNCTIONAL OUTCOME OF CORTICOSTEROID INJECTION FOR LATERAL EPICONDYLITIS

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Objective: Both obesity and diabetes mellitus are well-known risk factors for tendinopathies, and the differences in treatment outcomes for lateral epicondylitis (LE) may be attributed to patients' medical co-morbidities. We compared the efficacy of single corticosteroid injections in treating LE in patients with and without metabolic syndrome (MS).

Methods: Fifty-one patients with LE and MS were age- and sex-matched with 51 control patients without MS. The response to treatment, including pain VAS, Disability of the Arm, Shoulder, and Hand (DASH) score, and grip strength, were assessed at 6, 12, and 24 weeks follow-up.

Results: Prior to treatment, patients with MS had mean grip strengths and initial pain VAS and DASH scores similar to those observed in the control group. The pain VAS scores in the MS group were greater than those in the control group at 6 and 12 weeks of follow-up. The DASH scores in the MS group were significantly greater than those of the control group at 6 weeks of follow-up. The grip strength was weaker in patients with MS than that in the control group at 6 weeks of follow-up. However, there were no significant differences at 24 weeks of follow-up between the MS and control group in terms of pain VAS scores, DASH scores and grip strengths. After 24 weeks of follow-up, three patients (6%) in the control group and five patients (10%) in the MS group had surgical decompression due to persistent or recurrent symptoms after the injection ($p = 0.40$).

Conclusions: Corticosteroid injection for LE is not as effective in patients with MS compared to age- and sex-matched controls in the short terms with respect to pain perception (6 and 12 weeks), DASH scores (6 weeks) and grip strength (6 weeks).

EPIDEMIOLOGICAL CONSIDERATION OF ADULT DISTAL HUMERAL FRACTURES IN JAPAN

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Objectives: To consider the Epidemiological features of Adult Distal humeral Fractures in Japan.

Methodology: Participant were consecutive patients of Distal humeral Fractures 18 years of age who were admitted to our affiliated hospital between April 2012 and July 2016. Gender, age, mechanism of injury, classification of fracture (AO/OTA classification) were obtained.

Results: The mean age was 74.3 years and 67.0 years in men and 78.3 years in women respectively, and women over the age of 70 constitute 51.8 of patients.

The most common mechanism of injury was fall from own height and 165 patients were injured for that reason. Fall down (more than 1m) was secondary most common and there were 32 patients (14.7%) and unknown were 12 patients (5.5%) and traffic accident was 7 patients (3.2%). The Most common classifications of this fracture was A2 and there were 135 patients (61.9%) and other classifications were 1.8-6.4% in this study.

Conclusion: In Japan, Type A2 fracture is predominant classification of distal humeral fracture, and elderly women are considered as main patients of this fracture.

CUBITUS VARUS DEFORMITY AFTER MILD LATERAL HUMERAL CONDYLAR FRACTURE

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Objective: Lateral humeral condylar fractures heal with some residual elbow deformity, e.g., fishtail deformity, cubitus varus/valgus deformity. However, details of angulation or tilting angle of lateral condyle after the fracture have not been evaluated so far. We hypothesized some angulation about cubitus varus at the distal end of the humerus was arisen after lateral condylar fractures.

Methodology: Between 2008 and 2015, we followed up 68 mild fractures of the lateral humeral condyle for more than a year. 23 fractures were treated by open reduction and internal fixation (ORIF) with K-wires. 45 cases were treated with a long arm splint for 3 weeks. There were 50 male and 18 female patients. The average age of the patients at the time of the injury was 5.8 years. The humerus-elbow-wrist angle (HEWA), Baumann's angle (BA), tilting angle (TA) on the radiographs. The active ranges of motion (ROM) were clinically assessed at unaffected and affected sides at the final follow-up.

Results: No significant difference was detected between the sides in regard to TA or ROM at the final follow-up. However, HEWA/BA showed more significant loss of correction ($p < 0.01/p < 0.05$). There was 4.2/13.2 degrees at the affected side compared with 7.0/15.2 degrees at the unaffected side. There were significant differences both in HEWA and BA at affected side between ORIF and splint groups.

Conclusions: Mild lateral humeral condylar fractures followed subclinical cubitus varus deformity. ORIF may prevent the deformities. Overgrowths at the site of fracture can be developed at both of ORIF and splint groups. TA, or ROM was not significantly changed compared with that at unaffected side. In summary, cubitus varus deformity after lateral humeral condylar fracture is not accompanied by a change of TA or ROM, unlike the deformity after supracondylar or distal epiphyseal fracture of the humerus.

INFECTION

THREE CASES OF TENOSYNOVITIS CAUSED BY NON-TUBERCULOUS MYCOBACTERIUM (NTM).

Ryo Okabayashi

The purpose of this study is to report three rare cases of tenosynovitis caused by non-tuberculous mycobacterial (NTM)

Case1: A 54 year old male farmer was referred to our hospital with swelling and redness of his right palm to his middle finger. His blood test revealed slight elevation of C reactive protein (CRP), normal white blood cell (WBC) count and normal erythrocyte sedimentation rate (ESR). Magnetic resonance images (MRI) showed swell and intensity changes of the flexor tendon sheath. Operative findings showed severe synovitis which extended in to the carpal tunnel. M. intracellulare has been detected from the synovium and the patient was treated with rifampicin (RFP), clarithromycin (CAM) and ethambutol (EB). Four month postoperatively, the patient presented no sign of inflammation with full range of motion of the middle finger.

Case2: A 95 year old male developed swelling and pain of his right little finger without any history of trauma. The blood test showed slightly elevated CRP and moderate elevation of ESR. a MRI showed swell and intensity changes leading into the carpal tunnel. Intra-operative finding revealed severe synovitis without apparent abscess. M. intracellulare was detected from the synovium. He was initially treated with CAM and RFP followed by EB. Sixteen months after surgery, the patient has no sign of inflammation with ROM limitation of the PIP joint.

Case3: A 67 year old woman was referred to our hospital with a swell of her dorsal aspect of her hand and after being scratched by a cat and doing farm work. Her blood test was negative for inflammation and MRI revealed mass and intensity change along the extensor tendons. Intra-operative finding revealed severe synovitis along the extensor tendon with serous accumulation. Although the intra-operative culture was negative, the pathological findings revealed noncaseating granuloma which strongly suggested NTM infection. The patient is now treated with CAM, RFP and EB.

Discussion: Although NTM infection is rare, tenosynovitis is a typical clinical manifestation. NTM tenosynovitis usually progress slowly and present low levels of inflammation ending up in delayed diagnosis. NTM should be considered in cases indolent chronic granulomatous tenosynovitis.

PYOGENIC FLEXOR TENOSYNOVITIS: CLINICAL DIAGNOSIS REVISITED

Yong Chiang Kang

Abstract Clinical diagnosis is the key to early treatment of Pyogenic Flexor Tenosynovitis. Prompt treatment limits the morbidity of amputation and stiffness. The time tested clinical signs described by Kanavel have not been investigated prospectively. We conduct a prospective cohort study to evaluate the sensitivity and specificity of the clinical signs. We also investigate other factors that aid in the diagnosis, and investigate their role in the prognostication of this severe infection.

In our institution, 100 consecutive cases presenting with the classic clinical signs of Flexed digit, Flexor sheath tenderness, Pain on passive extension and Fusiform swelling of digit are included. The presence or absence of these signs is correlated with surgical diagnosis to evaluate the sensitivity and specificity of each sign. Other parameters in the patient profile, clinical history and assessment, laboratory indicators are also evaluated. We present the results of our study in a clinical matrix, to aid in the clinical diagnosis, evaluation of differential diagnoses, and prognostication of outcome.

CULTURE AND TRANSPLANT OF HUMAN FIBROBLAST CELLS (ALLOGRAFT) ON AMNIOTIC MEMBRANE FOR TREATMENT OF EPIDERM-PLYSIS BULLOSA

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Background: Epidermolysis bullosa (EB) is a genetic disease with skin fragility and instability at the junction of dermis to epidermis. Severe deformity of hands because of scars and adhesions leads to lose the proper function of hand which affects the quality of patients' life. Covering the wound after opening adhesion is the major problem in the way of reconstructive surgeons. Our purpose in this study is to use allogeneic fibroblasts amnion after surgery as a cover in patients to prevent further adhesion.

Material and Methods: this is an interventional study on 6 patients who suffer from Epidermolysis bullosa with deformity and adhesion. We took a skin sample from back of one of parents' ear. Then fibroblast was separated, cultured and transferred to the amniotic membrane. After separating the full adhesion, all parts without skin were covered with the allogeneic fibroblast amnion. Furthermore, speed, quality, recovery time of wound were examined as well as range of motion in finger joints and the pressure on the skin.

Results: results showed us wound healing improved and time of healing varied between 15 to 29 days. The average time of treatment was 23.1 days with the standard deviation of 77.3. Restored skin could perfectly tolerate the pressure of rehabilitation activities and splint.

Conclusion: allogeneic fibroblast with a scaffold like amnion can reduce the need for skin graft in patients with Epidermolysis Bullosa. Normal allogeneic fibroblast and disability of releasing collagen seven in these patients can be considered as an effective factors in wound healing and show better results than autogenic fibroblasts. Key words: Epidermolysis Bullosa, Fibroblast, opening adhesion, allograft

THE RELATIONSHIP OF NEUTROPHIL-TO-LYMPHOCYTE RATIO AND MORTALITY IN TROPICAL DIABETIC HAND SYNDROME

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Introduction: The neutrophil-to-lymphocyte ratio (NLR) is an accessible laboratory parameter said to be predictive of mortality. Tropical diabetic hand syndrome (TDHS) comprises upper extremity infections affecting patients with insulin resistance in an equatorial climate. Objectives: In this retrospective cohort study, we reviewed NLR among TDHS patients and its association with mortality during admission and after discharge.

Methods: Twenty-five hands from 25 consecutive patient referrals were enrolled from January 1, 2014 to December 31, 2015. Complete blood count upon admission and survival status after orthopaedic management were collected and tabulated in a spreadsheet. Receiver operating characteristic (ROC) curve were used to assess the utility of NLR in predicting mortality. Results: Majority of the patients were males

INFECTION

(76%) with a mean age of 50. The right side was affected most (56%). The mean neutrophil count was 78.36 and 13.96 for lymphocytes. NLR interquartile range was 8.10 with Q1 (<3.43), Q2 (3.44-9.33), Q3 (9.34-12.43) and Q4 (>2.43). In-hospital mortality was 52%, mortality in 6 months at 58%, and in 12 months at 100%. ROC value for admission mortalities was 0.939, mortality six months after discharge at 0.989, and in twelve months at 0.988, with findings statistically significant ($p < 0.05$). Area under the curve for all three specified times describe NLR as a good diagnostic tool.

Conclusion: Patients with increased NLR have higher incidence of in-hospital mortality. Within one year, all TDHS patients expired. TDHS mortality can be attributed to NLR.

Disclosure: No conflicts of interest declared.

A CASE REPORT OF ATYPICAL NONTUBERCULOUS MYCOBACTERIAL TENOSYNOVITIS IN A DEVELOPED COUNTRY

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Objective: Our objective is to increase awareness of NTM tenosynovitis among hand surgeons, who may not encounter this disease often. Nontuberculous mycobacteria (NTM) are commonly found in the environment, especially in soil, water and animal reservoirs. Lungs are most commonly infected by these atypical mycobacteria and are not thought of as top differentials when infections involve extra pulmonary sites including musculoskeletal sites. In fact, there have been very few reported cases of the musculoskeletal system being implicated by NTM and it is even rarer for such an infection to involve the underlying muscles and bony structures.

Methodology: This is a case report of an elderly but otherwise immunocompetent patient presenting to our institute with 1 month of persistent left hand pain. NTM tenosynovitis secondary to Mycobacterium abscessus was diagnosed after appropriate tissue cultures for mycobacterial infections and biopsy were obtained. We will explain her clinical course, focusing on the presentation, diagnostic work up, subsequent management and post-operative outcomes. This patient was managed jointly by the departments of Hand Surgery and Infectious Disease. The principles of surgical management and medical treatment will be highlighted in this report.

Conclusion: NTM tenosynovitis is a rare disease that can lead to significant morbidity. This report highlights the importance of appropriate diagnostic work up which led to the accurate microbiological diagnoses and assisted in the management of NTM tenosynovitis.

CAT AND DOG BITES ARE DIFFERENT AND REQUIRE DIFFERENT PRINCIPLES OF SURGICAL MANAGEMENT.

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Objective We have compared bite injuries caused by cats and dogs and analysed the distinct tissue damage with relation to the dental morphology of the animals. The history of the incident is also important in distinguishing puncture wounds caused by a 'snap and release', from avulsion type injuries associated with a 'grip and hold' bite. We aim to define the principles of surgical management depending upon the factors above.

Methodology We have recorded the morphology of the wounds, presence of infection, related complications, bacteriology results, and surgical approach of all animal bites admitted in our institution from 2013 to 2017.

Results A total of 71 cases were included, of which 26 were cat bites and 45 were dog bites. The mean age for cat and dog bite was 41.2 and 52.1 years respectively and both have a female predominance. The mean time from presentation-to-surgery

was 59 hours and 25 hours respectively. The only complication associated with cat bites was infection, and these included abscesses, cellulitis, septic arthritis and tenosynovitis. While infections are common in dog bites, it also has other associated injuries i.e nerve or tendon injury ($n=7$), fractures ($n=2$), amputations ($n=2$), and skin defects requiring resurfacing ($n=3$). The commonest organism was *Pasteurella* species in cat bites, whereas in dog bites both gram positive and negative bacteria were yielded.

Conclusion In cat bites, we should always assume that deep structures are penetrated and therefore joints, tendon sheaths and bone surfaces should be irrigated and debrided in depth. Dogs on the other hand has wider and shorter teeth, however they tend to grip and hold causing an avulsion type injury which damages the surrounding structures. We believe that a thorough understanding of the animal's dental morphology and the pattern of injury is important in defining the surgical management.

MICROSURGERY

EFFECTS OF TIROFIBAN ON THE SURVIVAL OF RANDOM SKIN FLAPS IN RATS

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Background: Tirofiban is a glycoprotein IIb/IIIa receptor antagonist, widely used in clinical settings. We investigated the effect of Tirofiban on the survival of random skin flaps.

Materials and Methods: McFarlane flaps were established in 60 rats divided into two groups. Postoperative celiac injections were given to both groups for 7 days. Tirofiban was injected into the test group, and saline was injected into controls. On day 7, tissues were stained with hematoxylin and eosin, immunohistochemically evaluated, while oxide-gelatin angiography was assessed for angiogenesis.

Results: The mean area of flap survival in the test group was significantly higher compared with the controls. Expression of vascular endothelial growth factor and skin flap angiogenesis, superoxide dismutase, and microvessel development, were markedly increased in the test group, and the malondialdehyde level was reduced.

Conclusion: Tirofiban promotes random skin flap survival.

EFFECTS OF NARINGIN ON THE SURVIVAL OF RANDOM SKIN FLAPS IN RATS

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Background: Random-pattern flap transfer is one of the most popular procedures for covering soft tissue defects. However, flap necrosis is still frequently observed. Naringin has been reported to have the ability of accelerating angiogenesis by activating the expression of VEGF. In this study, we investigated the effects of naringin on random skin flap survival.

Materials and Methods: The "McFarlane flap" rat models were established in 90 male Sprague-Dawley rats divided into three groups: vehicle-treated group; 40 mg/kg naringin-treated group; 80 mg/kg naringin-treated group. The area of necrosis was measured after 7 days, and the tissue samples were taken for histological analysis and edema measurement. Angiogenesis was assessed via lead oxide-gelatin angiography, immunohistochemistry and western blotting for VEGF expression. The inflammatory response was evaluated using an ELISA kit for TNF- α and IL-6 in serum. Oxidative stress was assessed by measuring the activity of superoxide dismutase (SOD) and the level of malondialdehyde (MDA).

MICROSURGERY

Results: Compared with controls, the mean survival area in naringin groups were significantly larger showing a possible dose-dependent effect of naringin. SOD activity was increased significantly, as well as the VEGF expression. MDA level, in the test group, however, was decreased. The hematoxylin and eosin (H&E) stained slices revealed that naringin had the angiogenesis promotion effect, meantime inflammation was clearly inhibited in the naringin groups.

Conclusion: Naringin has a positive effect on improving random skin flap survival.

THE COMPARATIVE STUDY ON TWO TYPES OF ARTERIALIZED VENOUS FLAP MODELS IN MINIPIGS

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Objective Comparison of two types of arterIALIZED venous flap models in minipigs with dissecting the cutaneous vessels in minipigs, in order to provide anatomical foundations for arterIALIZED venous flap research.

Methodology Deep superior epigastric artery (DSEA) of minipig was probed by PeriCam PSI System with Laser Speckle Doppler Perfusion Imaging techniques, and two types of arterIALIZED venous flap models were established on the torso integument of minipigs with anatomical techniques. Twenty healthy minipigs were randomized into two groups with self-control bilateral contrast test method, experimental groups(A group): end to side anastomosis was done between DSEA and cutaneous vein of flap; end to end anastomosis was control groups(B group).the area of the flaps were designed approximately 8cm×6cm. Blood flow perfusion (PU) of all the flaps in two groups were probed by PeriCam PSI System at different times.

Results According to the measurement data of PU, A groups were 83.62±3.14, and B groups were 98.14±6.54. A groups significantly lower than B groups in early postoperative period (P<0.05), especially within 72 hours, that meant the preload of flap of control groups were higher than experimental groups.

Conclusions This study describes the good results obtained with two types of arterIALIZED venous flap models in minipigs, and shows the significant difference between these two types of models in blood flow perfusion. In conclusion, these operative procedures are suitable for set up arterIALIZED venous flap models in minipigs which can provide anatomical basis for the research of arterIALIZED venous flap.

Keywords ArterIALIZED venous flap; Models; Minipigs

EFFECTS OF CURCULIGOSIDE A ON THE SURVIVAL OF RANDOM SKIN FLAPS IN RATS

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Background: The necrosis of a distal area of random skin flap remains challenging. Curculigoside A has been reported to induce angiogenesis in vitro by increasing proliferation, migration and tube formation in Rat Aortic Endothelial Cells (RAEC) and Rat Aortic Smooth Muscle Cells(RASMC). And Curculigoside A increased expression of vascular endothelial growth factor (VEGF). In the present study, we investigated the effect of Curculigoside A on the survival of random skin flaps.

Materials and Methods: McFarlane flaps were established in 60 rats divided into two groups. The rats in the vehicle-treated group received 0.9% saline intravenously once per day. Rats in the treatment group were given a bolus injection of Curculigoside A to the tail vein (10 mg/kg/d). The percentage flap survival area and tissue water content were measured after 7 days. Flap angiogenesis was assessed via lead oxide-gelatin angiography, hematoxylin and eosin staining, and immunohistochemistry and western blotting for VEGF. The expression levels of xanthine oxidase were determined

Results: The mean area of flap survival in the treatment group was significantly higher than in controls. Expression of vascular endothelial growth factor and superoxide dismutase, and micro vessel development, were markedly increased in the treatment group, and the malondialdehyde level was reduced.

Conclusion: Curculigoside A promotes random skin flap survival.

FLAP RECONSTRUCTION STRATEGY FOR DISTAL LEG TO FOOT SOFT TISSUE DEFECT

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Objective: Soft tissue reconstruction in the distal one third of the leg, ankle to foot regions is challenging due to paucity of donor tissue to cover the exposed tendons and bones. Reverse sural fasciocutaneous flap remains the workhorse flap in reconstructing these areas. Recently perforator-based flaps gain more popularity and offer a versatile alternative treatment. The study presented our case series and our strategy in distal lower limb reconstruction with various flap options.

Methodology: Adult patients with fasciocutaneous flap reconstruction for distal leg to foot soft tissue defect were retrospectively reviewed from Jan 2012 to Dec 2016. 16 Patients with 17 flaps were identified through medical records. Patient demographics, type, site and size of defects, flap reconstruction methods, and the clinical outcomes were studied.

Results: There were 9 reverse sural fasciocutaneous flaps, 4 perforator-based flaps and 4 free flaps. Most defects were caused by infection or trauma. Average age of patients was 53. Mean follow-up time was 13 months. All flaps survived with some minor complications only. Defect size for coverage differed in three types of flaps. Minimal pain related to the flap was encountered. Complications of partial flap necrosis, flap edge gapping, infection, donor site morbidities were described.

Conclusions: Choices of flap reconstruction of soft tissue defects in the distal one third of the leg to foot regions depend on the availability and versatility of the flap. Reverse sural artery flap and perforator based flap offer satisfactory results. Free flap reconstruction requires more advanced microsurgical skills but is still an armamentarium in more complex defects.

THROMBOSIS OF THE PALMAR DIGITAL VEIN: A CASE REPORT

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Objective Palmar digital vein thrombosis causing one or more nodules seems to be a relatively rare condition, judging by the dearth of reports in the literature. It should always be considered in a patient who presents with a painful, firm, blue nodule located at or in close proximity to one of the flexion crease of the finger. Common lesions presenting as one or more solid digital nodules are ganglions, epidermal inclusion cysts, giant cell tumors, and lipomas. We report a case of thrombosis of palmar digital vein in a 74-year-old female.

Methodology A 74-year old female complained of a nodule on the index finger of her left, non-dominant hand. The nodule had been present for several years and was painful when she grasped objects. On examination, a solid nodule was slightly bluish and about 10 mm diameter, lying just proximally from the distal interphalangeal (DIP) joint on the palmar and radial side. It was painful when pressure was applied. All laboratory examinations on complete blood count, blood coagulation test, routine chemistry were within the normal range. Because of painful interference of the nodule in her daily activities, the lesion was explored under local anesthesia and in a bloodless field. A small dark round tumor located in a superficial vein was resected after ligation of the vein. Histopathological examination revealed a thin vascular wall

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and an organizing thrombus in the dilated vascular structure. Based on the clinical and histological findings, the patient was diagnosed with thrombosis of palmar digital vein. No evidence of recurrence was seen after excision.

Results and Conclusions Palmar digital vein thrombosis is a condition only rarely reported in the literature. It should, however, be part of the differential diagnosis of palmar digital nodules because it is possible to grow and cause symptoms.

EVALUATION OF FREE FASCIOTOME FLAP DONOR SITES: WHICH ONE TO CHOOSE?

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Objectives: Different microvascular fasciotome flaps can be used for soft tissue defect reconstruction. Everyone has some advantages and limitations of donor site. Aim of our study was to evaluate appearance and satisfaction of scar at least 6 months after operation.

Material and Methods: Fifty patients responded for follow up. Forty were males and 10 females with an average age of 45.6 years (6 – 74). Etiology of defect was trauma in 31 case and oncology in 19 cases. Mean follow up was 35.9 months (7 – 77). Flaps used: Radial forearm flap – RFF (14); Lateral arm flap – LAF (10); Anterolateral thigh flap – ALT (6); Scapular (6); Parascapular (6); Inguinal (6); Medial sural artery perforator flap – MSAP (2). Assessment was done using mVSS (Modified Vancouver Scar Scale), VAS (Visual Analog Scale) for cosmetic evaluation, and VAS for overall satisfaction of the scar by the patient (all of the examination was done by the same examiner). Photography of the scar was taken during the visit. Scar photo analysis according to VAS was done by different volunteers (plastic surgeons, orthopedics, other specialists, medical students, people without medical education).

Results: Mean outcome of mVSS for RFF was 3.86 (1 – 8), LAF 2.7 (1 – 6), ALT 6 (2 – 10), scapular flap 5 (3 – 6), parascapular flap 4.8 (1 – 10), inguinal flap 5.2 (1 – 9), MSAP 4 (3 – 5). LAF showed significantly better result of mVSS compared to ALT flap ($p=0.02$) and scapular flap ($p=0.01$). Mean outcome of VAS for cosmetic appearance of the scar for RFF was 2.1 (0 – 10), LAF 1.4 (0 – 3), ALT 2.8 (0 – 10), scapular flap 2.7 (0 – 6), parascapular flap 2.3 (0 – 6), inguinal flap 0.7 (0 – 1), MSAP 1.5 (0 – 3). Mean outcome of VAS for overall satisfaction of the scar for RFF was 1 (0 – 3), LAF 1 (0 – 2), ALT 2.8 (1 – 7), scapular flap 1.5 (1 – 2), parascapular flap 1.5 (0 – 5), inguinal flap 0.8 (0 – 2), MSAP 0.5 (0 – 1). No complications of donor site were observed in LAF, parascapular and MSAP flap. Secondary healing of skin graft in RFF was in 4 cases. One case of hematoma was found in ALT flap. Superficial necrosis of scar and seroma formation was found in inguinal flap. One case of wound dehiscence was observed in scapular flap. Strong positive correlation was found between mVSS and complications of donorsite ($r=0.502$; $p=0.001$). No correlation was found between follow up time, patients age and VAS outcomes.

Conclusion: ALT flap showed the worst results in all 3 categories. Nevertheless, this flap was used in cases of very large tissue defects, when primary closure of donor site was impossible and skin grafts were used. The best scar outcome was with LAF, inguinal and RFF flap donor sites. Better results were found to be in cases of primary donor site closure rather than using skin grafts or local flaps.

A SYSTEMATIC REVIEW: ANTICOAGULATION IN DIGITAL REPLANTATION

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Background: The current practice of anticoagulation choice in digital replantation is highly variable with surgeons having particular favourites. The sparse studies comparing the different anticoagulants available is not so clear and often many are

led to choose between aspirin, low molecular weight heparin (LMWH) and intravenous heparin (UFH) for example. The failure of digital replantation often related to arterial or venous thrombosis has a significant burden on the patient and system.

Objectives: The aim of this presentation is to develop an understanding of the clinical consensus on anticoagulation during the perioperative period with the primary outcome of digital replant survival.

Methods: A comprehensive literature review across online databases searching for digital replantation and anticoagulation was performed. Over 450 papers were screened and of these included two randomized controlled trials and multiple case series.

Outcomes and Results: The randomized controlled trials compared LMWH and UFH showing comparable survival results with no difference between the groups. The case reports showed similar outcomes with different agents such as UFH, LMWH or urokinase infusion. However, there were less frequent anticoagulations related adverse effects with LMWH.

Conclusions: The available evidence in perioperative anticoagulation is highly variable and the overall consensus is not clear. Further research across quaternary centres are needed to provide clarity and evidence based guidelines that will provide the optimal outcome for replantation and function.

COMPLICATIONS OF FREE LATERAL ARM FLAP TRANSFERS: EXPERIENCE WITH 50 CONSECUTIVE CASES.

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Objective: Microvascular free tissue transfer has become a significant advancement in reconstructive surgery. The free radial forearm flap has become a work horse flap as a means of reconstructing different trauma or surgical defects. Lateral arm flap undeservedly lost its significance in reconstructive microsurgery. This cases study provides analysis of lateral arm flap usage options, complications rate and outcome results.

Methodology: 50 cases of free lateral arm flap transfers performed were retrieved from hospital's database and analyzed with regard to the surgical defect, chosen donor site and complications. Lateral arm flap was used for hand reconstruction in 16 cases, and head and neck reconstruction in 34 cases. Osteocutaneous flaps were in 6 cases and fasciocutaneous flaps were in 44 cases.

Results: A total of 50 lateral arm free-flap reconstructions were performed for 50 patients. There was one flap loss with 98% success rate. Postsurgical hematoma was in one case (2%). Donor site complication was humerus fracture in one case (17%). All donor sites were closed primarily with very good functional and esthetical results.

Conclusion: Our study shows that, because of the reliability, functional characteristics, and low donor site morbidity, the lateral arm flap is a useful and versatile flap for reconstruction not only soft tissue defects, but complex bone and soft tissue defects as well.

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HOW MUCH CAN A HOMODIGITAL NEUROVASCULAR ISLAND FLAP ADVANCE?

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Objective Homodigital neurovascular island (NVI) flaps are frequently used for reconstruction of pulp defects with varying degrees of advancement reported (maximum of 22mm in the literature). We find that such advancement is hard to achieve in practice. It is unclear how flap advancement was measured and if flexion of the digits were required. The aim of this study is to determine the maximal advancement of a homodigital neurovascular island flap when dissected to fixed anatomical landmarks.

Methodology 27 cadaveric digits were used. The distance from the fingertip to specific anatomical landmarks were measured. A 1x1cm flap was sequentially elevated till the PIPJ crease, palmo-digital crease, and bifurcation of the common digital artery. The ulnar digital artery of the index, middle and ring finger were then sacrificed and the flap dissected till the superficial palmar arch. The advancement of the flap at each landmark was recorded.

Results Advancement following dissection till the PIPJ crease, the palmo-digital crease, following division of adjacent digital artery and till the superficial arch were as follows: 8.0mm (SD 2.5), 12.4mm (SD 3.6), 15.7mm (SD 2.8) and 18.0mm (SD 3.4). For every 1mm of dissection, there was 0.4 mm (SD 0.17) of advancement when dissection was done till the PIPJ crease, 0.2mm (SD 0.16) from PIPJ crease to palmo-digital crease, 0.5mm (SD 0.22) between the palmo-digital crease till release of adjacent artery and 0.1mm (SD 0.07) when dissection was continued to the superficial arch. When dissection was done till the palmodigital crease, it was found that advancement was 20% of the digit length.

Conclusion In this study, we found a maximum of 18mm advancement. In addition, the digit length can be used to estimate the advancement (20% of digit length) that one can achieve by dissection till the palmodigital crease.

ANKLE JOINT RECONSTRUCTION VIA VASCULARIZED SCAPULA BONE FLAP FOR INFECTED DEFECT OF THE MEDIAL MALLEOLUS AFTER AN OPEN FRACTURE: A CASE REPORT

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open fracture, vascularized bone graft, scapular flap, ankle joint

Objective Postoperative infection following an open fracture may result in the loss not only of soft tissue but also of bone and cartilage, and reconstruction of the articular joint is difficult. Here we report on a case of ankle joint reconstruction by free vascularized scapula bone flap on a medial malleolus defect that resulted from a postoperative infection following an open fracture.

Methods A 25-year-old man was injured in a single-car accident and diagnosed with traumatic subarachnoid hemorrhage, multiple right rib fractures, and an open fracture of the right ankle joint. Osteosynthesis of the open fracture of the right medial malleolus was performed in another hospital. However, postoperatively, this became infected, and the patient was transferred to our hospital for curative treatment. First, debridement of the infected wound was performed, and the remaining infected free-floating bone fragments of the medial malleolus were removed. There was a 14 × 6 cm soft tissue defect and a 4 cm osteochondral defect of the medial malleolus. After signs of infection had disappeared, reconstruction surgery was performed. A 15 × 7 cm skin flap and a 4 cm × 2 cm scapular bone flap were elevated and used to reconstruct the medial malleolus and cover the open wound.

Results There were no signs of postoperative infection, and bone union was achieved 3 months post-operation. After 1 year, the patient could walk independently

with no ankle instability and was able to return to work. A biopsy of the reconstructed medial malleolus revealed chondrometaplasia of the periosteum.

Conclusions Vascularized bone grafts are effective in clearing infection and enable one-step reconstruction of bone and soft tissue defects. For joint reconstruction, the use of a vascularized scapular bone flap holds potential for osteochondral reconstruction by chondrometaplasia of the periosteum.

THE EFFECT OF SUB-EPINEURAL PLATELET-RICH PLASMA (PRP) ON REGENERATION OF THE SCIATIC NERVE IN A RAT MODEL

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Background: Peripheral nerve injury is one of the most challenging of modern surgical problem. Recent advances in understanding the physiological and molecular pathways demonstrated the important role of growth factors in peripheral nerve regeneration. Platelet-rich plasma (PRP) is a biological product that has many growth factors. The aim of this study was to investigate the effect of PRP in the regeneration of sciatic nerve crush in the rat model.

Methods: In this experimental study that established in the animal lab of the Hazrat Fatemeh Hospital in Tehran September to October 2013, Twenty-four healthy male Sprague-Dawley rats (200-250 g) were randomly divided into two groups. In all rats the sciatic nerve was cut and then carefully repaired by the tension free method under a light microscope. In group 1, after the repair, 0.05 µL of PRP was injected below the epineurium to the proximal and distal parts of the repaired area. In group 2 the same amount of normal saline was injected to the proximal and distal of the repaired area. After six weeks footprint analysis, neurophysiologic and histopathologic evaluations were performed.

Results: Significant differences existed between the two groups footprint analysis ($P=0.001$). Also the nerve conduction latency test was significantly shorter in PRP group. (1.0233 ms in PRP group and 1.7375 ms in control) ($P<0.001$). The average amplitude in the first group and the second group was 7.6250 mv (control) 6.3667 mv that does not show a statistically significant difference ($P=0.093$). Significant differences between the two groups in the number of axons of the proximal portion of the study was not seen ($P=0.29$). The parameters included number of axons of the proximal and the distal part of axons, the diameter of the distal and proximal axons in the two groups were compared. In the two groups there was statistically significant difference between the above parameters. ($P=0.298$).

Conclusion: It seems that PRP may have an important role in peripheral nerve regeneration and functional recovery after nerve laceration and repair. Further clinical evaluation recommended.

Keywords: platelet-rich plasma, sciatic function test, nerve regeneration, nerve injuries.

MICROSURGERY

SUCCESSFUL CYANOACRYLATE- ASSISTED SUTURE TECHNIQUE FOR MICROVASCULAR ANASTOMOSIS

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Objective: The conventional end-to-end technique of microvascular anastomosis with interrupted sutures can be time consuming especially in the hands of a less experienced microsurgeon. It has been shown to cause media wall necrosis with intimal wall hyperplasia, leading to intraluminal thrombosis. Studies have been done on the use of tissue adhesives to limit the number of sutures in microvascular anastomosis. The 'Lid technique' that was described by Ulusoy in 2009 combines two sutures that were placed 180 degrees apart with cyanoacrylate tissue adhesive. We describe a modification of the 'Lid technique' for microvascular anastomosis. **Methodology:** Twelve anastomoses were carried out on bilateral common iliac arteries in six rabbits. Two groups were compared; conventional anastomosis versus cyanoacrylate assisted technique. For the described technique, a limited number of sutures were placed. The tissue adhesive was then applied onto the 'lid' flap. Outcomes were measured at 7 days.

Results: 100% patency rates were achieved in both groups. The mean anastomosis time for the conventional and lid group was 36 minutes and 37 minutes respectively, and the mean bleeding time was 2 minutes and 0.3 seconds respectively. Histopathological evaluation for both anastomoses showed distinct findings that were significant. There was no intraluminal adhesive leakage in the cyanoacrylate assisted suture technique.

Conclusion: Our preliminary results for both conventional and the described technique are comparable in terms of anastomosis and bleeding time. A larger sample size has the potential to speed up the technique by addressing the learning curve and there are potential histological benefits.

PEDICLE VASCULARIZED BONE GRAFT OF THE DISTAL RADIUS FOR THE SCAPHOID NONUNION FRACTURE

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Abstract Scaphoid fracture is the most common of carpus bone fracture (60-70 %) and second to the distal radius fracture in the wrist. Etiology majority is low-energy injuries due to sporting event (59%), fall onto an out stretched wrist (35%), and high-energy trauma caused by fall from a height also motor vehicle injury. 82% of the scaphoid fractures in males.

One of complication of scaphoid fracture is nonunion. Incidence of scaphoid fractures developing nonunion is 10%-15%, and higher if the fracture at the proximal pole fractures (>30%), avascular necrosis (proximal pole fractures) → 14% to 39% scaphoid fracture nonunion are seen that have developed AVN.

Clinical examination of nonunion fracture scaphoid are decreased wrist motion and grip strength, general or so radial oedema and focal snuffbox tenderness (so does scaphoid fracture), tender of distal pole of scaphoid of palpation and axial compression of the thumb may reproduce pain.

Dorsal distal radius vascularized pedicled bone grafting is alternative to conventional measures for the treatment of displaced proximal pole fractures, established nonunions, and avascular necrosis of the proximal fragment. Graft based on the 1,2-intercompartmental suparetinacular artery (1,2 ICSRA) has reliable anatomy and predictable course between the 1st and 2nd extensor compartments and can be harvested and insert into the prepared fractures it using a single-incision approach. The procedure were: cutting the graft, elevate graft and pedicle, scaphoid preparation, inset the graft and closure.

Post operative care fit with a short arm thumb spica cast first two weeks continue for another 4 weeks and then removable thumb spica splint wearing all the time until healing (confirm by radiograph or CT).

Keywords: pedicle vascularized bone graft distal radius - scaphoid nonunion fracture

KRUKENBERG PROCEDURE COMPLEMENTED BY TWO MICROVASCULAR FLAPS TO SAVE FUNCTIONALITY AND LENGTH OF THE AMPUTATION STEM. A CASE REPORT.

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Objective: to show a rare case of saving length and functionality of amputated arm.

Methodology: Male, 57 y.o., right hand dominant damaged his arm under the wheel of traffic bus. His wrist was crushed and non-reparable. The lower arm was degloved. He underwent the urgent desarticulation of the radiocarpal joint, fasciotomies, debridement and temporary closure of the skin defects with degloved tissues. Dry necrosis and demarcation of damaged skin occurred within two weeks. Shortening of the amputation stem and Krukenberg procedure was accepted as the best solution for some functionality of the dominant arm. Skin defects on contact surfaces of the forceps were covered by two SCIP (superficial circumflex iliac artery perforator) flaps and full thickness autodermodermotransplants in non-contact surfaces. Donor site wounds healed primary, but one of SCIP flaps obtained marginal necrosis which was treated with debridement and full thickness skin graft within two weeks. All wounds healed in three months after accident and patient started exercises to obtain mobility in Krukenberg forceps.

Results: In 8 months after accident patient was able to grasp different objects and help himself to wash, dress, drink, etc. Patient is almost satisfied with aesthetic appearance of the pincer too. He is still doing grasp force strengthening exercises to improve power lifting of the dominant hand.

Conclusions: Krukenberg procedure provides functional independence to patients regardless to the aesthetic result. It should be offered as equal or even superior in cases when functional prosthetics or transplantation is unavailable.

MORRONISIDE IMPROVED THE VIABILITY OF ISCHEMIC RANDOM SKIN FLAP IN RATS

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Objective This study was undertaken to determine the therapeutic effect of Morroniside on the viability of ischemic skin flaps in rats. **Methodology** Forty adult male Sprague-Dawley rats were randomized into control group and treatment group. A modified McFarlane skin flap model was performed (causally based, 9 × 3 cm). The percentage of the surviving area of the flap was calculated. Flap blood flows were measured by laser-Doppler flowmeter. Flap vasculature was assessed by angiography after lead oxide injection. VEGF-positive cells were quantified by immunohistochemistry. Superoxide Dismutase levels and malondialdehyde content were determined using SOD and MDA assay kits.

Results The viability of the skin flaps was significantly improved in the Morroniside-treated group. Laser Doppler blood perfusion index was significantly increased in the treatment group than in the control group. In the treatment group, the distal section of the flap was nearly saturated with contrast agent, while in the control group, the contrast agent perfused only half on the flap. VEGF-positive cells in the treatment group were higher than in the control group. In the treatment group, Morroniside administration significantly increased SOD enzyme activity and reduced MDA levels.

Conclusion Morroniside was effective in increasing random skin flap viability in rats.

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VASCULARIZED FIBULAR AUTOGRAFTS FOR RECONSTRUCTION OF POST-ONCOLOGIC LONG BONE DEFECTS

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Abstract 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 able to fulfill the inclusion criteria and were included in the review. Of the 25 patients, eight had benign-aggressive tumors while 17 had malignant tumors.

Results showed a union rate of 84% (21/25). Revision surgery was done on eight patients (32%) 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 that united was 10.4 ± 4.1 months. The average functional score using the Musculoskeletal Tumor Score in 20 patients was 83.4 ± 10.4 %. The average follow-up was 41 ± 32 months. 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.

TENDON

CLINICAL OUTCOMES OF ZONE 2 FLEXOR TENDON REPAIRS USING THE MODIFIED LIM/TSAI TECHNIQUE

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Abstract The single looped suture modified Lim/Tsai technique has been shown to possess better biomechanical properties as the double looped suture original Lim/Tsai technique. However, there is no clinical data on the modified technique. We retrospectively studied 62 patients with 74 digits with zone 2 flexor tendon repairs using the modified technique. The overall "Excellent" or "Good" outcome was 51.4% using the original Strickland criteria and 81.1% using the revised criteria. The rupture rate was 2.7%. This is the first study on the functional outcome of the modified Lim/Tsai technique. We noted that the outcomes were negatively influenced by subzone 2C and severe crush injuries. Other factors that could have contributed to the poorer outcomes include rehabilitation protocols, cases lost to follow-up, and presence of extratendinous knot in the modified technique.

AN IN VIVO CANINE BIOMECHANICAL STUDY OF TENOLYSIS EFFECT TO GLIDING RESISTANCE AFTER FLEXOR TENDON REPAIR

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Evaluation of adhesion and measurement of gliding resistance between tendon and annular pulley of the fore-paw of canine following tenosuture were performed to clarify the tenolysis effect in following five different groups. In automatic movement group, modified Kesler procedure was done after cutting the flexor digitorum profundus tendon. Then an automatic movement started three weeks after the tenosuture and euthanasia was done after additional three weeks. In tenolysis in vivo groups (tenolysis group I and II), tenolysis was performed in third or sixth weeks after tenosuture and euthanasia was done three weeks after tenolysis. In in vitro group, only tenosuture was performed after euthanasia. An intact normal tendon of

the contralateral fore-paw was measured as a control. Adhesion evaluation followed the method of Rothkopf et al. and gliding resistance measurement followed the method of An et al.

Adhesion was observed in automatic movement and both in vivo groups. The gliding resistance of tenolysis groups I and II was significantly lower than that of automatic movement group. The gliding resistance of tenolysis group II was significantly lower than that of tenolysis group I.

In accordance with these results, we concluded that sixth week was a more favorable term for tenolysis to improve the gliding resistance between the tendon and pulley than that of the third week, in which sutured tendon may have not been completely repaired yet in canine.

AN ANATOMICAL STUDY OF THE FLEXOR POLLICIS LONGUS WITH SPECIFIC REFERENCE TO VOLAR LOCKING PLATE SURGERY

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Purpose Injury to the flexor pollicis longus (FPL) tendon may be associated with a volar locking plate (VLP) that is used in patients presenting with distal radius fractures. In addition to mechanical friction, reduced blood flow is an important factor contributing to the rupture of this tendon. The purpose of this study was to identify the feeding vessels of the FPL as a means of reducing the incidence of its rupture in patients undergoing VLP surgery.

Objectives and Methods The study involved dissection of 14 formalin-fixed upper limb specimens (8 males and 6 females). The dissections identified the FPL, radial artery (RA), and anterior interosseous artery (IA), and the branches of the RA (BRA) and IA (BIA) supplying the FPL. The number of branches (BRA and BIA), and the location of their last branches were recorded. In addition, the distance from the most distal branch of the IA (IA1) to the volar rim, and the pronator quadratus (PQ), respectively, and from the most distal branch of the RA (RA1) to the volar rim, were measured.

Results The mean number of branches of the RA and IA were 2 (0-4) and 4 (2-7), respectively. The distance from volar rim to IA1 is mean 57 mm, the distance from volar rim to RA1 is mean 43 mm, and the distance from to IA is mean 14.2 mm."

Discussion The close location of the RA1 to the volar rim may increase the risk of its injury on positioning the FPL on the ulnar side during VLP surgery. Careful preservation of the IA1, located near the PQ, is important in preventing ischemia of the FPL, as it is likely to be the most distal vessel to the FPL following VLP surgery.

FLEXOR TENDON PLATING - A NEW TECHNIQUE FOR TENDON REPAIR

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Objective: There have been many well-described techniques for flexor tendon repair. Similarly to how fractures have various modalities of fixation, we wanted to develop a new tendon repair technique that involved the use of tendon plates. The idea of plating allows less passage of suture material through the tendon while conferring the necessary amount of mechanical strength required for repair. Less suture substance would cause less tendon constrictive ischaemia and thereby improve vascularity and healing. We hypothesize that tendons repaired with plating will have the same, if not more biomechanical strength as compared to traditionally repaired tendons.

Methodology:

A biomechanical study based on a porcine model was used. A single operator repaired 60 fresh-frozen cut pig tendons. Half of these tendons (30) were repaired using the conventional modified Lim and Tsai method and the other half (30) using tendon plating. The repaired tendons underwent biomechanical testing using an Instron machine to determine the load to failure and the resistance to cyclical loading of the two groups.

TENDON

Results: Tendons repaired by plating had a statistically significant higher ultimate tensile strength as a 4 strand repair then modified Lim-Tsai 6 strand repair. They also withstood significantly higher Newton-cycles to 1 mm and 3 mm gap formation as compared with the 6-strand repairs.

Conclusion: Tendon plating is a viable alternative with stronger biomechanical strength of repair. However, further studies will be required to determine the in-vivo effects of tendon plating.

EVALUATION OF COMMON CHARACTERISTICS OF SELF INFLICTED WRIST INJURIES

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Objective: The aim of this study is to identify common patterns of self-inflicted wrist injuries. Our hypothesis is that self-inflicted wrist injuries are always on the non-dominant limb, on the volar surface and tend to be superficial in depth.

Methodology: A retrospective review of all self-inflicted wrist and forearm lacerations seen at our center during a 5-year period was carried out. All patients with documented self-inflicted injuries in the history given were selected for this study, while patients with histories of accidental injury were excluded. In accordance with the departmental protocol, all patients with self-inflicted injuries are admitted to prevent repeat attempts and underwent formal psychiatric assessment by a qualified psychiatrist.

Results: 38 patients (11 males and 27 females) were seen, with the age ranging from 16 to 77 years old with a mean age of 34 years. Amongst these patients, there were 35 (92%) with injuries to their non-dominant upper limb and 1 sustained injuries to her dominant upper limb. A majority of the injuries (33 of 38) were on the volar surface. Of the 38 patients, 26 (68%) of them had a single wound. Tendon injuries (injuring the palmaris longus, flexor carpi radialis and flexor carpi ulnaris tendons) were common. Nerve injuries were uncommon, with 7 patients injuring the median nerve, while 2 patients injured the superficial radial or ulnar nerves and 1 patient, the posterior interosseous nerve. 17 of the patients had a past history of psychiatric illness and 10 had a history of previous episodes of self-harm.

Conclusion: Self-inflicted wrist injuries have the following common characteristics: superficial wounds that lie on the volar aspect of the non-dominant hand. When the injuries sustained do not possess any of the above characteristics, the diagnosis of self-harm should be questioned.

SOLITARY AMYLOIDOMA IN ELBOW: A CASE REPORT.

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Amyloidoma of soft tissue is rare and also rare in extremity. There have been no previously reported of an amyloidoma occurred in the elbow lesion.

(case) 67-year-old male, has been have hemodialysis for 38-years. He was aware of a soft tumor on his right elbow 6 years ago, but he was watching the situation because he had no symptoms. But the soft tumor continued to grow gradually. He had used two lofstrand crutches for bilateral necrosis of the femoral heads and used both upper limbs as load limbs. For that reason he felt mild pain in his right elbow and appeared first checked his elbow tumor. On the volar side of the right elbow, 7 cm x 4 cm soft elastic and egg shaped soft tissue tumor appeared to protrude. No spontaneous pain, and Tinel's like signs, but he has mild pain on using his upper limb for using to walk. There was no restriction on the movement range of the elbow joint. In x-rays, no mineralized mass and both ulna and radius bony erosion was observed on the proximal radioulnar (site of attachment of biceps tendon). In MRI, on T2 weighted image showed ambient high signal, internal illegal low signal area.

The tumor had passed proximal radio ulnar joint from the volar side through the dorsal side. We performed biopsy for checking malignancy. It did not reveal any malignancy, total tumor resection was performed with the mid-volar side approach. It was organized with urethane like tissue colored with light brown and dark red part macroscopically. A part of the biceps brachii tendon and bicipital aponeurosis was excised with tumor because of hard to separate between each tissue. The final report of pathology was amyloidoma and which stained with Congo red. The patient was asymptomatic at three years after postoperatively with no Evidence of local or systemic disease, and able to gait with using double cane.

Discussion In conclusion, we reported a rare case of an amyloidoma occurs in elbow.

STATIC SPLINT AFTER REPAIR OF EXTENSOR TENDON RUPTURE IN RHEUMATOID ARTHRITIS(RA)

Yasue Harada

Purpose In the early active motion after repair of extensor tendon rupture in Rheumatoid Arthritis (RA) hands outrigger splint and taping were used. We tried a treatment using a simple static removable splint at the time of exercise, and reported on its effect.

Materials and Methods We investigated 6 RA patients (long-little 2, ring-little 3, little 1) after reparation of extensor tendon rupture in the wrist from 2008 to 2013. There were 16 males and 5 females with a mean age of 63years. The mean follow-up period was 7.9months. [Postoperative Therapy Protocol & Splint] Postoperative within 48 hours : We made a static splint and started active ROM exercise for all fingers. The splint consisted of two parts , one was the cock up splint of the wrist joint dorsiflexion, and the other was the splint of the finger extension (MP~DIP 0°) . During the exercise only, the finger extension splint was removed. MP active flexion and extension at the PIP DIP extension position, passive extension hold , PIP DIP active flexion and extension at the MP extension position were performed about 10 times every hour.

Postoperative 3 weeks: Start active ROM exercise of the wrist.

Postoperative 6 weeks: Use of all fingers in light ADL.

Postoperative 12 weeks: All restrictions on the patient were lifted.

Clinical outcome measures included MPJ motion, grip strength and DASH score .

Results The mean extension/flexion ranges of MPJ were -35.9/82.7°, preoperatively, and 4.5/86.0°, postoperatively. The grip strength average was 92.0%, postoperatively. The average DASH score was D/S 13.5, S/M 6.25, Work 2.1, postoperatively.

Discussion We tried to use a static splint that consisted of two parts. The postoperative ROM, DASH score were good. We considered that tendon excursion of proximal direction certainly occurred by active extension exercise from an early stage.

TRAUMA HAND

MUST ALL OPEN INJURIES IN THE HAND BE TREATED ACUTELY? OUR EXPERIENCE WITH OPEN HAND INJURIES AS ELECTIVE DAY SURGERY.

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Objective Open hand injuries presenting through the Emergency Department are routinely admitted and listed for operation acutely. Current practice in most institutions in Singapore is treating open hand injuries as an emergency, competing with other surgical emergencies in busy tertiary hospitals. In this study we report our results of treating all open hand injuries within five days as an elective day surgery procedures and not as a surgical emergency.

TRAUMA HAND

Methodology A retrospective data analysis of all patients sustaining open hand injuries and arranged for elective day surgery from 2015 to 2016 was performed. Polytrauma, bite injuries and infections were excluded. Severe hand injuries which required immediate attention for possible replantation or critical revascularization were also excluded. Patients who required repeat debridement post operation in view of deep seated infection were highlighted and evaluated. Demographic data, injury details and delay from trauma to therapy were looked at.

Results There were 248 cases (224 men, age 37 ± 14) available to be included in this study. All of them were done in the day surgery suites as day surgery. 81.0% were done under LA; the other surgeries were conducted under RA/GA with anaesthesia care. Our results revealed that deep infections were not associated with delay to surgery.

Conclusions Delayed timing of surgical treatment of open hand injuries did not impact on outcomes of deep seated infection in this retrospective single-center study. Treatment of open injuries of the hand as elective day surgery is a safe and effective means of managing such cases in a busy tertiary hospital. It further affords the utilization of the optimum team of health care professionals familiar with hand surgery to deliver the care while at the same time allowing for senior staff supervision.

REPAIR OF CHRONIC CENTRAL SLIP RUPTURE USING PALMARIS LONGUS AUTOGRAFT

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Objective: Several methods for repairing chronic central slip ruptures have been documented in literature. We report our experience with a reconstruction technique using an autologous palmaris longus tendon graft for traumatic central slip rupture of the middle finger.

Methodology: A 27-year-old male sustained a laceration over the proximal interphalangeal joint of his right middle finger, secondary to a vehicular accident. Eight months post-injury, he was referred due to a flexible boutonniere deformity. Intra-operative assessment revealed a disrupted central slip, with volar migration of the lateral bands and an attenuated triangular ligament. Reconstruction was carried out using a palmaris longus autograft. The tendon was passed through a transosseous tunnel in the middle phalanx, crossed proximally through a transverse tunnel in the stump of the central slip, and secured around the lateral bands.

Results: Prior to surgery, an extension lag of 75 degrees was noted at the PIP joint, with arc of motion limited to 30 degrees. Preoperative DIP joint hyperextension was measured at 8 degrees, with arc of motion restricted to 25 degrees. After reconstruction, active PIP joint flexion increased to 105 degrees, with extension lag reduced to 5 degrees. Hyperextension at the DIP joint was reduced to 2 degrees, with active flexion at 35 degrees.

Conclusions: For cases of chronic central slip rupture secondary to trauma, a reconstruction technique using palmaris longus autograft is an option for management that yields satisfactory results.

SURGICAL TREATMENT OF METACARPAL AND PHALANGEAL FRACTURE WITH ROTATIONAL MALALIGNMENT

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Objective Fractures of the metacarpal and phalanges are very common and most of those can be successfully treated with conservative treatment. The rotational alignment is one of important parameters for functional recovery, but it is easy to overlook if not carefully evaluated. We managed the metacarpal and phalangeal fractures accompanying rotational malalignment using open reduction and internal fixation. The purpose of this study is to report the results of this treatment by analysis of clinical and radiological results.

Methodology This study included 28 patients (18 male, 10 female) who had metacarpal and phalangeal fractures with rotational malalignment of finger on initial examination. Patients with combined injuries including open soft tissue damage or multiple fractures were excluded. The mean age was 36.1 years and the average follow up period was 14.6 months. Perioperative extent of rotation and correction during the follow up, union on the radiographs, range of motion (ROM), Disabilities of the Arm, Shoulder and Hand (DASH) score, and pinch power were evaluated at the last follow up.

Results The average rotational correction angulation was 11.9° and no patient showed scissoring appearance of fingers at the last follow-up. All patients showed solid bony union on the radiographs during the follow up. At the last follow up, the mean total active motion of the injured fingers was 254° , the mean DASH score was 3.2 and the mean pinch power was 3.0 kg.

Conclusions Clinical and radiologically satisfactory results were obtained in all patients. It is important to be careful not to overlook the rotational misalignment after the hand fracture, and surgical treatment should be considered for accurate reduction and fixation of the rotational alignment.

Keywords Metacarpal, Phalangeal bone, Fracture, Rotational deformity

MANAGEMENT OF FIFTH METACARPAL FRACTURES A SINGLE UNIT EXPERIENCE, IS IT WORTH FIXING?

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Objective outcome assessment of isolated fifth metacarpal bone fractures based on the treatment modalities.

Methodology A retrospectively analysis of all isolated fifth metacarpal bone fractures managed in our hospital in 2014 was performed. The objective evaluation of hand function was done with grip strength and range of movements. The direct cost of treatment was evaluated using the hospital financial systems and indirect cost using the days off work and the median salary of the profession based on Ministry of Manpower estimates.

Results This analysis of 62 patients shows our results which are comparable to the literature reviews. 75% underwent conservative management. The neck and base fractures were found in equal numbers, which is 20 patients. A significant portion of the operated cases had stiffness and pain, and all required implant removal at about 3-month post op and required intense therapy post implant removal. The time off work was longer in operated cases than conservatively managed. The cost of managing fifth metacarpal fractures are significantly higher than those managed conservatively and the functional outcomes for those fractures treated operatively are worse off at one year than those treated conservatively.

Conclusions Our study show that fifth metacarpal bone fractures can be managed non-operatively at a significant lower cost and earlier return to work and generally better outcomes than those with surgical management with plates and screws.

TRAUMA HAND

PEDICLED SECOND METACARPAL BONE GRAFT FOR PROXIMAL PHALANGEAL BONE LOSS AFTER DOG BITE

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Introduction We report the case of a proximal phalangeal open fracture with bone loss of the left index finger after dog bite treated by a pedicled second metacarpal bone graft for the bone defect after initial treatment of debridement and external fixation.

Case A 32-year-old female. She was bitten by her dog. The wound was closed and antibiotics were administered by previous doctor. She visited to our hospital the next day. Initial examination showed a 2.5 cm long wound on dorsal second MP joint concomitant with redness and swelling. Plain x-rays showed the fracture of the proximal phalangeal left index finger continued to MP joint. On the same day, we performed debridement and external fixation. Postoperative antibiotic therapy was performed. Because no remarkable infection was confirmed, open reduction was performed with wires on postoperative 8 days. Bone defect was repaired by a second metacarpal bone graft pedicled with a second dorsal metacarpal artery. The fracture was united at two months after surgery without infection. The range of motion of the index finger at 4 month after surgery was as follows; extension/flexion (degree), MP 15/60, PIP -10/40, DIP 0/20. In third operation, we removed wires, released the contracture of MP joint, and performed tenolysis of the extensor tendons. In order to prevent adhesion, the extensor tendon was wrapped with a pedicled adipofascial flap. The range of motion at 3 months after tenolysis was as follows: MP 0/70, PIP 0/60, DIP 0/30.

Discussion The infection rate after dog bite injury was from 15 to 20%. Free bone or artificial bone graft can repair bone defects, but they may have risks of infection and nonunion in contaminated wounds. Pedicled second metacarpal bone graft is an effective surgical method for reconstructing the bone defect of the proximal phalangeal fracture.

INTRAMEDULLARY PERCUTANEOUS PINNING FROM MP JOINT FOR PROXIMAL PHALANGEAL FRACTURES

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Objective There are various forms in finger proximal phalangeal fractures, and according to the case, percutaneous pinning, interosseous wiring, screw fixation, plate fixation and external fixation was performed. Although percutaneous pinning is often performed for transverse/short oblique diaphyseal fracture, joint contractures and tendon adhesions caused by improper pinning and immobilization. We have underwent intramedullary percutaneous pinning from MP joint and report the surgical technique and treatment outcomes.

Methodology Among seventy-four fingers of sixty-one cases whom surgery was performed after January 2005, excluding thumb, intraarticular fracture, long-oblique fracture, and open fracture accompanied with soft tissue injury, twenty-seven fingers of twenty-two cases were the subjects of this study, including 8 males and 14 females aged 13-81 (mean: 43) years. The injured finger was on the index finger (3 patients), middle (5), ring (4), and little (15). Fracture site was base in 19 cases, diaphysis in 5, neck-diaphysis in 1, and neck in 2. The mean follow up period was 5 months. The procedure under wrist block was to first insert two Kirschner wires intramedullary from MP joint, then reduce the displacement in antero-posterior and lateral plane, and after reduction of rotational displacement under active flexion, insert Kirschner wires into the subchondral bone of PIP joint. Buddy taping with the adjacent finger and apply dorsal splint with flexion of MP joint. Early exercise of PIP and DIP joint was started immediately after surgery. Bone union and range of motion

were investigated.

Results Bone union was obtained in all cases without malunion. Mean TAM was 235 degrees and mean %TAM was 96%, and according to Shitara's clinical criteria, 23 fingers with an excellent outcome in 23 patients, good in 3 and poor in 1.

Conclusions Good outcomes were obtained with intramedullary percutaneous pinning from MP joint for transverse/short oblique diaphyseal fracture of proximal phalanx.

BONY MALLET THUMB WITH THE SMALL FRAGMENT

Hagiwara Hiroyoshi

A 48 year-old-man was introduced to our institution at 1 week after the initial injury, who was suffering from the pain at the IP joint of the right thumb. He had hit his right thumb by a baseball. The joint revealed remarked extension restriction and swelling. Radiography and computed tomography demonstrated a small and thin fracture fragment at the dorsal base of the distal phalanx, which was approximately 4.5x1.5x1.2 mm size. At one week from the presentation, surgical procedure was conducted. The fragment was too small to adjust internal fixation or block pinning. So the fragment was removed. Then ipsilateral palmaris longus tendon was pulled out. An oblique burr hole from dorsal edge of the distal phalanx to the volar cortex was made and let the PL tendon pass through the hole. At volar side, the grafted PL tendon was sutured to the terminal portion of the FPL tendon. With applying tension, at the dorsal side, it was connected to the EPL tendon by interlacing suture method. Sutures with using Juggerknot Mini soft anchor system were added. After splint immobilization for 4 weeks with the IP joint extended, ROM exercise was begun. At one year after surgery, extension of the IP joint was 15.0° and DASH score was 0. Closed bony mallet thumb is rare. Our case with small fragment is thought to be extremely rare. We treated it with surgical procedure, with a good result.

CHIMERIC MEDIAL FEMORAL CONDYLE OSTEOCUTANEOUS FLAP FOR RECONSTRUCTION OF MULTIPLE METACARPAL DEFECTS

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Objective: When faced with reconstructing metacarpal defects, various options have been described. We herein describe a chimeric medial femoral condyle osteocutaneous flap (CMFCOF) as a new method for providing multiple bone grafts as well as soft tissue coverage in a single stage.

We present our experience about using CMFCOF for two patients with mutilating hand injury with dorsal hand soft tissue and two metacarpal segmental defects.

Methodology: The first patient was a 25-year-old female who presented left hand injury with dorsal hand soft tissue defect and bone defects over 4th and 5th metacarpal shaft. CMFCOF was used for reconstruction with skin paddle 4 x10 cm in size and two vascular medial femoral condyle bone grafts (1.5 x1.5 cm for each bone graft size, based on different branch of descending genicular artery).

The second patient was a 35-year-old male. He had right hand mutilating injury with dorsal soft tissue defect, 2nd and 3rd metacarpal shaft comminuted fracture with bone defect and exposure. CMFCOF with skin paddle (11 x 4.5 cm) and two vascular bone grafts based on different vascular branch (2 x 1 cm graft for 2nd metacarpal, 3.5 x 1.5 cm graft for 3rd metacarpal).

Results: There was no infection or partial flap necrosis. Complete radiologic bone union time was 4 months in 1st patient and 5 months in 2nd patient. The patients were able to achieve donor side knee full flexion without pain 2 months postoperatively.

Conclusions: The chimeric design of the flap lends flexibility at the time of inset that is absent in other options for vascularized bone grafts. The ease of harvest, straightforward anatomy, flexibility at inset, and limited donor site morbidity make this flap an effective option when treating such injuries.

TRAUMA HAND

THE EFFECT OF MIXED TASKS ON PRETRAINING FOR GRASPING TASKS WITH A FIXED PINCH POWER: A PRELIMINARY STUDY

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Background: The 3 phases in motor learning are the cognitive, associative, and autonomous phases. Evidence shows that the active center in the brain moves from the prefrontal cortex, through the posterior parietal cortex to the cerebellum. However, it is difficult to differentiate objectively. Thus, in this study, we preliminarily investigated the possibility of discriminating it objectively by testing whether mixed tasks impede the status of pretraining in healthy adult volunteers.

Methods: Four healthy adult volunteers were divided into two groups. In one group (n = 2), the subjects were adequately pre-trained to maintain 30% of the maximum pinch power for a certain time. In the other group (n = 2), such pre-training was not performed. Both groups performed the following 3 tasks: a prefrontal cortex load task using n-back (Task A); a steady pinch power task (Task B); and a mixed task (Task C: Task A + Task B). In addition, the value obtained when the pinch strength of the first dorsal interosseous (FDI) and extensor carpi radialis (ECR) during performance of the tasks was divided by electromyogram (EMG) amplitude (kgf/ μ V). Then, the changes in the maximum Oxy-Hb concentration of dorsolateral prefrontal cortex (DLPFC) were measured.

Results: In both the pretraining and non-pretraining groups, a positive change in Oxy-Hb concentration was shown in Task C. However, in the pretraining group, when Task C was performed, the Oxy-Hb concentration decreased in the same region where the decrease was observed when Tasks A and B were performed. Moreover, regarding FDI, motor learning improved in all the subjects. In contrast, regarding ECR, motor learning was delayed in the non-pretraining group and progressed in one subject in the pretraining group.

Conclusion: This finding is a new parameter for hand therapy after tendon transfer and should be investigated in the future.

COMPARISON OF OUTCOMES OF AO 3.5 DYNAMIC COMPRESSION PLATE, 3.5 LIMITED CONTACT-DYNAMIC COMPRESSION PLATE AND 2.7 ULNAR OSTEOTOMY PLATE FOR ULNAR SHORTENING OSTEOTOMY IN PATIENTS WITH IDIOPATHIC ULNOCARPAL IMPACTION SYNDROME

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Purpose: The purpose of this study was to compare the clinical and radiological outcomes of AO 3.5 dynamic compression plate(DCP), 3.5 limited contact-dynamic compression plate(LC-DCP) and 2.7 ulnar osteotomy plate for ulnar shortening osteotomy(USO) in patients with idiopathic ulnocarpal impaction syndrome. In addition, the effect of interfragmentary screw fixation(ISF) on radiologic outcomes of USO was assessed.

Methods: Seventy-eight patients who underwent ulnar shortening osteotomy using plate fixation and followed up at least 1 year were enrolled. Three types of plates were consecutively used: AO 3.5 DCP(Group I, n=31), AO 3.5 LC-DCP(Group II, n=19), AO 2.7 ulnar osteotomy plate (group III, n=28). The patients were also divided into two groups based on performing ISF: ISF group(n=27) and no ISF group(n=51). The clinical outcomes were evaluated by Disability of arm, shoulder and hand(DASH), Patient related wrist evaluation(PRWE). Radiological outcomes including time to bone union, presence of delayed union and re-fracture after metal removal were assessed.

Results: All patients showed union at final follow-up. There were no statistically significant differences in both clinical and radiological outcomes according to the types of plates. When comparing the groups treated with and without ISF, time to bone union was shorter in the ISF group(7.56 ± 2.56 weeks vs 9.79 ± 6.59 weeks,

$p=0.038$). Delayed unions were only observed in 8 of 51 patients treated with no ISF(15.68% vs 0%, $p=0.045$). In no ISF group, 5 of 43 patients (11.62%) who removed the plate had experienced re-fracture of the ulna after plate removal. However, there was no significant difference of clinical outcomes between the ISF group and no ISF group.

Conclusion: Types of plate didn't influence the clinical and radiological outcomes of USO in the patients with idiopathic ulnocarpal impaction syndrome. However, ISF with plating for USO has several advantages such as early bony union and prevention of re-fracture after metal removal.

Keywords: Ulnocarpal impaction syndrome, ulna shortening osteotomy, interfragmentary screw

TREATMENT OF COMPLEX HAND INJURIES USING MICROSURGERY AND EXTERNAL FIXATOR

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Purpose Reliable initial treatment with a view toward 2-stage reconstruction and a treatment plan centered on postoperative rehabilitation are important to improving the function of replanted fingers and reconstructed hand after severe trauma.

Subjects and Methods

1 Thirty one cases including incomplete amputation, severe crush injury, burn at the level of the forearm and the hand underwent reconstruction by free or pedicled tissue transfer. Twenty two cases underwent tissue transfer secondary to replacement of severe scarring which had caused adhesion of tendon and nerve in the traumatized tissue. Nine cases underwent tissue transfer in the emergency operation to avoid the occurrence of severe scar formation which is believed to cause loss of tendon and nerve function in the future.

2 Thirteen replanted fingers who wore a hinge type external fixator for the purpose of traction of a proximal interphalangeal (PIP) or metacarpophalangeal (MP) joint and ROM exercise. The structure of the modified Ilizarov minifixatorTM for joint ROM (Global hinge fixatorTM) was unique. We can use this fixator for solid bone fixation at the primary operation and change its structure 2 to 4 weeks later to make it suitable for ROM exercises without taking off the wires.

The patients ranged in age from 15 to 72 years old (mean : 48 years). Postoperative follow-up periods after secondary reconstruction ranged from 4 to 61 months.

Results and Discussion Functional outcome of major group was estimated by Chen's criteria. The final outcome was as follows, 5 cases in grade IV, 8 cases in grade III, 9 cases in grade II and 9 cases in grade I. The average TAM of the replanted finger was 56.5%. Functional assessment by the Japanese Society for the Surgery of the Hand yielded a score of 65 points(Good). In order to reconstruct the function of the traumatized forearm and hand, it is necessary to prevent the occurrence of severe adhesion around the tendon and nerve by replacing the scar tissue using flaps. In order to acquire better joint function, it is logical to start using an adjustable external fixator that allows ROM exercise while exerting traction on the finger joint before bone union.

MOLECULAR MECHANISMS OF NEGATIVE PRESSURE WOUND THERAPY

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Objective: To investigate the molecular mechanisms triggered by Negative Pressure Wound Therapy (NPWT), and how it promotes wound healing.

Methodology: Biochemical analysis of patient samples collected before and after NPWT treatment. Creation of a rodent-injury model (rat) to perform similar biochemical analysis on control and NPWT-treated rats, focusing on signaling pathways such as hypoxia, angiogenesis, metabolism and redox modulation. Analysis was

TRAUMA HAND

performed through western blot analysis, quantification of metabolites and measurement of enzymatic activities related to these pathways.

Results: We identified specific mechanisms triggered by NPWT such as changes in glucose metabolism, glucose mobilization and antioxidant mechanisms. We confirmed previous reports that showed improvement of angiogenesis mediated by VEGF, and also identified changes in angiotensin 1 and 2 proteins. The modifications in antioxidant mechanisms appeared to occur mainly through the maintenance of higher level of the enzyme MnSOD (Manganese Superoxide Dismutase) and through the maintenance of a higher level of SOD activity. SOD is involved in reactive oxygen species (ROS) regulation, through catalysing the dismutation of the superoxide anion (O_2^-) into hydrogen peroxide (H_2O_2). We also found normalization of glucose store mobilization and glycogen levels within the wounded tissues that were treated with NPWT. The peak level of these mechanisms modulated by NPWT appeared to occur within two or three days following NPWT application.

Conclusion: Our study confirmed previous findings regarding the modes of action of NPWT, and how it enhances angiogenesis as a possible mechanism for aiding wound healing. We also identified antioxidant mechanism maintenance and normalization of glucose store mobilization. This data collected will be used to develop new translational approaches, based on the modulation of glucose mobilization and redox metabolism, to facilitate wound healing, and to improve the treatment of chronic wounds, whether alone, or in conjunction with other methods available in wound care.

EVALUATION OF ADVERSE PROGNOSTIC FACTORS IN MIDDLE PHALANX FRACTURE IN THE PROXIMAL INTERPHALANGEAL (PIP) JOINTS

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Objective Evaluate adverse prognostic factors in middle phalanx fracture in the PIP joints

Methodology Of all patients who had received treatment for middle phalanx fracture in the PIP joints at our hospital between October 2013 and December 2016, the present study included 11 individuals whose progress was followed up for >6 months. Type of fracture, surgical modality, range of motion (ROM) of the PIP joints were evaluated. Additionally, cases of impaired ROM of the PIP joints were also evaluated.

Results The average follow-up period was 13.8 (6–18) months. Seven cases were die-punch and four cases were simple intraarticular fracture. Three cases exhibited highly comminuted fracture on the articular surface. Furthermore, two cases had a fracture also in the distal interphalangeal (DIP) joints, and one case developed a double fracture in the middle and proximal phalanges within the PIP joints. Six cases underwent open reduction (OR) surgery, whereas eight cases received external fixation. Kirschner wires were used for fixation. The average ROM of the PIP joints was 77.2° (50–100°) in flexure. Without two cases with <80° flexure angle, the remaining nine cases achieved an average ROM of 92.2° (80–100°). Extension was restricted at more than 5° in only one case. Of the two cases with a flexure angle of <80°, one had a fracture also in the DIP joints and OR surgery with external fixation was performed in PIP joints. The other case had an open fracture, which constituted a double fracture in the middle and proximal phalanges within the PIP joints.

Conclusion Favorable results were obtained from the treatment of comminuted fracture on the articular surface. In the cases with impaired ROM, fracture was observed at several locations. In particular, the cases with open fracture or that underwent OR surgery were more likely to experience impaired ROM.

SIMULTANEOUS VOLAR FRACTURE-DISLOCATION OF DISTAL INTERPHALANGEAL JOINT AND DORSAL FRACTURE-DISLOCATION OF PROXIMAL INTERPHALANGEAL JOINT IN A SINGLE DIGIT (DOUBLE FRACTURE-DISLOCATIONS IN A SINGLE DIGIT)

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Objective: Isolated fracture-dislocation of the distal and proximal interphalangeal joint is common in hand injury patients. However, up to date, simultaneous volar fracture-dislocation of DIP joint and dorsal fracture-dislocation of PIP joint in a single digit was not reported. We report two cases of double fracture-dislocations of simultaneous volar fracture-dislocation of DIP joint and dorsal fracture-dislocation of PIP joint in a single digit.

Methods: From Jan 2015 to Aug 2016, we treated two patients who showed simultaneous volar fracture-dislocation of DIP joint and dorsal fracture-dislocation of PIP joint in a single digit. All patients were male, and their ring fingers were injured. Mean age was 38 years, and all patients got injury during playing baseball. Mean follow-up period was 6 months.

Results: All patients showed dorsal base fractures on their distal phalanges with mean 40% involvement of joint surface and showed volar base fractures on their middle phalanx with mean 45% involvement of joint surface. We treated all volar fracture-dislocations of DIPJ by closed reduction and pinning with extension block technique. And the fracture-dislocations of PIP joint were treated by open reduction and screw fixation of middle phalanx. And three weeks after injury, active range of motion exercise of PIP joint was started. At 6 weeks after surgery, all fractures were united without any complications. At the final follow-up, the mean extension and flexion of DIP was 0 degree and 50 degrees, respectively. And the mean extension and flexion of PIP was -10 degrees and 85 degrees, respectively.

Discussion: Double fracture-dislocations of simultaneous volar fracture-dislocation of DIP joint and dorsal fracture-dislocation of PIP joint in a single digit were very rare injury. This injury might due to high energy on the tip of finger, such as baseball or basketball. And this injury could be successfully treated by meticulous surgical procedures.

POSTERIOR INTEROSSEOUS BONE FLAP IN PAEDIATRIC FOREARM BONE DEFECTS

Kamrani Reza Sh

Posterior interosseous bone flap (PIBF) is a well-known treatment for infected and noninfected forearm non-union in adults. We used this technique in five children with forearm problems.

Material: From Jan. 2014 to March 2017 we used PIBF for 5 children. 3 radius non-union because of osteogenesis imperfecta, osteomyelitis, and congenital pseudoarthrosis, and two patients with distal radius physis arrest.

Technique: In patients with non-union, one half of diameter of distal ulna from 30 to 45 mm was removed on the pedicle of antegrade posterior interosseous artery, and was transferred to non-union site of radius and fixed there with screws or plates. For patients with distal radius physis arrest, whole of distal ulnar was transferred to distal radius on the base of posterior interosseous artery.

Results: three patients with radius non-union were from 3 to 7 years old and two patients with distal radius physis arrest were 5 and 6 years old. All of non-union were going to union in 3 to 5 months. Both of distal radius physis arrest were failed because of growth arrest of distal ulna or non-union of transferred site.

Conclusion: PIBF is a viable and valuable vascularised bone graft for the children as adults for forearm non-union. But PIBF as a source of vascularised physis transferee had no success with this particular technique.

TRAUMA HAND

THE OPERATIONAL STATUS OF THE INTERACTIVE TELETRIAGE SYSTEM OF SEVERE FINGER INJURY IN MIKAWA REGION, AICHI PREFECTURE

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Objective: The Interactive Triage system using mobile phone photos helps trouble-free emergency transporting of severe finger injury and prevents delay of start of therapy. This system works during the daytime on weekdays. Our hospital is the Triage flagship institutes of Mikawa region in Aichi prefecture (about 2350 thousand people). We investigated operational status of Triage and diagnosis and treatment method at each conveyed institute in Mikawa.

Methodology: We prospectively analyzed 155 patients who called for ambulance as severe finger injury from April 2014 to March 2016. There were 136 males and 19 females (45±19 years old). We examined the number of patients, time of injury, rate of amputations and treatments, the number of patients managing by the Triage system, and the number of institutes requested by Emergency medical technicians (EMTs).

Results: One hundred and seventeen cases (76%) were between 9 am and 5 pm of the ambulance requesting time. The final diagnoses were amputation in 67(43%). The usage of Triage was 61/155 cases (39%). The average number of requesting by EMTs was average 1.4 times of using Triage and 2.1 times unavailable of Triage. ($p<0.05$). Institute requesting numbers are only 1 in 109 cases (70%), two in 27 (17%), three in 9 (6%), and more than 4 in 10 (7%). We investigated 67 cases which were diagnosed as finger amputation at each conveyed institute. The parts of injury were 9 thumb, 21 index, 16 middle, 8 ring, 11 small and 2 wrist. Level of injury were Tamai zone 15, zone 24, zone 15, zone 4, zone V7 and wrist 2. Treatment methods were 27 replantations, 21 stump pasties, 13 artery flaps, 4 composite grafts and 2 occlusive dressings.

Conclusion: Our results indicated the efficient patient transportation by the usage of Triage system.

LONG TERM OUTCOME OF TENDON RELATED EXTENSIVE INJURY TO THE WRIST UNDER FAHS (FULLY AWAKE HAND SURGERY) : A PRELIMINARY STUDY

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Objective: Fully awake hand surgery (FAHS) was introduced to eliminate risk of general anesthesia, obviate the need of painful tourniquet, and create interactive environment between surgeons and patients, allowing surgeons to evaluate the repair intra operatively, thus better outcome is expected, especially when dealing with tendon repair. This study aims to evaluate long-term outcome of tendon related injury to the wrist under FAHS.

Methods: Six cases of wrist injuries involving tendon, which are part of larger series to come, were presented to our center within 2013. All were males between 15-52 (32.5) years old. Three cases were caused by knife and the other 3 were caused by glass. All patients underwent FAHS with one-per-mil tumescent techniques. One patient underwent microsurgical oblique metacarpal replantation. Follow ups were done averagely 4 years and 6 months after the injury. Objective evaluation of outcome included tendon functionality, opposition, intrinsic function, deformity, sensation, grip strength, pinch test, and timing of return to work. Subjective evaluation included DASH and POSAS scores.

Results: Five patients showed excellent tendon functionality, opposition and intrinsic function with 1 patient resulted in poor tendon functionality, fair opposition, and good intrinsic function. No deformities and excellent sensation on all 6 patients.

Semmes-Weinstein monofilament test showed 2 patients retained their normal sensation and 3 patients resulted in diminished light touch. Mean grip strength was 43.25kg (40-47kg) and pinch test was 7.35kg (6.8-8kg). Mean time of return to work was 12.5 weeks (10-16 weeks). DASH score was 3.33-12.5 (5.41). Average observer POSAS score was 3.2 and patient POSAS score was 5.1.

Conclusion: FAHS for wrist injury involving tendon resulted in satisfactory long term functional outcome in most patients. One patient resulted in poorer outcomes due to involvement of palm amputation.

Keywords : wrist injuries, hand injuries, wakefulness, local anesthesia

INDICATION AND LIMITATION OF EXTERNAL FIXATOR IN PEDIATRIC PATIENTS

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Objective We have utilized external fixators for bone fixation, contracture release, joint traction, and bone and soft tissue lengthening. In this report, we investigated the indication and limitation of external fixator in pediatric patients under the age of 15.

Methodology This study included 32 patients, consisting of 16 males and 16 females, who had been operated on over the past 7 years and 3 months. The average age was 10.4 years at the time of surgery. The cases were brachydactylies, constriction band syndromes, radial ray deficiencies, osseous syndactylies, scar contractures, thumb polydactylies, lower limb phasias, malunions, metacarpal fusion, cleft hand, thumb aplasia, Apert syndrome, ulnar ray deficiency, and clinodactyly. The operative techniques were bone lengthenings, interdigital widenings, corrective osteotomies and distractions, fixations and tractions, soft tissue lengthenings, ray transfers/metacarpal shifts, and corrective osteotomies. The Ilizarov mini-fixator M3 unit was used for hands and feet, and ring-form external fixators for forearms and lower limbs. Since we have experienced wire dislocation, we introduced protective devices.

Results In distraction osteogenesis, the mean gained length was 9.8mm, and the Healing index was 22-89 day/cm. Additional surgeries were conducted due to the followings; wire dislocations after falls, fractures after fixator removal, and pseudoarthrosis. The youngest patient had postoperative pin site complications, resulting in early removal of the fixator.

Conclusions Distraction osteogenesis was applied in patients at age of 3 and above as bone lengthening and functional positioning would help improve functions of the hand. From our experience, in both pediatric and adult patients, the indications of external fixators are finger lengthening and functional positioning in order to improve hand functions. Furthermore, we need to take the characteristics of skin and bones in pediatric patients into consideration. Accordingly, careful attention should be paid to the location of the pins and postoperative pin site care in pediatric patients.

ATRAUMATIC, ISOLATED VOLAR COMPARTMENT SYNDROME OF THE FOREARM IN A PATIENT WITH MULTIPLE MYELOMA: A CASE REPORT AND REVIEW

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Objective: To present a case of a multiple myeloma patient with an atraumatic cause of acute compartment syndrome of the volar forearm who was treated with a multidisciplinary approach.

Methodology: A 63-year-old female with multiple myeloma developed acute compartment syndrome of the volar left forearm. Patient was co-managed with Hematology. Emergency fasciotomy done but the authors encountered significant bleeding post-operatively due to her hematologic disorder requiring multiple blood transfusions, plasma exchange, and multiple debridements with eventual skin grafting.

TUMORS

Results: Clinical picture improved and she has since been able to return to managing her photography business.

Conclusion: Recognizing compartment syndromes requires having and maintaining a high index of suspicion, particularly in cases with a non-classical history and presentation. A multidisciplinary approach addressing all medical conditions should be taken to ensure that the patient receives holistic care.

LIPOFIBROMATOUS HAMARTOMA WITH MACRODACTYL OF THIRD DIGIT LEFT HAND: A CASE REPORT.

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Objective: Lipofibromatous hamartoma is a rare tumour of peripheral nerves which is characterized by an excessive infiltration of the epineurium and perineurium by fibroadipose tissue. It is considered to be congenital in origin and more than one third of cases have been associated with macrodactyly. Reporting, female 14 years old presented with macrodactyly of the third finger left hand since born. She complained of clumsiness in the last 6 months. We have performed plain x-ray and CT-scan (with contrast) of the left hand, and found localized extended growth of bone and soft tissue of the third finger. We have performed surgical exploration of the third finger using zig-zag incision from distal until proximal phalang of third finger and found a yellow and cordlike mass of the digital nerve that surrounded and enlarged by fibrofatty tissues until palm region. We added another incision at the palm region and do the debulking procedure until the mass has been total excised. From the histological examination, we found a characteristic appearance of lipofibromatous hamartoma that surround the nerve.

Results: Until 3 months post operative follow up, there was a decrease of the mass size, motoric function and range of motion of the third finger was still normal, but there was still sensoric deficit according to the nerve distribution.

Conclusion: Debulking procedure in peripheral nerve tumors of digit have an advantages that has been proven to improve functional outcome, but also limitation. The surgeon must consider about the patient needs, according to the symptoms or cosmetic problem.

Keywords: Lipofibromatous hamartoma, Macrodactyly

THE ESSENTIAL OF LONG-TERM FOLLOW-UP FOR MACRODYSTROPHIA LIPOMATOSA AFTER SURGICAL TREATMENT

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Objective The aim was to analyse a long-term outcome of surgical reconstruction of six Macrodystrophia Lipomatosa (MDL) cases based on the functional improvement and cosmetic appearance.

Methodology This study involved 6 MDL patients who were admitted in Cipto Mangunkusumo Hospital (RSCM) consists of 1 MDL of the hand and 5 cases of the lower limb. An outcome analysis of functional improvement and cosmetic appearance is evaluated by Visual Analog Scale (VAS), which were conducted 6 months after reconstructive surgery from surgeon and patient standpoint.

Results The results concerning the functional improvement of six patients were categorized good in our terms. The MDL of the hand patient were able to use her hand for routine activities including to grip and pinch objects. Five patients of lower limb MDL were able to wear shoes and exceeding their activities of daily living. In general, fine scars and close to symmetrical condition especially for maintaining mobility both were achieved in 6 patients. The cosmetical appearance outcome analysis in terms of patient point of view were categorized excellent in 2 patients and good in 4 patients. As regard to the surgeon standpoint, the assessment showed different results, which were classified as excellent in 1 patient, good for 2 patients, and put down as fair for 3 patients.

Conclusions Surgical outcome analysis through a long-term follow up becomes important in the management of MDL to achieve the best possible results and patient satisfaction. Complications following the procedures and a localized recurrence that may arise in the future make the continuous follow up should be emphasized.

POSTOPERATIVE NEUROLOGIC DEFICITS AFTER INCISIONAL BIOPSY AND SURGICAL ENUCLEATION OF SCHWANNOMAS OF THE UPPER LIMB

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Objective: Neurological deficits occur in a significant number of patients after surgical enucleation of schwannomas. Incidence of adverse outcomes can be minimized through appropriate selection of patients. The purpose of this study was to identify risk factors for postoperative neurologic deficits.

Methods: We evaluated 43 patients who had undergone enucleation of schwannomas of the brachial plexus and peripheral nerves of the upper limb between 2003 and 2017. There were 21 males and 22 females, with a mean age of 50.4 years (15 to 79 y). The mean follow-up was 22.7 months (3 to 98 m). The 45 schwannomas were histopathologically confirmed. There were 1 schwannoma of the plexus, 25 of the median nerve, 15 of the ulnar nerve, and 4 of the radial nerve. Patients with neurological deficits were compared to those without in terms of age, sex, history of incisional biopsy, and location and maximum diameter of tumor.

Results: Three months after operation, 12 patients had postoperative neurological deficits. One patient developed motor weakness after excision of a schwannoma of the median nerve in the axilla. Schwannomas in the elbow and more proximal part of the limb were significantly associated with higher risk of neurologic deficits ($p = 0.033$). Ten patients underwent incisional biopsy prior to surgical enucleation. Although statistical analysis demonstrated no relationship between neurological deficits and incisional biopsy, four of 10 patients developed new deficits after incisional biopsy.

Conclusions: Prior to surgical enucleation of schwannomas in the proximal part of the limb and incisional biopsy, patients should be informed more thoroughly about the potential for postoperative neurologic deficits to occur.

SIMILAR BUT NOT THE SAME: TWO CASES OF RARE INTRAOSSEOUS LESION OF PHALANX

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Background Swellings in hands are commonly benign. Commonest intraosseous lesions are enchondroma, giant cell tumour and osteomyelitis. Cases We report 2 rare cases of similar presentations of swelling and discomfort at right little finger for about 6 months duration. Both patients are right hand dominant and unemployed. The pain and swelling had been progressively increasing, hence explains the need for medical attention. They did not present with other systemic illness. Radiographs showed similar findings of expansile lytic lesion over middle phalanx with cortical breach preserving the joint. Bone biopsy was done with similar technique. However, the results were not the same. Patient 1 was diagnosed for intraosseous gout and patient 2 for epithelioid hemangioma. Both patients were counselled for curettage, bone grafting and external fixation of phalanges. However, patient 1 had defaulted treatment. In patient 2, external fixator was removed after 2 months and physiotherapy commenced for improvement of joint movements. There had been no evidence of infection, recurrence or malignant transformation in 2 years follow-up. Discussion Isolated intraosseous gouty tophus and epithelioid hemangioma at phalanx are extremely rare. They can mimic other common lytic lesions of phalanx clinically and radiographically. Biopsy for histopathological examination should be done prior to planning the management. We suggested curettage to reduce the urate load in patient 1 and excise the tumour in patient 2 in order to prevent either worsening of symptoms or pathological fractures and to improve their hand functions.

Conclusion Curettage and bone grafting are treatment of choice. External fixations are recommended in late presentations of massive lesions with or without fracture as it provides additional stability. Curettage and cementation is an option.

TUMORS

A CASE OF EPIDERMOID CYCT ACCOMPANIED BY OSTEOLYSIS AND REQUIRING DIFFERENTIATION FROM BONE TUMOR

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Background Epidermoid cysts are the most common cysts of the skin, usually appearing in the hairy regions. However, epidermoid cysts on the non-hair-bearing areas, such as the palms and the soles are rare. we report the bone of the left ring finger distal phalanx accompanied by osteolysis and report epidermoid cyct which was required to be distinguished from bone tumor.

Case The case is a 14-year-old female with bone osteolysis of left ring finger in X-ray photograph. In this case, bilateral (middle finger-ring finger) was present from birth, and at our age at 1 year old, after undergoing syndactylous surgery, it was only follow-up visit once in a year. In X-ray, osteolysis was recognized on the radial side of the left ring finger trunk, but the finger under direct view did not recognize morphological abnormality such as nail deformation. Ring finger DIP Distal radius side skin incision was made, approached to the affected part, and the content was removed. Upon bone reconstruction, bone was collected with the left anterior iliac bone and used for reconstruction.

Discussion There are several reports as in this case. Both of these cases are osteolysis, the site is filled with atherosclerotic material in intraoperative findings, and a baglike structure is in a form that fuses to the bone. As a clinical finding, it is necessary to consider cartilage tumours and Glomus tumor.

Although the cause is unknown, it is believed that most of it is caused by burying epidermal components due to some cause after trauma. There are also a few reasons caused by the embryonic cell remains as other causes. As in this case, there have never been cases of merging with congenital malformations. Further examination is necessary to repeat the case from now on.

MULTIPLE SCHWANOMAS OF THE PERIPHERAL NERVE OR SCHWANOMATOSIS ?

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Objective: A schwannoma is an encapsulated, slow growing tumour of a nerve sheath which is almost always solitary. On the other hand, schwannomatosis is a rare benign tumor of the nerve sheath which rarely show familial inheritance and without the typical skin, hearing and eye manifestations. Differential diagnosis of neurofibromatosis should be considered in patients who present with multiple synchronous swelling. We report of a case of multiple synchronous swelling over the right hand and forearm of a 76-year-old lady.

Methodology: A 76-year-old lady presented with multiple swellings over the right hand and forearm starting insidiously as pea sized then gradually enlarged over 5 years causing a tingling like discomfort limiting her hand function. There were three swellings over the medial flexor forearm, ulnar border of wrist, and thenar area of the palm measuring about 1cm x 2cm, firm, non tender, well defined and not attached to overlying skin or deeper muscle. Tinel's was positive over the 3 swellings. There were no palpable lymph nodes, no skin patches or skin freckling suggestive of neurofibromatosis.

Results: MRI with contrast showed four well defined lesions with intermediate signals on T1, high intensity on T2 and enhanced brightness on contrast. Two lesions arose from the median nerve and two from the ulnar nerve. A provisional diagnosis of Schwannomas (nerve sheath tumor) was made. The swellings were surgically enucleated and one-month post operation, she experienced less discomfort of her right upper limb.

The histopathological report of all the specimens showed well circumscribed masses composed of cellular areas of monomorphic spindle cell shaped cell with poorly defined eosinophilic cytoplasm and pointed basophilic nuclei (Antoni A) and loose areas of myxoid matrix (Antoni B). Findings were consistent with Schwannoma.

Conclusion: It is rare to see multiple nonvestibular schwannomas involving two peripheral nerves (median and ulnar) of a single limb, hence we diagnosed as schwannomatosis.

CAVERNOUS LYMPHANGIOMA OF THE DIGITS - A RARE CAUSE OF MACRODACTYLY

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Objective: We present a case of dystrophic macrodactyly of the left ring and little finger in an 18 month old girl which turned out to be an isolated cavernous lymphangioma

Methodology: An 18 months old baby girl presented with gradually enlarging bulbous swelling of the left ring and little finger. The finger swellings were noted at birth and subsequently enlarged slowly disfiguring the ring and little finger, more prominent over the dorsum of the hand and extending till the distal phalanx. Radiograph of the left hand showed a large soft tissue shadow with no bony involvement of the affected phalanges. MRI showed a large subcutaneous tissue mass of the ring and little fingers with no definite margins. The mass was homogeneous in consistency, hypointense in T1 and hyperintense in T2 weighted sequence indicating presence of fat. A provisional diagnosis of macrodystrophic lipomatosa involving the ulnar nerve distribution was made, keeping in mind the relative normal sized bones and non fatty dominance of the mass which were atypical of such lesion. She then underwent surgical debulking of the mass.

Results: The histopathological report revealed microscopic findings consistent with lymphangioma. At one month post surgery, both the digital swellings have markedly reduced and the scars well healed. Parents were advised regarding the high possibility of reaccumulation and the rare risk of malignant transformation of less than 3%.

Conclusion: Surgical excision of lymphangioma remains an unresolved challenge showing disappointing results of surgical treatment of nine upper extremity cases with high rate of recurrence. Cavernous lymphangioma of the hand and digits as a cause of macrodactyly are relatively rare. Functional limitation of the enlarged and cosmetically disfigured digits associated with pain as well as possible secondary infection makes surgical resection the preferred option.

MALIGNANT CANCER METASTASIS LESION IN UPPER EXTREMITY

[Chang Chih-Hao](#)

Introduction Malignant cancer was treated progressively and got great improvement recently. Due to this advancement, the malignant cancer was no more leading to mortality at once and resulted longer life. Before, we did not recognize many metastatic lesion in upper extremity. But in these years, the metastatic lesions found in upper extremity were increased and was easy to make wrong manifestation. So, in this study, we focused on the statistics to know how high of the rate for metastatic lesion happened at upper extremity and where is the primary lesion.

Materials and Methods From 2012~2017, we collected 56 cases who were identified to have metastatic bony lesion in the upper extremity. According to the location, there are 2 scapula, 38 proximal humerus, 7 middle and distal humerus, 1 olecranon, 0 radial head, 5 forearm two bones, 2 wrists and 1 finger. The malignant cancers included 19 liver, 13 breast, 7 lung, 2 prostate, 4 blood, and 11 others. They are treated with different methods including wide excision, cementing, ORIF, endoprosthesis and amputation.

TUMORS

Results and Discussion In this study, we tried to make some analyses about early and delay diagnosis, nature of cancer spreading, rich or not hematogenous content, cytotoxic solution effect and excision method. These factors did influence the survival rate of the patients. Today, malignant cancer happened so widely and frequently. Almost each person will have one to two cancers during all his life. Treat the metastatic lesion is a hot topic in the future. In this study, we tried to afford some informations about how to diagnosis, how to treat, and how to make your patient owning good life.

A CASE OF AN INFLAMMATORY CYST MASQUERADING AS A GANGLION IN THE PALM

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Introduction Ganglions are common lumps found within the wrist and hand arising from joints or tendon sheaths. Ganglions are typically found on the dorsum and volar aspect of the wrist as well as the base of the finger on the palmar aspect.

Case Report We report a case of a 65 year old male farmer who presented with a five year history of a palmar swelling over the base of his index finger on his dominant right hand. The swelling was located overlying the second metacarpophalangeal joint measuring 4 x 3 x 4 cm with no skin changes. It was non-tender, non-pulsatile, firm and non-mobile. Tinel's sign was negative, and sensation was normal. He had full range of motion of the index finger and was able to form a fist. He was keen for excision as it caused discomfort when gripping farming tools. Magnetic resonance imaging showed a homogenous mass arising from the second flexor digitorum superficialis tendon sheath. Diagnosis was based on the lump's location and the imaging, which suggested a ganglion cyst. Intra-operatively instead, we found a subcutaneous capsulated soft yellowish mass compressing the second flexor digitorum superficialis tendon but not arising from its' sheath. We did not proceed to dissect the lump as we thought that it was a lipoma. Surprisingly however the final histopathological diagnosis reported a benign inflammatory cyst which was lined with inflammatory cells and contained brownish cheesy like material.

Conclusion In conclusion, lumps in the hand can have unexpected microscopic diagnoses and it may be prudent to dissect a portion of the lump before stitching it to get a clearer clinical diagnosis.

SYNOVIAL OSTEOCHONDROMATOSIS OF THE METACARPOPHALANGEAL JOINT OF THE MIDDLE FINGER: A CASE REPORT

Kono Aki

Synovial oOsteochondromatosis is a rare disorder characterized by synovial metaplasia and proliferation which forms multiple cartilaginous nodules. Common symptoms include Usually, the patient complains "locking" and pain in the major joints caused by impingement of the tumor and pain. of major joint such as knee, hip, elbow, shoulder. We report a rare case of synovial osteochondromatosis of the metacarpophalangeal joint of the middle finger that improved after tumour resection-removal and synovectomy.

35-year-old woman presented with a history of left middle finger pain and swelling that had persisted for 2 years without any history of trauma. She noticed the swelling 2 years before, and felt more pain gradually. Multiple A lot of elastic hard nodulestumor in metacarpophalangeal joint of the middle finger were seen, and range of motion was limited. Plain radiographs showed the swelling of soft tissue but no extra-osseous tumor mass shadow with calcifications. T2 weighted magnetic resonance imaging (MRI) depicted showed the multiple 1mm-3mm tumors that had high-intensity areas.

We removed Tthe tumor and synovial membrane was resected via dorsal approach. The lesion was composed There is a lot of multiple rice-grain-size cartilage fragments. Histopathological examination confirmed the presence of synovial an osteochondromatosis. Her pain was immediately relieved after surgery. At the finalhalf a year follow up after 6 months, the patient is she had no pain free without and the "locking" of the finger wsa improved.

To our knowledge, sSynovial oOsteochondromatosis that occur in the metacarpophalangeal joint has been reported in only a few cases. Because of the rarity of the tumor, long-term follow-up should be warranted. We must follow the case carefully.

GIANT CELL TUMORS OF THE TENDON SHEATHS IN THE HAND

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Introduction: Giant cell tumor of the tendon sheath (GCTTS) is the second most common tumor of the hand after ganglion cysts. However, the local recurrence after excision has been reported in 5-30% of cases. The purpose of this study is to evaluate the clinical results of patients and to determine the risk factor of recurrence. Patients and Method: From 2002 to 2016, 30 patients [17 males, 13 females, mean age 50, ranging from 13–77 years] underwent excision of GCTTS of the hand. The average follow-up time was 15 months (3-180), the disease duration was 20 months (1-60), and the size of tumor was 14.6mm (11-25). We always used the operating microscope during resection of tumors. We evaluated size of tumor, disease duration, bone erosion, pseudocapsule, and tumor-occupying factor.

Results: Recurrence was noted in only one case, who was successfully managed by a second excision. 2 cases were recurred after resection in other hospitals. Recurrence group (n=3) and control (n=27) were compared, but we could not find the risk factor for recurrence with a statistically significant difference. 2 cases were recurred in the proximal interphalangeal (PIP) joint.

Discussion: The local recurrence of GCTTS was caused by incomplete resection or satellite lesion. GCTTS in or around PIP joint was difficult to remove adequately, because the neurovascular structures are quite close to tumor margins. To prevent recurrence, some literatures suggested postoperative radiotherapy or use of imatinib. However, they have been still controversial. We guess the pre-operative planning and microscopic resection are important to prevent recurrence.

Conclusion: GCTTS in the hand are a common benign soft tissue tumor. Incomplete resection and satellite lesion seem to be the main factors influencing the rate of recurrence.

FIBROLIPOMATOUS HAMARTOMA OF THE MEDIAN NERVE

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Objective Fibrolipomatous hamartomas (FLH) of the nerve are rare, benign tumor consisting of fibroadipose tissue. Here we report 2 cases (three hands) of FLH arising from the median nerve.

Methodology and Results

Case 1 A 44 year old female was referred to our hospital with a mass on her right forearm which had been asymptomatic for 10 years. Clinical examination showed presence of an elastic soft 3cm mass in the distal third of her forearm with no neurological deficit. Tinel's sign of the mass was positive, radiating over the median nerve territory. Magnetic resonance imaging (MRI) revealed enlargement of the median

TUMORS

nerve with high intensity changes in both T1 and T2 weighted images. Histopathology with a needle biopsy showed interlacing collagen bundles with proliferating fibroblasts and adipocytes and was diagnosed as FLH. Since the patient had no neurological deficit, she was treated conservatively.

Case 2 A 66 year old male was referred to us with numbness on his bilateral thumb to his ring finger. Clinical examination showed a 1cm mass proximal to his bilateral wrist. Hypesthesia and weakness of his left abductor pollicis brevis (APB) muscle was present. Electrophysiological examination of the bilateral median nerve demonstrated severely delayed distal motor latency and diminished sensory nerve action potential. MRI showed enlargement of the median nerve with T1 and T2 intensity changes resembling FLH. Neurolysis and decompression of the bilateral median nerve was performed from proximal end of the flexor retinaculum to the carpal tunnel. Postoperatively he regained normal muscle strength of APB and the electrophysiological examination demonstrated remarkable improvement of both hands.

Discussion Treatment option for LFH varies from close observation to resection, but in the absence of any notable neurologic symptoms, observation has been advocated. In cases neurological symptoms, clinical and electrophysiological improvement can be achieved with decompression and neurolysis.

SURGICAL TREATMENT AND OUTCOME OF GIANT CELL TUMOR OF TENDON SHEATH OF THE HAND

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Objective Giant cell tumor of tendon sheath (GCTTS) is benign soft-tissue tumor that most commonly occurs in the hand. It has a relatively high recurrence rate in despite of benign tumor. In order to improve the treatment outcomes, we analyzed risk factors for recurrence statistically, and furthermore discuss exposure of surgical field in this study.

Methodology We reviewed 21 cases (22 hands), aged 17 to 88 years (mean, 44.6 years) who underwent excision of GCTTS by the same surgeon between 2009 and 2015. The mean follow-up was 26.5 (range, 1-52) months. We investigated risk factors of recurrence which past study reported as followings; cases with recurrences at the first visit, radiographic bony erosion, flexor or extensor tendon adherence, joint capsule adherence, polycystic tumor, and tumor diameter more than half of the phalanx diameter. The case with any one of these risk factors was defined as high-risk group, and low-risk group without them. Statistical analysis was conducted using the Fisher's exact test retrospectively to identify the association between recurrence and the two groups.

Results

There were 10 cases in high-risk group and 11 cases in low-risk group. There was only one recurrence case in high-risk group. As for the recurrence rate, There was no significant difference between the two groups. The overall recurrence rate was 4.6%. Among them, recurrence rate of cases with postoperative visits for over 1 year was 6.3%.

Conclusions

There was no significant difference between risk factors of recurrence which past study reported and the recurrence rate. GCTTS is considered as a tumor with high recurrence rate; however, the rate was not high in this study. We think that recurrence rate of this tumor is not necessarily high if you can completely resected tumor by using preoperative imaging and procedure with the basic principles of hand surgery.

WRIST

DYNAMIC ACTIVE SPLIT ECU TENDON SLING FOR ULNAR STUMP STABILIZATION

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Introduction: Symptomatic instability of ulnar stump both in sagittal and coronal planes after resection procedures of distal ulna is common occurrence. Goldner and Hayes described use of proximal half strip of ECU tendon to attach to distal ulnar stump to achieve dynamic stabilization. We modified technique and obtained satisfactory outcome in 20 cases.

Materials and Methods: Twenty wrists in 19 consecutive patients were included in this review study from 2002 to 2014 with average follow up was 30.9 months (ranged 3-100 months). There were 14 female and 5 male patients, with average age of 65.6 at time of surgery. Pathology of DRUJ included 8 rheumatoid arthritis, 5 primary osteoarthritis, 3 post-traumatic arthritis, 2 psoriatic arthropathy, 1 gouty arthritis and 1 scleroderma patient. Ten of them presented as Vaughan-Jackson syndrome. 16 Darrach procedures, 2 total wrist replacements, 1 Sauvi-Kapandji procedure and 1 primary wrist fusion were included. In 11 patients, concomitant tendon transfer or grafting procedures were performed.

Result: 18 patients had no ulnar sided pain while 2 have mild pain. All patients exhibited instability of ulnar stump upon passive ballottement test but without pain. Upon active gripping, the ulnar stumps were stable in all positions of forearm rotation and wrist positions in all cases. Radiologically evidence of radio-ulnar impingement was absent in all except 2 patients. One of them was being attributed to inadequate resection of the ulnar head without any surgical complication.

Our modified technique of dynamic active tendon transfer of split ECU tendon allows internal splinting of ulnar stump in a more physiological position. ECU muscle is activated upon active gripping and force vector of ECU muscle tends to divert the ulnar stump away from radius and minimize the potential impingement and instability. Stabilization effect is independent of wrist position.

Conclusion: Modified Darrach procedure is simple and rehabilitation uncomplicated.

ACCURACY OF THE WRIST PHYSICAL EXAMINATION IN A HAND SURGERY UNIT WITH VARYING DEGREES OF EXPERTISE

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Introduction: Accurate clinical and radiographic examination of a wrist is required to diagnose injury. Knowledge of basic wrist anatomy is the key to ensuring a complete assessment. Nevertheless, the high wrist complexity itself and the different expertise level between the physicians could misdiagnose the structure involved.

Materials and Methods: We compared six groups (A-F) with varying degrees of expertise in our hand unit in terms of their accuracy to pin a needle in eighteen wrist bony structures on a cadaveric specimen. The accuracy was estimated by the shortest distance from the needle tip to the asked structure. This distance was measured by fluoroscopy using a 1 mm scaled ruler placed closed to the specimen on a standardized posterior-anterior radiograph. The specimen was always strictly located over a preformed radiolucent scaffold.

Results: The group A (orthopaedics consultants with more than 5 years of experience) and group E (qualified occupational therapist and physiotherapist with more than 5 years of experience) had the best results in terms of accuracy and internal consistency (Cronbach α : 0.856 and 0.773, respectively) while the group D (pre-intern trainees) had the highest rates of fail and longest distances in measure-

WRIST

ments (Cronbach α : 0.535). The three thirds of the scaphoid and the scapholunate joint were the structures with worst results to be addressed.

Discussion and conclusion: This study highlights a dedicated training and a thorough knowledge of anatomy are required for examination of the wrist in the hospital setting. Systematic training can improve the accuracy of wrist palpation examination.

TOPOGRAPHICAL ANATOMY OF THE DISTAL ULNA ATTACHMENT OF THE RADIOULNAR LIGAMENT

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Purpose : The deep component of the distal radioulnar ligament provides translational stability and rotational guidance to the forearm. However, controversy exists regarding the importance of this structure as well as the nature of its attachment to the distal ulna. We aimed to evaluate the topographic anatomy of the distal ulna attachment of both the superficial and the deep components of the radioulnar ligament and to assess the relationship between its internal and its external morphometry.

Methods : Thirteen human distal ulnae attached by ulnar part of the distal radioulnar ligament were scanned using microcomputed tomography and reconstructed in 3 dimensions. In addition, the distal radioulnar ligaments were examined under polarized light microscopy to determine the histological characteristics of collagen contained within the ligaments.

Results : The deep limbs have broad marginal insertions at the fovea, whereas the superficial limbs have a circular and condensed insertion to the ulnar styloid. The center of the deep limb was separated from the base of the ulnar styloid by a mean of 2.0 ± 0.76 mm, and this distance was positively correlated with the width of the ulnar styloid. The mean distance between the center of the ulnar head and the center of the fovea was 2.4 ± 0.58 mm. The proportion of collagen type I was lower in the deep limb than in the superficial limb. **Conclusions :** This new observation of the footprint of the radioulnar ligament in the distal ulna indicates that the deep limb may serve as an internal capsular ligament of the distal radioulnar joint, whereas the superficial limb as the external ligament.

Key words : Micro-CT, triangular fibrocartilage complex, distal radioulnar ligament, footprint, fovea.

OTHERS

THE NERVE DAMAGE WITH CRUSH CAN ACTIVATE THE AUTOPHAGY TO PROMOTE NERVE REPAIR IN RAT MODEL

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Introduction Despite the early diagnosis of nerve repair and modern micro-surgical technique, no matter how accurate, nerve repair is unable to recover to the pre-injury level. Many factors may affect recovery, such as neuronal damage and end nerve organ damage with different types and levels. Recent studies demonstrated that autophagy can promote nerve repair. In our study, we were generated the nerve crush model to examine correlation between autophagy and nerve repair in the rat model organism.

Materials and Methods SD rat were be used for the nerve crush model. The nerve crush model was located in the sciatic nerve with vascular clip to clamp for 5 minutes and release. The samples were collected from 30 minutes, 4 hours, 1 day, 3 days, 7 days, 14 days, 21 days and 56 days.

The electrophysiological data were be examined and analyzed. H&E staining were used for identified tissue morphology and histology. IHC were used for detected the autophagy protein expression level.

Results The electrophysiological data showed that the latency and amplitude of action potential of nerve crush were slower and smaller than control group until 14 days. The H&E staining showed the nerve with swelling and edema. The IHC showed that the nerve with crush with beclin-1 and LC3 up-regulation.

Discussion The autophagy can promote nerve repair in the nerve crush model. However, there still cannot explain how it is. In the future, we will use the anti-autophagy drug to examine the therapeutic potential in nerve repair.

EFFECT OF SUGAR TONG SPLINT IN LIMITING FOREARM ROTATION

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Introduction To promote primary healing, restriction of forearm rotation by a cast or a splint has been recommended after distal radioulnar joint injury including a triangular fibrocartilage complex tear. Historically, a long arm hinged brace was used for restriction of forearm rotation in our Hong Kong settings. Several studies recently have shown that a below-elbow splint is sufficient for immobilization and some authors have reported that sugar tong splint is superior to allow mid-range elbow flexion and extension while preventing forearm rotation.

Objectives The purpose of this study was to investigate the forearm immobilization by sugar tong splint, in terms of the average active pronation and supination achievable at the forearm while wearing the sugar tong splint.

Methodology Healthy participants who did not have any trauma or injury to the dominant upper limb were recruited into our study. The dominant upper limb was assessed and a sugar tong splint was fabricated. Active range of motion (AROM) in forearm pronation and supination was measured with a goniometer. They were required to pronate/ supinate their forearms under the following circumstances: 1) without sugar tong splint, 2) point of sensory feedback, i.e. the first point where the participant reported feeling the splint beginning to resist forearm rotation, and 3) point of maximal force applied to rotate the forearm.

Results There were 9 healthy participants included in this study. Sugar tong splint could not completely immobilize, but largely restricted the forearm rotation. The mean point of sensory feedback for the sugar tong splint in pronation was 15.9o and in supination was 24.3o. There was 80% reduction in our participant's AROM when performing forearm rotation with the sugar tong splint.

Conclusions Sugar tong splint is recommended for providing maximal restriction of forearm rotation to reliable and compliant clients, while not limiting elbow extension and flexion.

NORMATIVE DATA OF CHOPSTICKS MANIPULATION OF AGED 6 TO 15 YEARS IN HONG KONG

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Introduction Chopsticks manipulation is one of the major fine motor achievements of children to accomplish in Chinese culture. Children begin using chopsticks at about 4.6 years old and completely master it at the age of 6.7 years. Occupational therapists and parents often regard chopsticks use as a developmental milestone

OTHERS

during a hand function evaluation. However, no developmental test batteries adopted this skill into their assessments. In Taiwan, Chang, Chien and Lin (1993) developed a chopsticks manipulation test for adult to determine their functional performance after severe hand injuries. However, no study reports the developmental progression of children in this specific skill by using a standardized assessment.

Objectives To establish local normative data assessed by the Test of Chopsticks Manipulation (TCM) in subjects aged 6 to 15 years living in Hong Kong.

Methodology Subjects without any known developmental disabilities were recruited in the study after obtaining their parents' consent. TCM was chosen to assess their chopsticks skills. They were asked to perform TCM and two hand strength tests in a random fashion. Questions covering chronological age, hand dominance were also recorded. Data were then stratified into 20 groups by different ages.

Results 477 subjects were recruited in this study. The mean seconds to complete the TCM was 94.32, 66.65, 59.04, 53.95, 51.85, 48.36, 45.80, 42.14, 40.75 and 39.94 for boys aged 6 to 15 years old respectively. The average seconds to complete the task was 80.93, 49.57, 48.13, 47.74, 42.14, 42.39, 35.79, 35.00, 32.77 and 32.40 for girls respectively.

Conclusion The study provides updated reference norms of the Test of Chopsticks Manipulation (TCM) for the children between 6 to 15 years old in Hong Kong. Findings in this study have also proven that age and gender seemed to affect the performance of chopsticks manipulation of children.

THE PREVALENCE OF NEUROPATHIC PAIN AND DISABILITY IN NERVE INJURY PATIENTS - RESULTS OF AN ONGOING STUDY

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Objective The prevalence of neuropathic pain and disability in nerve injury patients
Methodology – the google based interviewer administered standard DN4 and Quick DASH questionnaires were used to collect the data for this prospective ongoing study. Analysis done using excel spreadsheet. 12 patients were reviewed after the nerve repair for acute and sub-acute nerve related pain and sensory impairment. 8 were males and 4 were females. One patient was operated for neuroma and others were acute lacerations. They were reviewed in 3, 6 and 12 months post operatively. Six patients were injured at workplace, 4 were at home and 2 were at road accidents.

Results The early results of the study will be presented. 1/3 of the patients had neuropathic pain and Quick DASH score was 33.9 in average.

Conclusions The prevalence of neuropathic pain and disability needs more and more evidence to catch all the patients suffering from these symptoms after nerve injuries.

NON-CONTACT ULTRASOUND EXAMINATION OF THE HAND- USE OF THE WATER BATH

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Objective Few hand surgeons have learned how to use ultrasound imaging in their everyday practice. The reasons for this are unclear but may include such factors as the cost of equipment. However the true potential of this imaging may be obscured by the difficulty in interpreting the static images provided by the hospital imaging department. A particular feature of such images is the distortion due to the pressure of the contact probe. A study has been undertaken to assess whether the anatomical deformation of the contact probe made interpretation of anatomical structures more difficult.

Methodology Ultrasound images of the hand obtained in a waterbath (undistorted images) were compared with those distorted images taken by a contact technique using gel. Images were taken at 4 sites(first dorsal interosseous, hypothenar border,

flexor tendons, median nerve) and a panel of untrained consultant and trainee surgeons were asked to identify named structures and to outline areas on the images.

Results Soft Muscular sites underwent greater distortion on contact in comparison with the less deformable flexor tendons Interrater reliability showed that the waterbath method had excellent reliability (Intraclass coefficient 97) while the gel method had only moderate reliability(Intraclass coefficient 71).

Conclusions This data suggested that there was less accurate identification of structures deformed by contact pressure. The water bath has a potential to increase accuracy of identification and measurement and its use may increase interest amongst hand surgeons in ultrasound examination.

RELATIONSHIP BETWEEN JOINT POSITION AND MUSCLE ACTIVITY OF THE TRICEPS BRACHII MUSCLES.

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The objective of the present study was to investigate the muscles activity among the three heads of the triceps brachii muscle using electromyography during an isometric contraction of a controlled force elbow extension on different joint position.

Six health subjects performed isometric elbow extensions consisting of linear torque ramps of 5-s from 0 to maximal voluntary contraction (MVC) at elbow flexion position of 30 degrees and 90 degrees. EMG signals from the lateral, long and medial heads of the triceps brachii muscle were recorded during for each subject, and normalized to EMG during isometric MVC. The EMG signal of the long head was detected using surface electrode, and the lateral and medial head were detected using bipolar fine wire electrode. A two way ANOVA was performed using the mixed procedure to determine whether difference existed in normalized integrated EMG (NIEMG) of each heads of the triceps brachii muscle between joint position and %MVC (30%, 60%, 90%).

The NIEMG of lateral and medial head were significantly higher in 90 degrees than in 30 degrees elbow flexion at each %MVC. The NIEMG of long head was significantly higher in 90 degrees than in 30 degrees at 60% and 90%MVC, but no significant difference at 30%MVC.

The activity of triceps brachii muscle was difference in each heads. The lateral and medial head were lower activity in low contraction and elbow extension position. If limited active extension after trauma of elbow joint, the extension exercise of the elbow joint suggested that flexion position is effective.

MEASURING LEVELS OF UPPER-EXTREMITY DISABILITY IN THE ELDERLY

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Objective: The Hand20 is the validated questionnaire for upper extremity disorders with explanatory illustrations. Our hypothesis was that the illustrated Hand20 would demonstrate high reliability among elderly individuals compared to the Japanese Society for Surgery of the Hand Version of Disability of the Arm, Shoulder and Hand (DASH-JSSH).

Methods: To evaluate reproducibility, a total of 542 patients with upper extremity disorders completed both the Hand20 and the DASH-JSSH twice. Cases that had more than 10 % of responses missing were defined as inappropriate cases, which were excluded from the analysis. The test-retest reproducibility was assessed with the intraclass correlation coefficient (ICC).

Results: ICCs for the Hand20 and the DASH-JSSH were 0.93 and 0.92, respectively. Both questionnaires met recommended reliability standards for individual-level

OTHERS

applications, which were considered to range from a low of 0.90 to a high of 0.95. Even in the elderly patients (more than 65 years old), reproducibility for the Hand20 was equivalent (ICC = 0.93). However, the reproducibility for the DASH-JSSH was lower in elderly patients compared to all age group (ICC = 0.89). Inappropriate cases among elderly individuals were seen in 3 cases (2.5 %) and 30 cases (24.8 %) on the Hand20 and the DASH-JSSH, respectively.

Conclusions: With an aging society, the development of instruments to assess the health status of elderly people has become an important issue. In this study, reproducibility for the DASH-JSSH was not enough to assess individual elderly patients. In contrast, reproducibility for the Hand20 met recommended reliability standards for individual-level applications regardless of age. Furthermore, completeness of item responses for the Hand20 was significantly better than that for the DASH-JSSH. These results support our previous study in which explanatory illustrations led to less missing data and improved the reproducibility. The questionnaire with illustrations may expand the applicable age range.

RELIABILITY AND CONCURRENT VALIDITY OF THE RING GAUGE METHOD AND THE METACARPAL HEAD TAPE MEASURE METHOD OF MEASURING HAND SIZE

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Objective: There are several methods for measuring edema of the hand. While the volumetric and figure-of-eight techniques have undergone extensive psychometric testing, alternative methods of measuring hand size, such as circumferential finger size determination using a ring gauge (ring gauge method; RGM) and tape measurement of hand girth taken along the distal palmar crease (metacarpal head tape measure method; MHTM), have not. The purpose of this study is to examine the reliability and validity of the RGM and the MHTM.

Methodology: RGM; Finger size was assessed by measuring the circumference of the little finger of each hand using a ring sizer device (Fig 1), an inexpensive tool for determining the appropriate size of a ring. Ring sizer loops were fitted individually around the finger until the smallest acceptable ring reached the basal portion of the proximal phalanx. MHTM; A tape measure was wrapped across the ventral and dorsal surface of the hand along the distal and proximal palmar crease between the fifth metacarpophalangeal (MCP) joint and the second MCP joint with the fingers extended. Two examiners measured 30 hands in 30 patients with hand edema using the RGM and the MHTM 3 times each to determine intra- and inter-tester reliability. The validity of each method was established using the tape measure method and figure-of-eight method, respectively.

Results: The intra-class correlation coefficient (ICC) obtained for intra-tester reliability was 0.99 for both methods. ICCs for inter-tester reliability were 0.97-0.98 for the RGM and 0.98-0.99 for the MHTM. Pearson product-moment correlation values between the RGM and tape measure method were 0.87-0.97, while those between the MHTM and figure-of-eight method were 0.82-0.89.

Conclusions: The RGM and the MHTM are reliable and valid evaluation tools for the assessment of hand size.

THE USE OF CORNEAL BLADE IN HAND SURGERY

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Objective To Simplify difficult surgical steps in Hand Surgery using the Corneal Blade.

Method

Case 1. 25 year old lady with 5 years old intrinsic plus deformity involving all the 4 fingers and thumb as a part of post infective sequel. She was treated in the first stage by release of the adductor pollicis and thumb web and coverage of the raw area using a posterior interosseous flap. In the second stage interosseous release from the origin or the metacarpal shaft. During this procedure two conventional vertical incisions over the dorsum of the hand, the intermetacarpal spaces were explored following the retraction of the extensor tendons. The corneal knife was used to bring about easy and total release of the interossei muscle from the anterior surface of the metacarpal bones.

Case 2. 11 year old female, who presented with loss of active flexion of index finger at PIP and DIP joints of 6 months duration following a incised wound over the volar aspect of the PIP joint. She had undergone 2 unsuccessful attempts of tendon repair and reconstruction prior to the presentation. On surgical exploration we found the A2 pulley was not salvageable. One half of the proximally retracted FDS tendon was used to reconstruct the FDP. We decided to reconstruct the A2 pulley using a looped palmaris longus tendon graft. To facilitate this procedure of passage of the graft atraumatically between the periosteum and the dorsal extensor expansion, we choose the corneal knife.

Results we achieved cosmetically and functionally good results in both the cases.

Conclusion: Corneal blade may be employed in bringing about complete release of interossei muscle and pulley reconstruction in making the surgical procedure easy.

STEM CELL INTRA-ARTICULAR THERAPEUTIC INJECTION FOR CHONDRAL DEFECT WITH 9 CASES FOLLOW UP

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Introduction: Chondral defect in wrist is a defect in the articular hyaline cartilage, which not only cause pain, but also lead to functional impairments to patients. Injection of stem cell has been suggested upon ineffective arthroscopic debridement.

Materials and Methods: 6 males and 3 females aged from 25 to 58 have been recruited. Among them, 6 subjects have completed 1 year follow up while the remaining have completed 6 months follow up. Bone marrow was harvested, processed and cultured in clean laboratory. Cultured Autologous MSC (2-3 mL, 1 x 10⁶ cells/mL) were injected in wrist joint. Functional and radiological outcome have been assessed with the use of Patient-Rated Wrist Evaluation, DASH score and wrist assessment by occupational therapist.

Results: 9 patients have finished stem cell injection without any adverse effect noted. Common findings for all patients will be inflammatory response post 1 month injection with decreased mean and median in extension, flexion, radial deviation, ulnar deviation, Pronation, supination, power grip and power pinch. Apart from significant improvement in ulnar deviation (P=0.027) and power water function (p=0.03), Supination (P=0.027) and Flexion (p=0.007) have been found to have improvement in third month follow-up after recruitment of the latest 3 patients. Result of SF 36 suggest quality of life of patients is arbitrary and individualized. 2 of the recruited patients can managed to return working with light-duty job.

Discussion and Conclusion: The progress of the study has demonstrated the safety and feasibility in recruitment of patient in this first local phase 1 clinical trial.

OTHERS

TWO-TIER WOUND SEALING BEFORE SURGICAL HAND WASHING FOR THE HANDS WITH A MINOR CUT INJURY

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Objective Proper hand washing is important to prevent surgical site infection. However, there is a lack of evidence-based recommendation for hand washing when the hands have a minor cut injury. We aimed to evaluate whether a two-tier wound sealing procedure before hand washing is effective in preventing microorganism colony formation.

Methodology We randomized 20 volunteers (orthopedic residents and fellows) into either right- or left-hand injured subjects. Each subject was assumed to have a minor injury on the volar surface of the index distal phalanx of the assigned hand, and the other hand was used as a control. Subjects applied a 1.5cm diameter, circular, waterproof topical dressing on the index digit (first tier), washed their hands using an alcohol-based solution, and then wrapped the index digit with a piece of antimicrobial drapes (second tier), and finally performed hand rubbing. Subjects stamped each hand into a hand-shaped agar plate for 10 seconds and the plates were incubated for 48 hours. We observed any growth of microorganisms, and if any, identified the organisms using standard laboratory identification procedures. As a positive control, an individual stamped the hand after washing with tap water.

Results We observed 4 colonies in the 20 injured hands, all of which were located on digits other than the index digit. Mean number of colonies was 0.2 in the injured hands and 0.25 in the uninjured hands ($P = 0.770$), while the number was 43 in the positive control. The colonies from the injured and uninjured hands were coagulase negative staphylococcus species, with no difference between the injured and uninjured hands.

Conclusions This study in a hypothetical model for hands with a minor cut injury demonstrates that a two-tier wound sealing procedure before hand washing is effective in preventing microorganism colony formation.

HOW DID WE TRAIN SURGICAL NURSES FOR HAND SURGERY?

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Objective provision of knowledge and competency to function as an effective operating room (OR) nurse in endoscopic carpal and cubital tunnel decompression. **Methodology** - Hand surgery was introduced as a service in the hospital, a tertiary level public-sector organization in northern Singapore, in 2011. The constraints of manpower precluded the establishment of a dedicated hand surgery OR nursing staff. The challenges faced by senior nursing staff with time and manpower constraints was to develop an on the job training program that was universally accessible, learner centered and controlled and to ensure patient safety and quality care. Using instructional design principles and founded on Bandura's theory of social observational learning, an Open Educational Resource (OER) in video format for Endoscopic Carpal / Cubital Tunnel Release surgery was designed, developed and deployed on the YouTube channel of the department for universal access. The OER was deployed on the department YouTube channel and on the local server to ensure universally access to all personnel for anywhere and anytime on demand self-paced OJT in hand surgery.

Results Evaluation of this model and the OER for OJT was measured using validated instruments including a 10 point examination of the knowledge retained and the usability of the OER with a validated System Usability Scale (SUS). The effectiveness of the model was evaluated using a survey questionnaire of the participants.

Conclusions This model was found to be able to improve the competency of the OR nurses and was found to be useful, usable and effective for OJT. This can be adopted for many other complex procedures in future after testing.

A SIMPLE AND EFFECTIVE ELASTIC BAND TOURNIQUET IN PAEDIATRIC UPPER LIMB SURGERY

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Aim Paediatric upper limb surgery needs fine tissue handling in a bloodless surgical field. The standard pneumatic tourniquets do not cater for all limb circumferences and are often ineffective. We describe and report our experience with a simple, safe, and effective elastic band tourniquet technique using a Penrose tubing.

Method This technique was applied to 113 paediatric patients for upper limb surgery from January 2011 to Dec 2014, in a single institution. The age range is 6 months to 5 years. A variety of procedures utilizing this technique was performed by our senior author. Tourniquet time ranged from 30 to 109 minutes in a single inflation. The use of the technique was assessed by ease of use and time taken to apply. Its effectiveness was measured by presence of intra-operative bleeding. After removal of the tourniquet, any ill effects such as skin abrasion, constriction, or blistering were recorded. At first post-operative review in four days, the limb is assessed for presence of paralysis.

Results In all cases, the tourniquet was effective with no intra-operative bleeding. Upon release, there is a return of distal circulation followed by a transient period of hyperemia. The skin constriction resolved within five minutes. No skin complications or oedema had occurred. On routine evaluation post-operatively, there was no paralysis. This exceedingly safe record is maintained at the time of writing – up to four years of follow-up period

Conclusion The technique described is easy to use, safe and inexpensive. We propose for widespread use in the suitable paediatric patient, with strict adherence to technique and principles of tourniquet use.

VALIDATION OF THE PERCEIVED STRESS SCALE IN PATIENTS WITH HAND INJURY

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Objective: The purposes of this study was to validate construct validity and convergent validity of the Perceived Stress Scale (PSS) with 14 items (PSS-14).

Methodology: Workers with hand injury were recruited to participate in this study. The participants filled in the PSS-14 and the World Health Organization Quality of Life-BREF (WHOQOL-BREF) during hospitalization. We validated the construct validity by confirmatory factor analysis (CFA; a model consisting of self-regulation domain and perceived stress domain), examined the convergent validity with every domain of the WHOQOL-BREF using Pearson's r.

Results: A total of 242 patients with hand injury participated. The model fitting was unsatisfied because the factor loading of item 12 in perceived stress domain was 0.02, which was much lower than the criterion (0.3). In addition, item 7 had a factor loading on self-regulation domain far from the other items (0.31 vs. 0.79-0.93). We removed these two items, re-conducted CFA, and found item 14 had a factor loading = 0.28 in perceived stress domain. We then removed item 14 and the CFA showed acceptable model fitting: $\chi^2 / df = 2.68$; root mean square error of approximation = 0.08; standardized root mean square residual = 0.06; comparative fit index = 0.96; Tucker-Lewis index = 0.95. Factor loadings were >0.36 . The self-regulation domain of the PSS had acceptable convergent validity ($r = 0.38-0.46$); however, the perceived stress domain of the PSS had insufficient convergent validity: no significantly correlated ($r = -0.06$) with the psychological domain in the WHOQOL-BREF.

OTHERS

Conclusions: After removing three items, the PSS showed a two-factor structure with acceptable model fitting. The remained items of the self-regulation domain of the PSS would be useful to evaluate stress of workers with hand injury. However, the items of the perceived stress domain should be used with caution due to insufficient convergent validity.

Key words: hand injury, construct validity, Perceived Stress Scale

THE USE OF ORFICAST INSTEAD OF POP IN CYLINDRICAL CASTING OF CONTRACTURE OF THE PIP JOINTS

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Objective: Plaster cylindrical serial casting of interphalangeal joints of fingers began as an idea in the hand rehabilitation center established in the 1960 in Vellore, India, by Paul Brand. As experienced by Brand, the technique is not one of progressive stretching but of growth. The cells of the contracted tissue are stimulated to grow and become internally rearranged or modified by being held in the maximum possible extension. This is why the process takes time and position must be held for a period of time there is no chance for remodeling to take place in an hour or two. Each day or every other day the joint can be re-casted.

Materials & Methods: In this survey 28 sample with flexion contracture in PIP joint who were referred to for hand rehabilitation, were treated by cylindrical casting method with orficast. Before starting the intervention, all patients were evaluated by T.A.M, flexion contracture and flexion gap. In one month, every other day joints were re-casted, and between casting wax bath, oil massage and exercise were used for the patients. The patients were re-evaluated for their range of motion, contracture and gap.

Results: In re-evaluating mean of T.A.M was superior than first evaluation (from 88.51 to 130.18) mean of flexion contracture was decreased (from 37.59 to 8.14), mean of flexion gap was decreased too (from 4.37 to 2.37).

Conclusion: Findings show that this method is useful for treating flexion contractures without any limitation in range of motion (1-3).

Keywords: Flexion contracture, PIP, Cylindrical casting, Total active motion, orficast

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COMPARISON BETWEEN POSTOPERATIVE DYNAMIC SPLINTING AND ALTERNATING SPLINTING ON A RHEUMATOID ARTHRITIC HAND AFTER ARTHROPLASTY OF METACARPOPHALANGEAL JOINTS: A CASE REPORT

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Introduction: The deformity of the metacarpophalangeal (MCP) joints due to rheumatoid arthritis (RA) makes picking up and firm grasping of objects increasingly difficult. MCP joint arthroplasty using Swanson implants is the current preferred method of treatment. As aftercare, A.B. Swanson recommends the use of dynamic extension splints. However, Burr et al. noted efficacy in the alternate use of flexion and extension static splints. In this study, the efficacy of these types of splinting was

explored through a patient in whom both methods were used in the same area of each hand.

Material and methods: The patient was a 67-year-old man diagnosed with RA 17 years earlier. At the initial MCP arthroplasty of his left hand, he used a dynamic splint for 8 weeks. 9 years after, he had another arthroplasty for his right hand, in this time, MCP flexion and extension static splints were used for 8 weeks.

Results: The range of motion (ROM) in the patient's MCP joint at 12 weeks postoperatively after dynamic splinting was 44° (-6/50) in the ring finger and 28° (-28/56) in the little finger. ROM in the patient's MCP joint at 12 weeks postoperatively after alternating splinting was 70° (-4/74) in the ring finger and 54° (-30/84) in the little finger.

Conclusions: Alternating splinting enabled the patient to acquire more flexion in the MCP joints and increased his ROM. In addition, because the patient acquired increased grip function, he could more effectively use his hand for his activities of daily living (ADL). In this case, alternative splinting produced better results for both ROM and ADL.

SURGERY FOR CONTRACTURE OF THE FOREARM ROTATION DUE TO DISORDERS OF BOTH THE PROXIMAL AND THE DISTAL RADIOULNAR JOINTS

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Limitation of the forearm rotation is caused by problems in the proximal or the distal radioulnar joint. Usually, procedure to either joint improves such limitation. However we had cases in which either procedure to the proximal or the distal radioulnar joint was not effective. In such cases we performed procedures to both proximal and distal radioulnar joints.

Patients and Methods :

Case 1 (Rheumatoid Arthritis); Radial head resection did not improve forearm rotation, therefore we added ulnar head resection.

Case 2 (congenital radial head dislocation); Radial head resection did not improve supination, then we added Baldwin procedure.

Case 3 (neglected radial head dislocation); Release of interosseous membrane and Baldwin procedure did not improve pronation, then we added radial head resection.

Case 4 (congenital radioulnar synostosis); Mobilization done at the age of 5 years did not improve enough rotation. 11 years later, radial head resection and Baldwin procedure were performed.

Results and conclusions : We reexamined patients at mean 6 years 2 months (3 y. 1 m ~ 9 y. 6 m.) after the surgery. Limitation of the forearm rotation was improved in all patients, and they did not complain any feeling of instability in the elbow and the wrist. These results suggest that procedure to both the proximal and the distal radioulnar joints is useful, if either procedure such as radial head or ulnar head resection does not improve contracture of the forearm rotation.

THE EPIDEMIOLOGY OF HAND SURGERY CASES OPERATED AT A TERTIARY REFERRAL CENTRE IN DHAKA.

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Hand surgery in Bangladesh is managed both by orthopaedic and plastic surgeons in tertiary referral centres due to the limited number of hand surgeons available in the country. Tertiary referral centres especially in the city of Dhaka cater for most of the hand surgery patients treated in the country.

OTHERS

Aim In this study we aimed to analyse the epidemiology of patients with ailments and injuries of the hands that were operated in two tertiary referral centres in the city of Dhaka.

Method Data was collected from the surgical register of the DMCH and NITOR, the two main tertiary referral centres in the city of Dhaka, the first is a predominantly plastic surgical unit and the latter in orthopaedic unit. The data was then analysed to see the demography of patients being treated for hand surgical problems and also a Pareto analysis was performed on the operations to determine the common procedures performed at the centres. 2000 cases were collected from the two centres and analysis was performed using Excel 2016.

Results Trauma accounted for a significant portion of cases treated especially at the NITOR and treatment of acute burns and Burns contracture and congenital hand surgery was more common in DMCH. Electrical burns continued to pose a challenge in hand surgery. Infection with neoplasms of the musculoskeletal system of the hand were also common between the two centres. Delay in seeking medical attention both of trauma and congenital cases seems to be common at both centres. Most of the cases were performed by junior doctors to senior registrar level with minimal supervision by consultants. Major cases were conducted solely by consultant level surgeons. The details of the analysis will be presented and the common five conditions for which patients seek treatment will be listed.

Conclusion This is the first time that an analysis of the epidemiology of hand surgery cases in the country of Bangladesh has been performed. We believe this is an important data for public health officials to determine the allocation of resources to ensure better quality of hand surgery care in Bangladesh. Also we believe that this data will help in the development of the community orientated curriculum for the training of doctors in hand surgery practice in Bangladesh.

NEUROPATHY CAUSED BY METAL HYPERSENSITIVITY AFTER PLACEMENT OF STAINLESS STEEL PLATE: A CASE REPORT

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Keywords : Metal hypersensitivity, Stainless steel plate, Ulnar neuropathy

Introduction : Metal hypersensitivity, mostly documented in prosthesis implantation and fracture implants, is a rare complication with neuropathy involvement.

Clinical Course : A case of a forty-two year-old female with ulnar wrist pain, unremarkable physical and radiological findings. Ulna shortening osteotomy with small stainless steel DCP and screw fixation was performed. Post-operative day three, the patient developed pain, swelling, Ulnar neuropathy and flexor tendon contracture, then was later re-operated. Severe adhesion was found around the implant. Minimal skin patch testing reaction and pathological study suggests a cell-mediated delayed type IV hypersensitivity reaction. A Titanium LCP was later implanted in place of the small stainless steel DCP. The patient's clinical status significantly improved afterwards.

Conclusions : Metal hypersensitivity from stainless steel could be manifested as neuropathy and tendinopathy in acute complications after metal implants.

BICIPITORADIAL BURSITIS: ANALYSIS OF 11 CASES

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The bicipitoradial bursa, which locates between the distal end of biceps brachii tendon and radial tuberosity, reduces the friction during supination and pronation of

forearm. The bursitis causes radial or median nerve palsy on some occasion. To elucidate the clinical character of bicipitoradial bursitis, eleven cases of this condition were analyzed. The symptoms, imaging findings, pathological findings and treatment results of 11 patients (3 females, 8 males, 48 to 77 years old, 65.3 years on an average) were retrospectively reviewed. The patients with neurological deficits were evaluated by scoring of the Japanese Society for Surgery of the Hand Version of the DASH (DASH score). The follow-up periods were 6 months to 8 years 2 months, 2 years 10 months on an average. Radial nerve palsy was seen in 3 cases, median nerve palsy in 1, pain in 4, symptomatic mass in 2 and indolent mass in 1. MRI revealed a low signal intensity lesion in T1WI and homogeneous or heterogeneous high signal intensity lesion in T2WI. Conservative treatment was done in 3 cases, and a spontaneous regression of the lesion was seen in 1 case. Operation was done in 8 patients without any recurrent case. Histologically, mild synovitis without distinctive inflammatory cellular infiltration was seen in 6 cases, proliferation of lymphocytes and plasma cells are seen in 1 and tuberculous synovitis was seen in 1. Clinical symptoms were improved in all cases. The average preoperative DASH score was 50.4, and 15.0 postoperatively. However, improvement of the symptoms was not enough in 1 case, which was undergone operation 10 months after onset. The cause of bursitis was possibly repetitive minor trauma in all cases except for the case with tuberculosis. If the patient has some symptoms of radial or median nerve deficit, bicipitoradial bursitis should be kept in mind. Surgical intervention should be done as soon as possible if the patient has some neurological disorders.

POST-EXERTIONAL FOREARM MRI IS USEFUL AS A TOOL FOR DIAGNOSIS AND TREATMENT EVALUATION FOR CHRONIC EXERTIONAL COMPARTMENT SYNDROME OF FOREARMS

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Objective: Chronic exertional compartment syndrome (CECS) is a rare condition. Patients usually asymptomatic at rest, but feel pain due to muscular or neural ischemia caused by elevated intramuscular pressure during exercise. In most cases, Patients are mostly athletes like motorbike racers. We know fasciotomy of their forearm muscles is effective, but there is no fixed criteria for diagnosis and treatment evaluation. We have decided to take pre- and post- exertional forearm MRI before and after fasciotomy since 2013. The purpose of this study is to evaluate the efficacy of post-exertional MRI before and after fasciotomy.

Methodology: We treated 8 forearms of 5 patients diagnosed as CECS of forearms since 2013. Patients consist of 3 motorbike racers 6 forearms, 1 pitcher 1 forearm, 1 manual laborer 1 forearm with the history of muscle contusion. 3 motorbike racers complained of forearm pain and weakness during competition. The pitcher complained of weakness after consecutive pitching. The laborer complained of weakness after fishing or working. We took pre- and post-exertional MRI before and after fasciotomy in all cases. Patients were asked to grip and release continuously using finger gripper for ten minutes, after that, post-exertional MRI was taken. We compared the intensity change on post- exertional MRI and symptom change.

Result: Symptom eased perfectly in all of 3 motorbike racers postoperatively. On post-exertional MRI, T2 high area presented mainly in FDP and brachioradialis disappeared perfectly. On the other hand, Symptom remained in the pitcher and the laborer postoperatively. On post-exertional MRI, T2 high area presented mainly in FDP remained in these two patients. Intensity change on post-exertional MRI correlate with symptom change.

Conclusion: We took pre- and post-exertional MRI before and after operation. The intensity change on post-exertional MRI correlate with patients' symptom change. Post-exertional MRI is useful tool for diagnosis and treatment evaluation.

OTHERS

IMPORTANCE OF INITIAL MANAGEMENT AND SURGICAL TREATMENT AFTER HYDROFLUORIC ACID BURN OF THE FINGER

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Occupational injuries to digits due to hydrofluoric acid (HFA) are frequently encountered. They have distinctive features, including intense pain, progressive tissue necrosis, and possible bone erosion. To minimize tissue damage, it is of great importance to execute prudent preoperative assessment and determine the correct surgical modality to reconstruct and maintain the function of the hand. However, proper protocols for fingers have not been presented in previous studies.

Eight cases with HFA burn to digits were presented to the emergency room. Wounds were immediately irrigated with saline, calcium gluconate was applied topically to block destructive effects of fluoride ions. Blisters that could lead to progressive tissue destruction were debrided. A fish-mouth fasciotomy was performed and prostaglandin was administered intravenously to maintain maximal distal circulation. Wounds were evaluated daily for apparent demarcation for 6 or 7 days. Digits were reconstructed with free sensate second toe pulp-free flap to provide sufficient padding for the fingertip. All patients showed excellent recovery with stable flaps with acceptable external contour, durable soft tissue padding, and full range of motion of affected joints.

In conclusion, when a patient is admitted due to HFA exposure to the finger, early treatment including irrigation, topical neutralizers, and fasciotomy are of great importance to minimize tissue damage. In addition, a physician should wait at least 7 days until the degree of damage to the tissue can be classified so that the physician can decide whether aggressive debridement should be proceeded. In case of deep layer injuries of weight bearing portions such as finger pulp, reconstruction techniques utilizing durable tissues such as partial second toe pulp free flap should be employed.

TITLE: THE EFFECTS OF TAILORED REHABILITATED EDUCATION ON HEALTH LITERACY AND HEALTH STATUS AMONG BREAST CANCER PATIENTS AFTER SURGERY: A RANDOMIZED CONTROLLED TRIAL

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Purpose: The research was devoted developing a tailored rehabilitated education (TRE) to improve health literacy and health status.

Methodology: Single-blind randomized controlled trial comparing tailored rehabilitated education and usual education. Participants: Ninety-nine female (49 in intervention group; 50 in control group) with breast cancer within 1-week of cancer operations and without accepted breast cancer education before. Intervention: Four weekly individual sessions of tailored rehabilitated education programs were intervened to improve the health literacy and health status. Measurements: The primary outcome was the health literacy, assessing by European Health Literacy Survey Questionnaires. The secondary outcomes were six questionnaires evaluating health status of body function and structure, activity, participation, personal factor, environment and quality of life with the measurements of Disability of Arm, Shoulder and Hand, Barthel Index, Frenchay activities, Brief Symptom Rating Scale, return to work, and The EuroQOL five dimensions questionnaire. Results: Our results supported that the TRE produced significant improvement in health literacy

and health status of body function and structure, participation, personal factor, environment, and quality on life. However, there was no significant difference of the activity scores assessed by Barthel Index between two groups. Conclusions: The findings supported the clinical efficacy of TRE in breast cancer patients after surgery. Further implementations of the TRE programs in patients after breast cancer surgery is practical to improve health literacy and health status effectively. Key words: Breast cancer, health literacy, rehabilitation, international classification of function, disability and health, tailored education

TRANSLATION AND VALIDATION OF THE DISABILITY FOR ARM, SHOULDER AND HAND (DASH) IN THE FILIPINO POPULATION

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Introduction: Although the standard medium of instruction in the education system of the Philippines is English, evaluating the functional outcomes of Filipinos using the original DASH may pose problems in understanding certain contexts and activities not familiar in the local everyday language.

Methods: Using the detailed instructions from the Institute for Work & Health's (IWH) Translation Guidelines, the authors with a team of language experts and native speakers of both Filipino and English translated, back-translated and finalized the questionnaire for validation. Thirty five adult patients with traumatic brachial plexus injury were enrolled in the validation stage. For the test-retest reliability, the same questionnaire was given to the patient at least 7 days apart but not more than 14 days. The validated Filipino version of the SF-36 was used as the Gold Standard to determine the construct validity of the translated DASH. We also compared the DASH score (initial) with the SF-36 total and Subscale, validated Brief Pain Inventory Severity and Interference Scale and the Visual Acuity Scale (VAS) for Pain.

Results: There were no major concerns in translating the DASH from English to Filipino. The internal consistency was adequate, using the Cronbach's Alpha was 0.93 (>0.70) with an average inter-item covariance of 0.399. The test-retest reliability was 0.87 (p=0.000). There was no significant difference in testing the validity of the translated DASH against SF-36 total and Subscale, validated Brief Pain Inventory Severity and Interference Scale and the Visual Acuity Scale (VAS).

Conclusions: The translated DASH (PHIL-DASH) questionnaire was internally consistent and showed no difference in testing for test-retest reliability and validity against functional outcome measures and pain scales validated for Filipinos.



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